VOL. 1

Proposed Lease (Water Lease) for the Nāhiku, Keʻanae, Honomanū, and Huelo License Areas

Corrected Final Environmental Impact Statement

September 2021 (Corrected)

Prepared For

Alexander & Baldwin, Inc.
East Maui Irrigation Company, Ltd.

Prepared By

Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

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This Final Environmental Impact Statement and all ancillary documents were prepared under my direction or supervision, and the information submitted, to the best of my knowledge, fully addresses document content requirements set forth in Hawai'i Revised Statutes, Chapter 343 and Hawai'i Administrative Rules, § 11-200-17 and 11-200-18, as applicable.

Keola Cheng

August 26, 2021

Keola Cheng
Director of Planning
Wilson Okamoto Corporation

Date

Environmental Impact Statement Content Requirements Checklist

Final EIS Compliance	HAR 11-200-18 Final EIS Content Requirements	
The Final EIS shall consist of (11-200-18):		
Passim	1	The Draft EIS revised to incorporate substantive comments received during the consultation and review processes
Appendix J to Appendix N	2	Reproductions of all letters received containing substantive questions, comments, or recommendations and, as applicable, summaries of any scoping meetings held;
Chapter 9, Table 9-3	3	A list of person, organizations, and public agencies commenting on the Draft EIS
Appendix J to Appendix N	4	The responses of the applicant or proposing agency to each substantive question, comment, or recommendation received in the review and consultation processes.
Insertions are shown in the color "red" and underlined. Deletions are shown by one line striking through it [~~strike though deletion~~]	5	The text of the Final EIS shall be written in a format which allows the reader to easily distinguish changes made to the text of the Draft EIS

Draft EIS Compliance	HAR 11-200-17 Draft EIS Content Requirements		
	A	The Draft EIS shall contain at a minimum the information contained in this section (11-200-17)	
Executive Summary	B	Summary Sheet with the following	
Executive Summary		1	Brief description of the Proposed Action
Executive Summary		2	Significant beneficial/adverse/cumulative/secondary impacts
Executive Summary		3	Proposed mitigation measures
Executive Summary		4	Alternatives considered
Executive Summary		5	Unresolved issues
Executive Summary		6	Compatibility with land use plans/policies; listing of permits/approvals
Table of Contents	C	Table of Contents	
Section 1.1	D	Statement of Purpose/Need for the Proposed Action	
Chapter 2	E	Project Description with enough detail to evaluate environmental impacts	
Chapter 2, Figs.4-2 to 4, 4-21 to 26		1	Detailed map (USGS topo, Firm, or floodway boundary)
Section 1.2		2	Statement of objectives
Chapter 2		3	General description of action's characteristics:
Chapter 2		a	Technical
Section 4.7		b	Social
Chapter 4		c	Environmental

Section 2.1		4	Use of public funds or lands for the action
Section 2.1.5		5	Phasing and timing of the action
Chapter 4, Figs. 4-1 to 4-41 ~~31~~		6	Summary technical data, diagrams etc. for evaluation of potential impacts
Section 1.3		7	Historic perspective
Chapter 3	F	Rigorous exploration and objective evaluation of alternatives	
Section 3.3		1	No action
Section 3.2		2	Different nature with similar benefits and different environmental impacts
Section 3.2		3	Alternate designs or details
		4	Postponing the action
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Section 4.18.4		4	Related projects in area contributing to possible cumulative effect
Section 2.1.3.1 Section 4.7.2		5	Area's population/growth characteristics & assumptions used to justify the action
Section 4.17 (none)		6	Secondary population/growth characteristics
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[1] This was mistakenly not included in the DEIS.

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Appendix S Historical Industrial Use Table

LIST OF ACRONYMS USED

The following is a list of acronyms and abbreviations used in this Environmental Impact Statement (EIS).

A&B	Alexander and Baldwin, Inc. or collectively Alexander and Baldwin, Inc. / East Maui Irrigation Company, Limited
AIS	Archeological Inventory Survey
ALISH	Agricultural Land of Importance to the State of Hawai‘i
ALUM	Agricultural Land Use Maps
ASCE	American Society of Civil Engineers
BFQ_{50}	A stream’s median base flow
BLNR	Board of Land and Natural Resources
BMP	Best management practice
BWS	County of Maui Board of Water Supply
CDP	Census-Designated Place
cfs	Cubic feet per second
CIA	Cultural Impact Assessment
COL	Conclusions of Law from the CWRM D&O
CSH	Cultural Surveys Hawai‘i, Inc.
CWRM	Commission on Water Resources Management
CWRM D&O	The Commission on Water Resources Management Findings of Fact, Conclusion of Law, and Decision and Order in Case CCH-MA13-01, dated June 20,2018
CZM	Coastal Zone Management
CZMP	Coastal Zone Management Program
DOA	State of Hawai‘i Department of Agriculture
DAR	Division of Aquatic Resources
DBEDT	Department of Business, Economic Development and Tourism
DEIS	Draft Environmental Impact Statement
DEM	County of Maui Environmental Management
DHHL	Department of Hawaiian Home Lands
DLNR	State of Hawai‘i Department of Land and Natural Resources
DOCARE	Division of Conservation and Resources Enforcement
DOE	State of Hawai‘i Department of Education
DOH	State of Hawai‘i Department of Health
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EMI	East Maui Irrigation Company, LLC
EMWP	East Maui Watershed Partnership
EPA	Environmental Protection Agency
F	Fahrenheit
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency

FIRM	Flood Insurance Rate Maps
FOF	Findings of Fact from the CWRM D&O
FY	Fiscal Year
GET	General Excise Tax
GHG	Greenhouse Gas Emissions
GIS	Geographic Information System
GPAD	Gallons per acre per day
gpd	Gallons per day
gpm	Gallons per minute
H_{90}	64% of the median base flow, which generally represents the flow necessary to restore 90% of the habitat in a stream
HAER	Historic American Engineering Survey
HAR	Hawai‘i Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
~~HDA~~	~~Hawai‘i Department of Agriculture~~
HKLD	Hana very stony silty clay loam
HRS	Hawai‘i Revised Statutes
HSA	Historic Structure Assessment
HSHEP	Hawaiian Stream Habitat Evaluation Procedure
HSI	Habitat Suitability Indices
HU	Habitat Units
~~HwC~~	~~Honolua silty clay~~
IAL	Important Agricultural Lands
IFS	Instream Flow Standard
IFSAR	Instream Flow Standard Assessment Reports
IIFS	Interim Instream Flow Standards
IPCC	Intergovernmental Panel on Climate Change
KAP	Kula Agricultural Park
kgal	Thousand gallons
LCA	Land Commission Award
LRFI	Literature Review and Field Inspection
LSB	Hawai‘i Land Study Bureau
LUC	State of Hawai‘i Land Use Commission
m	Meter
MBTA	Migratory Bird Treaty Act
MCC	Maui Country Code
MDWS	County of Maui Department of Water Supply
MECO	Maui Electric Company
Mg	Million gallons
mgd	Million gallons per day
MG/L	Milligrams per Liter
MIP	Maui Island Plan
MISC	Maui Invasive Species Committee
mm	Millimeter
MMMC	Maui Memorial Medical Center
MRC	Marine Research Consultants, Inc.
MTF	Maui Tomorrow Foundation
MW ~~mW~~	Megawatts
NAAQS	National Ambient Air Quality Standards
NAR	Natural Area Reserve
NHLC	Native Hawaiian Legal Corporation

NHO	Native Hawaiian Organizations
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSI	No Significant Impacts
OEQC	Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs
PA	Proposed Action
PacIOOS	Pacific Islands Ocean Observing System
PASH	Public Access Shoreline Hawai‘i
PSP	Public Sector Pension
PUC	Public Utilities Commission
Q_{90}	Low flow/drought conditions
RGB	Rural Growth Boundary
RSLC	Rate of sea-level change
~~rSM~~	~~Stony alluvial land~~
RUP	Restricted Use Pesticides
SA	Significantly Adverse
SB	Significant Beneficial Impact
SBR	Service Business/Single Family Residential
SE	Sea Engineering, Inc.
SIA	Social Impact Assessment
SHPD	State Historic Preservation Division
SLC	Sea-level change
SSURGO	Soil Survey Geographic Database
STB	Small Town Boundary under the Maui Island Plan
STEM	Science, Technology, Engineering, and Mathematics
SWCA	SWCA Environmental Consultants
SWPP	State Water Projects Plan
SY	Sustainable Yield
TIG	The Investigative Group
TMK	Tax Map Key
UBC	Uniform Building Code
UGB	Urban Growth Boundary under the Maui Island Plan
UIC	Underground Injection Control
UHMC	University of Hawai‘i Maui College
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WOC	Wilson Okamoto Corporation
WTP	Water Treatment Plant
WWRP	State Water Resource Protection Plan
WWRF	Wastewater Reclamation Facility

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Summary and Executive Summary

SUMMARY

Project Name:	Proposed Lease (Water Lease) for the Nāhiku, Keʻanae, Honomanū, and Huelo License Areas
Proposing Entity:	Alexander & Baldwin Inc. (A&B) / East Maui Irrigation Company, Limited (EMI), collectively referred to as "A&B"
Approving Agency:	Department of Land and Natural Resources 1151 Punchbowl St., Honolulu, HI 96813 Contact: Mr. Ian Hirokawa
Location:	East Maui
Tax Map Keys:	(2) 1-2-004:005, 007 (por.) (2) 1-1-002:002 (2) 1-1-001:044 (2) 1-1-001:050; (2) 2-9-014:001, 005, 011, 012, 017
Land Area:	33,000 acres (approximate)
Recorded Fee Owner:	State of Hawaiʻi, Department of Land and Natural Resources
Existing Use:	Native forest, existing EMI Aqueduct System and infrastructure ~~Infrastructure~~, otherwise generally undeveloped
State Land Use District:	Conservation
Special Management Area:	License Area is outside of SMA
County of Maui Zoning:	Interim, License Area is completely within the State Conservation District.
Maui Island Plan:	The Maui Island Plan Directed Growth Maps show that there are no Urban, Small Town or Rural Growth areas located within the License Area.
Flood Zone Designation:	Zones X and A
Proposed Action:	Issuance of one long-term Water Lease ~~lease of State land~~ from the Board of Land and Natural Resources (BLNR) pursuant to Hawaiʻi Revised Statutes (HRS) ~~Section~~ § 171-58(c) for *the "right, privilege, and authority to enter and go upon"* the State-owned Nāhiku, Keʻanae, Honomanū, and Huelo license areas *"for the purpose of developing, diverting, transporting, and using government-owned waters"* including the right to go upon those State lands to maintain and repair existing access roads and trails used in connection with the privately owned East Maui Irrigation (EMI) Aqueduct System ~~water aqueduct system~~.

Impacts:	Analysis of the following environmental resource criteria have been addressed in the ~~Draft~~ Final EIS: Physiography Hydrology Natural Hazards Natural Environment Historic and Archaeological Resources Cultural Resources and Practices Socio Economic Characteristics Recreational Uses and Park Facilities Visual Resources Air Quality Noise Hazardous Materials Traffic Public Services and Facilities Infrastructure and Utilities Secondary and Cumulative Impacts
Determination:	By order dated July 8, 2016, the BLNR instructed that "A&B and EMI should proceed with the preparation of an environmental impact statement (EIS) in an expeditious manner as possible." The potential for significant environmental impacts requires the preparation of an EIS.
Agencies Consulted in EIS Process:	See Chapter 9
Planning Consultant:	~~Mr. Earl Matsukawa, AICP~~ Mr. Keola Cheng Wilson Okamoto Corporation Honolulu, Hawaiʻi 96826 Telephone: (808) 946-2277 Fax: (808) 946-2253

EXECUTIVE SUMMARY

Brief Description of the Proposed Action

The Proposed Action constitutes the issuance of one long-term (30-year) Water Lease from the Board of Land and Natural Resources (BLNR) that authorizes the lessee the *"right, privilege, and authority to enter and go upon"* the License Area (defined as the approximately 33,000 acres of State-owned land that contains most of the East Maui Irrigation (EMI) Aqueduct System and the streams diverted by the EMI Aqueduct System) for the *"purpose of developing, diverting, transporting, and using government owned waters"* through the existing ~~East Maui Irrigation (~~EMI~~)~~ Aqueduct System which supplies water to domestic and agricultural water users. The Water Lease, which will be awarded by public auction, will enable the lessee to enter upon lands owned by the State of Hawaiʻi in order to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System, and will allow for the continued operation of the EMI Aqueduct System. It will enable the continuation of conveyance of ~~to deliver~~ water to the County of Maui Department of Water Supply (MDWS) for domestic and agricultural water needs in Upcountry Maui, including the agricultural users at the County-owned Kula Agricultural Park (KAP) and the County's planned 262-acre KAP expansion~~., as well as for the Nāhiku community,~~ The Proposed Action will also ensure the continued delivery of water for the Nāhiku community, which, through the MDWS, draws water sourced ~~between 20,000 to 45,000 gallons per day (gpd), depending on weather,~~ directly from the EMI West Makapipi Tunnel 2 2 (Well No. 4806-07), a development tunnel located on EMI owned land directly adjacent to the Koolau Ditch ~~Aqueduct System~~. It will also allow the continued provision of water to approximately 30,000 acres of agricultural lands (formerly in sugarcane) in Central Maui for Mahi Pono's diversified agricultural operations (which includes agriculture related industrial uses) through the Central Maui Field Irrigation System. ~~where it will be used to support diversified agriculture.~~

In general, the objectives of the Proposed Action are:

- Preserve and maintain the EMI Aqueduct System, including its access roads and trails
- Continue to meet domestic and agricultural water demands in Upcountry Maui
- Continue to provide water for agricultural purposes in Central Maui (specifically, to allow for the full transition of fields previously used for sugar cane cultivation into new, diversified agricultural uses)
- Continue to serve community water demands in Nāhiku

Revisions made between the DEIS and FEIS are: to address public comments on both the text of the EIS and the technical studies, some of which were updated to respond to public comments; to include updated/public information on topics addressed in the DEIS; to provide clarification or expanded explanations of topics covered in the DEIS, often in response to comments received; or to incorporate information from the DEIS appendices into the text of the FEIS.

As explained in the DEIS, the three impact areas that could potentially be affected by the Proposed Action (issuance of a long-term Water Lease) are referred to herein as East Maui, Upcountry Maui, and Central Maui. For clarity, and as further discussed at the start of Chapter 4, the three areas are comprised as follows:

East Maui includes the following:

- The License Area comprised of 33,000 acres of State-owned land that is the subject of the Proposed Action and which contains most of the EMI Aqueduct System and the streams diverted by the EMI Aqueduct System;

- The Collection Area, which includes the License Area, as well as approximately 17,000 acres of privately-owned land mauka and west of the License Area that contributes to water diverted by the EMI Aqueduct System; and,

- Areas generally makai of the EMI Aqueduct System, including a portion of the Hāna Highway, various undeveloped, agricultural and rural areas including the Nāhiku community.

Upcountry Maui includes the following:

- Several communities, including Kula, Pukalani, Makawao Haʻikū, Hāliʻimaile, Waiakoa, Kēōkea, Waiohuli, ʻUlupalakua, Kanaio, Olinda, ʻŌmaʻopio, Kula Kai, and Pūlehu;
- The County-owned KAP and the 262-acre KAP expansion area planned by the County;
- The Upcountry Maui area considered in this FEIS is generally the area serviced by the County of Maui Department of Water Supply's (MDWS) Upcountry Maui Water System, which is estimated to serve over 35,000 people. The County anticipates that the population served by the Upcountry Maui Water System will grow to approximately 43,675 by 2030;
- The applicant has no involvement with any existing or proposed uses at KAP, the KAP expansion area, or in Upcountry Maui; the Proposed Action would merely enable the continuance of conveyance of water to MDWS.

Central Maui includes the following:

- The area comprised of the approximately 30,000 acres of agricultural land that had been cultivated with sugarcane for over a century utilizing water from the EMI Aqueduct System through the Central Maui Field Irrigation System. Geographically, what is referred to as Central Maui encompasses approximately 36,000 acres, but approximately 6,000 acres is comprised of uncultivated areas, including roads, gulches, and patches of uncultivated land;
- In December of 2018 Alexander & Baldwin (collectively EMI and Alexander & Baldwin will be referred to as "A&B") sold the majority of its former sugarcane lands in Central Maui to Mahi Pono,[1] Mahi Pono's objective is to transition as much of the former sugarcane land as possible to diversified agriculture.

[1] MP Central A, LLC, MP Central B, LLC, MP CPR, LLC, MP East A, LLC, MP East B, LLC, and MP West, LLC acquired former sugarcane and watershed lands, including the Central Maui agricultural fields, from A&B in December 2018. In early 2019, MP EMI, LLC acquired a 50% interest in EMI. Agricultural operations are centralized under Mahi Pono, LLC. All such entities are hereinafter referred to, whether individually or collectively, as "Mahi Pono".

No construction activity will be required to implement the Proposed Action in East Maui or to the MDWS systems delivering water from the EMI Aqueduct System. In ~~the~~ Central Maui ~~agricultural fields of Central Maui~~, Mahi Pono will continue to prepare fields and conduct farming operations for diversified agricultural crops. In addition to planting and farming, current ~~Current~~ plans include new accessory structures to support agricultural operations such as washing and packing areas, storage, etc., solar farm(s), and significant investment over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e., the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields), all described in Section 2.1.4 of the FEIS.

Currently, the majority of the Central Maui agricultural fields have not yet been returned to active cultivation. As of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd, most of which is being used in Central Maui.[2] As of November 2020, Mahi Pono projected that that by the end of the calendar year 2021, it could be cultivating the following within Central Maui:

a. 4,920 acres in orchard crops, including lemons, limes, oranges, avocadoes, coffee, macadamia nuts

b. 633 acres in row crops

c. 102 acres in tropical fruits

d. 12,000 acres in cattle operations

As reported to the BLNR in October 2020, Mahi Pono estimates that it will need approximately 32.3 million gallons a day (mgd) of East Maui water, largely for these farming needs in Central Maui, but water will also be used for agricultural processing, historical lessees and uses (including water for pasture, livestock, non-profit irrigation and fire suppression at/around the Puʻunēnē Mill area, including for non-profits and a federal post office, as well as for related uses around the County's Central Maui landfill for quarry, composting, restrooms, dust control), fire protection, reservoirs, dust control, and hydroelectric uses, and for the County of Maui's Upcountry Maui water needs.

Mahi Pono has implemented several soil-beneficial water saving strategies in Central Maui, including:

- Planting windbreaks in the fields.
- Incorporating significant uses of weed mat along plant lines, which will reduce evapotranspiration and erosion.
- Mowing rather than plowing inter-rows to preserve organic matter and keep cover to prevent soil erosion.

[2] The COVID-19 pandemic has resulted in some delays in the projected farming activities and therefore actual water use in 2020 was lower than what Mahi Pono previously projected.

- Operating within the terms of a Conservation Plan from the National Resources Conservation Service, which includes swales and diversions for erosion protection.
- Practicing rotational grazing of livestock.
- Planting permanent tree crops that will develop canopies that will assist with soil moisture retention and reduce evapotranspiration.

In broad terms, at full implementation (estimated for 2030), the Mahi Pono farm plan would consist of:

- Approximately 20,650 acres of irrigated farm land, including 12,850 of orchard crops, 600 acres of tropical fruit, 1,200 acres of row and annual crops, in addition to 800 acres for community garden and limited non-GMO energy crops, and an area for green energy, and irrigated pasture.
- Approximately 13,800 acres of cattle pasture, comprised of 4,700 acres of irrigated pasture, and 9,100 acres of unirrigated pasture.

However, Mahi Pono's farm plan as described in this Final ~~Draft~~ Environmental Impact Statement (FEIS) ~~(DEIS)~~ is, like any responsible farming plan, a fluid and responsive plan that responds to the ever-changing agricultural market demands and the type of agricultural activity to be pursued (i.e., orchard crops, tropical fruits, row and annual crops, energy crops, pasturage etc.), as well as responding to other variables such as the availability and cost of water for crop irrigation, and the need to be sensitive to the existing local farming community. Mahi Pono's goals for its diversified farm plan in Central Maui will be guided by its core principles of using reasonable and environmentally responsible "best management practices" (BMP), planting non-GMO crops, and growing food for local consumption to the extent practicable. Since January 2020, Mahi Pono committed to foregoing the use of Round-Up and other glyphosate-based products within the Central Maui agricultural fields. For the purpose of this FEIS ~~DEIS~~, Mahi Pono's farm plan ~~Farm Plan~~ projects use of the total amount of water available after compliance with the ~~IIFS~~ Interim Instream Flow Standards (IIFS) requirements of the Commission on Water Resources Management (CWRM), as set forth in its Findings of Fact, Conclusions of Law and Decision and Order in CCH-MA 13-01, issued on June 20, 2018 by (CWRM D&O) and continue provision of water to MDWS, although it is understood that the Department of Hawaiian Home Lands (DHHL) also has rights to a ~~will eventually convert its~~ water reservation ~~to active use~~.

Through the CWRM D&O, ~~Independent of the Proposed Action, on June 20, 2018, the Commission on Water Resources Management (~~CWRM~~)~~ issued a decision on 27 petitions ~~Petitions~~ that had been filed in 2001 to establish IIFS ~~Interim Instream Flow Standards (IIFS)~~. The ~~CWRM Findings of Fact, Conclusion of Law, and Decision and Order (~~CWRM D&O~~) in Docket No. CCH MA 13-01~~ established IIFS for numerous streams and tributaries of streams in the License Area, which includes water originating and flowing from both State and privately owned lands within East Maui.[3] The CWRM D&O establishes a quantity of water that must remain in each of the petitioned streams at specified locations. In summary, ~~The~~ the CWRM D&O ordered full stream restoration for 10 streams for taro growing areas and community use, and partial flow

[3] CWRM found that there are 24, not 27, streams that were subject to the IIFS contested case because: (1) Waikani is not a stream but a waterfall of Wailuānui Stream; (2) Alo is a tributary of Waikamoi Stream; and (3) Pua'aka'a is a tributary of Kopili'ula Stream.

restoration on 12 additional streams (Please refer to Section 1.3.4). To inform their decision, the CWRM evaluated each of the petitioned streams individually, analyzing their flow characteristics, instream uses, offstream uses, habitat restoration potential for fish and other stream animals, recreational opportunities, and scenic values. Then the streams were looked at in an integrative approach with consideration for the overall ecological ramifications of the decision. The CWRM also considered the economic ramifications of its decision on offstream uses, with a specific focus on supporting public uses such as drinking water, as well as diversified agriculture. Compliance with the June 2018 CWRM D&O requires modifications to many of the stream diversion works that are part of the EMI Aqueduct System, to achieve the partial and full flow restoration ordered. These compliance requirements must be met irrespective of whether the Water Lease issued.

The maximum amount of water that can be awarded through the Water Lease is what is available for diversion after implementation of the CWRM D&O. Hence, with the issuance of the Water Lease under the Proposed Action, the EMI Aqueduct System would divert only the maximum allowable amount after compliance with the CWRM D&O from streams within the License Area, which is estimated to be approximately 87.95 mgd. The EMI Aqueduct System is estimated to divert an additional 4.37 mgd from the point that it leaves the License Area at Honopou Stream and collects water from streams on privately owned land to its last diversion at Maliko Gulch. Thus, an estimated total of approximately 92.32 mgd of surface water would be conveyed through the EMI Aqueduct System for uses described herein.

Surface Water Supply and Allocation

Water Available at Māliko Gulch	92.32 mgd
Water Allocations (MDWS Upcountry Maui Water System, KAP and KAP Expansion)	7.1 mgd
Gross Total Potentially Available for Central Maui Agricultural Fields	**85.22 mgd**

Members of the public report that East Maui, specifically the License Area, has already been affected by increased stream flows resulting from less offstream diversions due to the closure of sugar operations in December 2016, even with the subsequent incremental increase in water use by Mahi Pono. While a lesser amount of surface stream water is currently being diverted through the EMI Aqueduct System relative to what would be allowed should the Water Lease be awarded per the Proposed Action, even under the Water Lease the amount of water permitted for diversion will be substantially less than the amount that was diverted during normal sugar production. For example, in 2006 it is estimated that the EMI Aqueduct System delivered approximately 156.69 mgd at Māliko Gulch, whereas under the CWRM D&O, it is estimated that the delivery at Māliko Gulch will be approximately 92.32 mgd (Please see Section 2.1.2).

The amount of water awarded by the Water Lease is also subject to all applicable requirements under Hawaiʻi Revised Statutes (HRS) § 171-58, which articulates terms for the disposition of a water lease. HRS § 171-58(e) requires that any new lease of water rights "shall contain a covenant that requires the lessee and the department of land and natural resources to jointly

develop and implement a watershed management plan. The board shall not approve any new lease of water rights without the foregoing covenant or a watershed management plan." At the time of the DEIS publication, ~~The~~ the content and parameters of a watershed management plan for a water lease ~~related to the proposed Water Lease~~ were ~~are~~ unresolved ~~at this time~~. However, on October 11, 2019, the BLNR approved the minimum content requirements for a watershed management plan. A copy of the BLNR-approved DLNR report is attached as Appendix O-1 and the components of an acceptable watershed management plan are outlined in Section 2.1. However, the specifics of the watershed management plan in connection with the proposed Water Lease are yet to be determined, but will be resolved before the BLNR can issue the Water Lease.

The Water Lease is also subject to the rights of the DHHL to reserve water sufficient to support current and future homestead needs as provided by ~~Section~~ § 221 of the Hawaiian Homes Commission Act. The reservation request approved by the Hawaiian Homes Commission in May 2019 related to the EMI Aqueduct System is for 11,455,510 gpd (which is comprised of 10,428,000 gpd of non-potable water for Kēōkea-Waiohuli and 1,027,510 gpd of non-potable water for Pulehunui), which is consistent with the amount of the DHHL reservation identified in the DEIS. At this point, the DHHL reservation has not yet been acted upon by the CWRM, and the exact timing for when the DHHL will make use of any reservation or portions thereof is not known. Until that reservation is physically claimed, however, it is assumed within the assessment of this EIS that the water will remain available for use by the lessee under the Water Lease.[4] However, as detailed in Section 2.1.1, the DHHL has cautioned that in light of the fact that no water leases have been issued under HRS § 171-58, and the manner in which reservations are to be actualized has yet to be determined, in addition to any specifications made by the CWRM and BLNR regarding the Water Lease, a separate agreement between the lessor and the DHHL will be necessary to allow any temporary use of water reserved for DHHL.

Alternatives Considered

Various alternatives that could potentially achieve the objectives of the Proposed Action were evaluated, regardless of their cost and with particular attention to those that could enhance the environment or minimize adverse environmental effects. Some of these alternatives were considered but dismissed as they were not feasible or would intensify adverse environmental effects. Those alternatives that were considered feasible were comparably evaluated with the Proposed Action (See Chapter 3).

Alternatives considered but dismissed included certain water source alternatives which have been revisited and evaluated further in this FEIS in response to comments on the DEIS, including use of groundwater and use of reclaimed water, as well as additional water storage, and desalination. A change of ownership of the EMI Aqueduct System was similarly considered but continued to be dismissed from further study, even after examination of Temporary Investigative Report (See Appendix Q) prepared by County Board of Water Supply (BWS) Temporary Investigative Group after the publication of the DEIS that explores options for ensuring public access to water, including the feasibility of purchasing and maintaining the EMI Aqueduct System.

[4] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture.

The reasonable alternatives that were comparatively analyzed with the Proposed Action were the: (1) Reduced Water Volume Alternative, where the Water Lease would be issued allowing the lessee to use less water than is permitted under the CWRM D&O; (2), Water Lease with Different Terms, which consists of two scenarios, (a) an Alternative Lease Duration scenario, where the Water Lease would be issued for a term of years other than the 30 years contemplated under the Proposed Action; and (b) the Modified Lease Area scenario, where the Water Lease would allow the use of the same amount of water as under the Proposed Action, but the geographic boundaries of the License Area ~~Lease Area~~ would be reduced in size sufficient only to maintain the public safety and integrity of the EMI Aqueduct System and to allow an increase in public access into the watershed area for recreational and cultural purposes, depending upon the access protocols that the State, the landowner, establishes. It should be noted that the 2020 revocable permit, as well as the 2021 revocable permit, removed the Hanawī Natural Area Reserve (NAR) from the License Area. Hence, it is assumed that the Hanawī NAR would be not be part of the License Area under the Proposed Action. However, it is unlikely that the removal of the Hanawī NAR from the License Area would result in additional public access to that area, as the NAR rules restrict public access. This may not be true for other areas that the BLNR may ultimately decide to withdraw from the License Area for the purposes of the proposed Water Lease. The No Action (aka No Water Lease) alternative, where the EMI Aqueduct System would only divert approximately 30% of the water available from the Collection Area[5], plus the water presently diverted from streams on private lands beyond the License Area, was also analyzed.

Under the No Action alternative significantly less East Maui stream water would be available for diversion through the EMI Aqueduct System. It is estimated that the resulting amount of water that would be available for irrigation purposes in Central Maui is 29.72 mgd (versus the 82.33 mgd anticipated under the Proposed Action). Mahi Pono prepared a conceptual No Action, i.e., no Water Lease farm plan that would provide significantly less irrigated farm land, and therefore significantly fewer crops. At full operations, the No Action alternative farm plan includes:

- 9,080 acres of irrigated farm land, including 200 acres of tropical fruit, 4,180 of orchard, 400 acres of row and annual crops, in addition to 300 acres for a community farms and space for limited non-GMO energy crops.
- 24,470 acres of cattle pasture, comprised of 3,800 acres of irrigated pasture, and 20,670 acres of unirrigated pasture
- 11,570 unirrigated acres will have limited agricultural utility. Mahi Pono will likely have to find alternative uses for this property, including utilizing the property for unirrigated pasture.

The table below compares the farming proposed by Mahi Pono should the Water Lease be issued versus the farm plan without the Water Lease.

[5] The Collection Area refers to the approximately 50,000 acres of land from which the surface water is collected. Of those 50,000 acres, approximately 33,000 acres are owned by the State of Hawai'i, and the remaining approximately 17,000 acres are privately owned.

Mahi Pono Farm Plan Water Lease vs. No Water Lease						
Proposed Use	**Acres**		**GPAD**		**Surface MGD**	
	Water Lease	No Water Lease	Water Lease	No Water Lease	Water Lease	No Water Lease
Community Farm	800	300	3,392	3,392	1.89	0.70
Orchards (citrus, mac nuts, beverage crops)	12,850	4,180	5,089	5,089	53.36	17.36
Tropical Fruits	600	200	4,999	4,999	2.13	0.69
Row and Annual Crops	1,200	400	3,392	3,392	3.12	1.15
Energy Crops	500	200	3,392	3,392	1.18	0.47
Pasture, irrigated	4,700	3,800	1,161	1,161	4.20	3.40
Pasture, unirrigated	9,100	20,670	0	0	0	0
Green Energy	250	250	0	0	0	0
TOTAL	30,000	30,000	2,745	991	65.88	23.77

Significant Beneficial and Adverse Impacts (Including Cumulative and Secondary Impacts)

The Water Lease would allow the use of government-owned waters from the License Area through the EMI Aqueduct System. Use of that surface water would allow the continued provision of water to enable approximately 30,000 acres of farmland in Central Maui to remain in agriculture and continue to transition to diversified agriculture under the Mahi Pono farm plan.

The Water Lease would also allow the continuation of a supply of water to the MDWS, which in turn provides water for domestic and agricultural water needs in Upcountry Maui, including agricultural users at KAP and the planned 262-acre KAP expansion, as well as for the Nāhiku community. ~~,~~ These continued water deliveries are ~~which draws 20,000 to 45,000 gallons per day, depending on weather, directly from the EMI~~ premised upon EMI's continued receipt of permits or a lease from the State BLNR.

In response to comments on the DEIS, a further analysis of the impacts of the Proposed Action on East Maui farming was undertaken. (Please see Section 4.7.4). In summary, under the Proposed Action, in compliance with the CWRM D&O, 10 acres were added to the truck-crop acreage identified in the CWRM D&O and in the DEIS (i.e., the number was increased from 35 acres to 45 acres), and 10 acres were added to the taro farming areas identified in the CWRM D&O and the DEIS (i.e., the number was increased from 45 acres to 55 acres). These increased projections account for (1) the possibility that CWRM D&O may have missed some farm areas that would be

feasible to cultivate, and (2) an increase in taro farming could result in more truck farming by taro farmers who supplement their income by using flow-through water to irrigate other crops.

The MDWS~~'s~~ Upcountry Maui Water System is the second largest in the County. It services the communities of Kula, Pukalani, Makawao Haʻikū, Haliʻimaile, Waiakoa, Kēōkea, Waiohuli, ʻUlupalakua, Kanaio, Olinda, ʻŌmaʻopio, Kula Kai, and Pūlehu. The Upcountry Maui Water System is estimated to serve over 35,000 people, and the service area includes several businesses, churches, Kamehameha Schools, Hawaiian Homelands and government facilities. The County anticipates that the population served by the Upcountry Maui Water System ~~system~~ will grow to approximately 44,000 ~~43,675~~ by 2035 ~~2030~~. Continued water service to the MDWS through the EMI Aqueduct System as anticipated under the Proposed Action provides a significant cost avoidance benefit to the County of Maui because the costs of developing new wells is significant. There are also beneficial agricultural and fiscal impacts related to the continued water service to the Upcountry Maui Water System. It is estimated that under the Proposed Action approximately 1,510 acres of land in Upcountry Maui would be farmed by 2030, generating crops sales and new jobs as discussed in Section 4.7.3 and Section 4.7.4.

Moreover, the proposed Water Lease will ensure that the EMI Aqueduct System, which enabled the cultivation of naturally non-arable lands in Central Maui, will be maintained to continue to serve the community, continue Maui's rich agricultural heritage, and to enhance the sustainability and diversity of Maui's, as well as the State's economy. Mahi Pono's objective is to continue to transition as much of the former sugarcane land as possible to diversified agriculture. Under the Proposed Action, the utilization of waters delivered from the EMI Aqueduct System will be an essential element to the success of any such diversified agricultural pursuits. Several benefits arise from the Mahi Pono farm plan under the Proposed Action ~~proposed diversified agriculture in Central Maui~~.

Assuming a 10-year development period for the Mahi Pono farm plan with the proposed Water Lease, the total development expenditures would be about $214.7 million, or an average expenditure of about $21.5 million per year. Indirect sales associated with development activities are estimated to be $18.5 million per year for a total of $39.9 million per year, of which $33.5 million would be on Maui and $6.5 million on Oʻahu. Profits on development activity and indirect sales would be about $4.0 million per year.

Direct and indirect employment associated with the development activities to implement the farm plan would average about 326 jobs, of which 285 jobs would be on Maui and 42 jobs on Oʻahu. Actual employment would vary over the 10-year development period. Payroll for the direct and indirect jobs would average $14.5 million per year and these jobs would support an estimated 730 residents.

Fiscal impacts would generate an average of about $1.9 million per year in State taxes, for a 10-year cumulative total of about $18.6 million, less the solar farm State subsidy of $500,000 per 1 MW of generating capacity. State tax revenues from development activities less the energy subsidy would result in a cumulative loss of about $100,000 (with rounding).

The County of Maui would derive negligible tax revenues from the anticipated development activity and the City and County of Honolulu would derive cumulative excise tax surcharges of about $1.0 million.

At full implementation and operations, the Mahi Pono farm plan is projected to generate more than 338 million pounds per year of crops, generating $155.9 million per year in annual food sales and $329.5 million per year in combined direct and indirect sales. Pastures will support some 7,300 cow-and-calf animal units, producing over 4,300 calves per year and together with crop sales will result in total farm sales of about $160.7 million per year. The 32.5 MW solar farm(s) would generate revenues of about $8.2 million per year. The Mahi Pono farm plan is also anticipated to create some 790 jobs on-site (approximately 160 more than provided by sugar operations in 2006) and another 350 indirect jobs for a total payroll of $45.3 million per year. This is projected to support 2,550 ~~Maui~~ residents and generate $4.5 million per year in State revenues through taxes by 2030. Property taxes paid by to the County of Maui would be about $800,000 per year, and the City and County of Honolulu would derive about $140,000 per year from the excise tax surcharge. These benefits far outweigh economic and fiscal impacts generated by the Mahi Pono farm plan under the No Action alternative (i.e., the farm plan with no Water Lease). The tabulation below compares the benefits generated from the Mahi Pono farm plan under the Proposed Action versus the No Action alternative Mahi Pono farm plan (further discussed in Section 3.4.13).

Mahi Pono Farm Plan At Full-buildout and Operation		
Economic and Fiscal Impact Categories	**Proposed Action (Issuance of Water Lease)**	**No Action (No Water Lease)**
Food Production	338 million pounds/year	110.5 million pound/year
Annual Food Sales	$155.9 million/year	$51.3 million/year
Cattle Revenue	$4.8 million/year	$6.3 million/year
Solar Farm Revenue	$8.2 million/year	$8.2 million/year
Indirect Sales/year	$160.7 million/year	$57.7 million/year
Total Direct and Indirect Sales	$329.5 million/year	$123.5 million/year
Direct Jobs	790	270
Indirect Jobs	350	120
Payroll (Direct and Indirect)	$45.3 million/year	$15.6 million/year
Number of Maui Residents Supported	2,550	880
State Taxes Collected	$4.5 million/year	$1.7 million/year
City and County Taxes Collected	$140,000/year	$50,000/year
County of Maui Property Tax	$800,000/year	$650,000

Generally speaking, ~~Diversified~~ diversified agriculture will increase the amount of local food production and enhance Hawai'i's food security. The Mahi Pono farm plan also includes a utility scale renewable energy component that will further Hawai'i's goals of having 100% renewable energy by 2045. Diversified agriculture in the 30,000 acres in Central Maui will also keep the fields open and green, which is something many view as beneficial, and is consistent with State and County planning and zoning (See Chapter 5).

The amount of water available through the Water Lease will be limited by the IIFS established under the CWRM D&O. Therefore, the cumulative effect of the Water Lease includes the implemented CWRM D&O.

- The CWRM ordered that all diversions on the following streams cease to primarily allow for all water to flow to the taro growing areas or for community and non-municipal domestic uses: Honopou, Huelo (Puolua), Hanehoi, Pi'ina'au, Palauhulu, Waiokamilo, Wailuānui, Waiohue, West Wailuāiki,[6] and Makapipi. (CWRM D&O, at 268-269). All diversions for these streams are required to be modified so that no out of watershed transfers will occur from these streams, which will have uninterrupted free flowing water to the communities that depend upon them. It was not the CWRM's intent to regulate where and how much water will be used for traditional kalo agriculture or how the water will be apportioned amongst the kalo lo'i. The CWRM's approach does not automatically set precedents for other areas, but provides a model of water use that integrates traditional culture with modern natural resource management (CWRM D&O, Conclusions of Law (COL) 138-145).

- The CWRM ordered full and partial restoration of streams it concluded to have the potential to benefit greatly from the restoration of flow to 64% of the median base flow (BFQ_{50}), which generally represents the flow necessary to restore 90% of the habitat in a stream (H_{90}), based on the biological diversity and habitat that already exists. Restoration of these streams (Pi'ina'au, Wailuānui, Honomanū, Waikamoi, Nua'ailua, East Wailuāiki, Kopiliula, and Waiohue) was ordered to allow the stream species to flourish and reproduce, benefitting not only the natural environment but also allowing for better opportunity for the exercise of traditional and Hawaiian right (CWRM D&O, COL 131). -

- The CWRM concluded that West Wailuāiki (that was ordered for full restoration) presents a unique research opportunity to collect valuable information regarding the impact of full restoration of a stream versus habitat restoration (H_{90}). East Wailuāiki (that was ordered for H_{90} restoration) and West Wailuāiki lie in close proximity to each other and have similar biological values and similar habitat biota. Therefore, the CWRM intends for these two streams to be studied in the future in combination with one another to see the impact, if any, of full restoration versus habitat restoration (CWRM D&O, COL 135).

- Honomanū Stream, which was ordered for H_{90} restoration above Hāna ~~Hana~~ Highway, is a gaining stream from above the Lower Kula Ditch to Spreckels ~~Spreckles~~ Ditch. Below the ~~Spreckles~~ Spreckels Ditch it becomes a losing stream most likely as a result of the

[6] West Wailuāiki was ordered to be fully restored because it presented a unique research opportunity to collect information on full restoration vs partial (H_{90}) restoration of nearby East Wailuāiki Stream which has similar biological values and similar habitat and biota.

diversion. Honomanū Stream, despite having several diversions on it, has a high biological rating with a potential for high natural habitat gains with the restoration of flow to the dry reaches. Thus, the CWRM concluded that Honomanū Stream should have full streamflow restoration below the Lower Kula Ditch diversion, which provides water for the MDWS system that is used for domestic and agricultural uses. (CWRM D&O, COL 136).

- Various streams within the License Area have gaining streams and no additional release of water past the diversions are believed necessary to maintain habitat below the diversions. These streams should allow for a minimum connectivity flow across diversion structures to allow for passage of biota upstream. (CWRM D&O, COL 30). ~~low biological ratings and or do not have the potential to improve drastically with increased flows~~. These streams were set at connectivity flow which is twenty percent (20%) of the instream flow (CWRM D&O, COL 30). Streams that are set at connectivity flow are: Kapā'ula, Pa'akea, Pua'aka'a, Puohokamoa, Ha'ipua'ena, Nua'ailua, and Hanawī. (CWRM D&O at 268-269). None of these streams have registered diversions for taro cultivation nor is there taro cultivation known to occur on these streams (CWRM D&O, COL 147).

- The CWRM acknowledged that in the context of a proceeding to set IIFS, it does not have the authority to determine how much water may be used for noninstream use for municipal and agricultural uses. That authority lies with the BLNR in issuing a water lease pursuant to HRS § 171-58, subject to the IIFS set by the CWRM. (CWRM D&O, COL 148). Recognizing that the noninstream uses, especially municipal use, are valued uses, the CWRM set the IIFS to allow the MDWS to continue to divert water through its Upper and Lower Kula Pipelines. (CWRM D&O, COL 149). In not requiring full restoration of all streams, the CWRM has allowed some streams to continue to be diverted so that the BLNR may continue to license the diversion of water not needed to meet the IIFS from those streams for noninstream use. The available water would also include freshets and stormwater which are not included in the calculation of the IIFS. (CWRM D&O, COL 150).

- The CWRM recognized that the EMI Aqueduct System remains a valuable asset that delivers noninstream public trust benefits, such as drinking water, as well as other reasonable and beneficial uses. The reduction in diversions does not, by itself, compromise the structural integrity of the EMI Aqueduct System so long as it continues to be maintained as a single coordinated system. The CWRM considered factors that contribute to the operational capacity of the existing EMI Aqueduct System by allowing some water diversions from streams in the higher elevation eastern portion of the watershed. (CWRM D&O, COL 151).

The diversion of surface waters from the License Area in East Maui to the agricultural fields in Central Maui under the Proposed Action, as well as delivery water to the MDWS ~~to service Upcountry Maui and Nāhiku~~, would not involve the construction of any new facilities, hence, it is not anticipated that there would be any unavoidable impacts or probable adverse effects related to development and construction. Past access into the License Area to construct the EMI Aqueduct System may have resulted in the inadvertent introduction of invasive species. In the future, with continued access for maintenance of the EMI Aqueduct System, the possibility of inadvertently introducing additional invasive species remains.

In the Proposed Action, the amount of water that can be conveyed by the EMI Aqueduct System will be limited to the amount available after compliance with the CWRM D&O. The CWRM D&O

limits the amount of water that can be diverted, particularly when streams in the License Area are naturally running low during seasonally dry weather conditions. Hence, the amount of water that can be diverted during dry weather conditions would be substantially less than when sugar was being cultivated. As a result, dependence on groundwater resources during such conditions may increase and/or water conservation measures may be required. Future climate change could also exacerbate the frequency and length of periods of low rainfall.

The Water Lease will authorize the use of diverted surface water, resulting in certain streams having less flow than under natural conditions. However, the Water Lease will also be subject to the CWRM D&O, which identified the streams most important for biological habitat purposes and mandated certain minimum flows to support those streams. As such, the biological impacts of the Water Lease are far less than the impacts that were in place at least since the time of the completion of the EMI Aqueduct System (in 1923), if not even earlier, e.g. the completion of the first portion of the EMI Aqueduct System in 1878. As discussed in Section 4.2.1, the License Area will see an overall increase in habitat units (HU) for native stream species when compared to historical diversion rates. Specifically, the License Area will see an overall increase of 13.8 percent in available HU under the Proposed Action when compared to historical diversions under sugarcane operations. Conversely, the License Area will see an approximate 36.1 percent decrease in available HU under the Proposed Action when compared natural flow conditions (meaning conditions assumed to have existed prior to the construction of the EMI Aqueduct System) as assessed by the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model (Please see Appendix A).

Additionally, Mahi Pono's proposed agricultural operations include implementing ~~a~~ high-efficiency irrigation systems to reduce water usage. Therefore it is anticipated to use less water than what was previously used during sugarcane operations, thereby leaving more water in the streams. However, by using less surface water to irrigate the Central Maui agricultural fields, it is expected that there will be a lower level of groundwater recharge to the region's groundwater aquifers as discussed in Section 4.2.2. Consequently, the lower level of groundwater recharge in combination with periods of lower rainfall, could result in lower levels of groundwater supply in the Central Maui aquifers. Beneficial impacts to the soils in Central Maui are expected as they are improved through the removal of volunteer (i.e., rogue) sugarcane and weeds, and related soil preparations for diversified agriculture. These preparations include the application of effective micronutrients, plastic removal, pH adjustments, and the application of organic matter as discussed in Section 4.1.2.

Mitigation Measures

The current floristic, fauna, and invertebrate conditions in License Area are a result of more than 100 years of impacts from use and management of the EMI Aqueduct System and access roads and trails. As a result, these areas are not pristine. Generally, EMI's anticipated activities within the License Area in connection with the proposed Water Lease will be limited, and take place within the same areas that EMI has been accessing for decades. As such, activities related to EMI's maintenance of the EMI Aqueduct System are expected to have insignificant impacts. However, it should be noted that the native forest habitat becomes progressively more extensive and of higher ecological integrity as one moves towards the eastern portions of the License Area. The native species richness in the stream communities follows a similar west-to-east progression. Thus, more stringent mitigation measures should be followed in these areas of the License Area.

With regard to the maintenance of the EMI Aqueduct System, when maintenance activities are undertaken within the License Area in pristine areas, such as on cliffsides, near waterfalls, or in other native species dominated areas, the following avoidance and minimization measures

identified in the East Maui subsection of Section 4.4.1 and 4.4.2 are recommended and have been updated with the USFWS and DLNR recommendations made in response to the DEIS.[7] ~~will be employed:~~

- ~~A qualified biological monitor should be on site to ensure that no listed or candidate species are impacted.~~
- ~~The monitor should have familiarity with the plants of the area, including special-status species, familiarity with natural communities of the area, including special-status natural communities, experience conducting floristic field surveys, and experience with analyzing impacts of development on native plant species and natural communities~~
- ~~To avoid the introduction or transport of new invasive plant species into more pristine portions of the License Area during EMI Aqueduct System maintenance activities, all equipment and vehicles arriving from outside the License Area should be washed and inspected prior to any maintenance activities on cliff sides, near waterfalls, and in other native species-dominated areas in the License Area. Such washing and inspecting should be done at a designated location.~~
- ~~Construction materials arriving from outside Maui should also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles, and insects). When possible, any raw materials used in maintenance activities should be purchased from a local supplier on Maui to avoid introducing non-native species not present on the island. Inspection and cleaning activities should be conducted at a designated location. The inspector must be a qualified botanist/entomologist able to identify invasive species that are of concern relevant to the point of origin of the equipment, vehicle, or material.~~

It is noted that EMI has worked closely with the Maui Invasive Species Committee (MISC) to assist in mitigating non-native weeds along with the EMI Aqueduct System and access roads and has committed to continuing to work with MISC in order to institute more stringent protocols for equipment sanitization and protection of the License Area.

As it relates to Central Maui, Mahi Pono will clear the former sugarcane fields in Central Maui to transition to a diversified farm operation. Applicable BMPs and erosion control measures will be implemented to ensure no adverse impact to the existing geology and topography. Once diversified farming commences, appropriate BMP and erosion control measures will be used to comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules (HAR) , Chapter 11-54 and HAR, Chapter 11-55 Water Pollution Control, Department of Health. The Mahi Pono farm team, as well as its lessees, follow BMPs approved by the State of Hawai'i Department of Health (DOH), NRCS, the Environmental Protection Agency (EPA), and other governmental agencies in the use of chemicals, and controlling dust and erosion and runoff associated with their farming activities. As it relates to agricultural chemicals for diversified agriculture, usage would be in strict compliance with federal regulations and will follow BMPs approved by the DOH, NRCS, the EPA, and the State of Hawai'i Department of Agriculture (DOA) and other governmental agencies. Mahi Pono will exercise due care to prevent the release of fuels, lubricants and other hazardous materials. Mahi Pono intends to use a limited amount of fertilizers and pesticides in accordance with all laws and regulations and only on an as-needed

[7] In the interest of brevity within an Executive Summary, the partial listing of mitigation measures that was provided in the DEIS Executive Summary has been deleted, and the reader is directed to the more detailed and specific listing of measures within the East Maui subsections of Sections 4.4.1 and 4.4.2.

basis. (Please see, e.g., Section 4.10, 4.12) Additionally, as previously mentioned, since January 2020, Mahi Pono has also committed to foregoing the use of Round-Up and other glyphosate-based products within the Central Maui agricultural fields. In addition, Act 45 which was passed by the 2018 Hawai'i Legislature and effective on January 1, 2019 required that all Certified Applicators of Restricted Use Pesticides (RUP) submit a report of the RUP that were applied each year. The proposed structures to support Mahi Pono's agricultural operations will obtain all applicable permits and approvals for site preparation and building construction, including the National Pollutant Discharge Elimination System permit for the management of storm water during construction. No significant changes to existing drainage patterns or systems within Central Maui are anticipated.

In Upcountry Maui, when ~~When~~ water service is provided to the planned 262-acre expansion of the KAP, grading and grubbing work prior to cultivation will disturb soils but with intent of facilitating cultivation and to conserve soil and water. The County will be responsible for complying with all applicable permit requirements.

The Cultural Impact Assessment (CIA), prepared by Cultural Surveys Hawai'i, Inc. (CSH), suggests that cultural informants may have an unclear understanding of how the CWRM D&O and the awarding of the Water Lease may affect cultural resources and practices. However, it should be acknowledged that due to the reluctance of many to participate in the CIA consultation prior to the publication of the DEIS, much of the information relied upon in the CIA is documentation that was provided to the CWRM during the IIFS proceedings, and therefore is information that was given some years before the issuance of the CWRM D&O. In the CIA published with the DEIS, CSH described potential impacts to the regional environment, taro farming, freshwater ecosystems, and cultural sites. To address impacts to the regional environment, taro farming, and freshwater ecosystems, the CIA looked to other qualified environmental professionals who had prepared studies in support of the DEIS to offer recommendations for mitigation measures. CSH also relied on pertinent information from the CWRM D&O and the voluminous filings that had been made by the parties in the IIFS proceeings. Based upon post-DEIS consultation, the CIA also discusses in more detail two potential additional impacts (access by cultural practitioners and climate change), as requested by comments on the DEIS. The mitigation measures provided in the CIA, summarized below, have the potential to mitigate impacts of the Proposed Action on cultural resources, practices, and beliefs. ~~Nevertheless, the CIA provides recommendations, some of which are addressed through the preparation of this DEIS~~

- A qualified professional should address questions or clarification on the regional environment regarding stream flow, water diversion impacts, and climate statistics.
    - To the extent of analyzing the Proposed Action, the FEIS ~~DEIS~~ addresses these concerns in Chapters 2 (Section 2.1.2) and Chapter 4 (Section 4.2.1 and 4.3.1).
    - In addition to the recommendations provided by the other technical studies conducted as part of the EIS, CSH recommends that the Proposed Action include monitoring and public reporting of stream flow volumes. At present, the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within the EMI Aqueduct System. The information obtained is reported to CWRM on a monthly basis. CSH recommends that this monitoring system is maintained and upgraded as needed in order to report accurate information on stream flow and diversion amounts to the community.

- A biologist or similar qualified professional should provide an assessment of the impacts of water diversion to indigenous freshwater species (*ʻōpae*, *ʻoʻopu*, and *hīhīwai*) within the License Area.
    - The implementation of the IIFS under the CWRM D&O has the potential to reduce or eliminate this cultural impact. Furthermore, Trutta Environmental Solutions, LLC and SWCA Environmental Consultants, Inc. prepared reports assessing the impacts of the Proposed Action, particularly impacts on indigenous freshwater species, and terrestrial flora and fauna. The impacts of the Proposed Action to freshwater species are discussed in Section 4.2.1 and the impacts to terrestrial flora and fauna are discussed in Sections 4.4.1 and 4.4.2. Moreover, the two reports are appended to the FEIS ~~DEIS~~ (See Appendix A and Appendix C).

- A botanist, ethnobotanist, or similar qualified professional should provide an assessment of the ideal conditions of water flow and water temperature needed for kalo growth in comparison to the current water flow and water temperature of impacted areas in order to understand and address the stated impact.
    - The implementation of the IIFS under the CWRM D&O has the potential to reduce or eliminate this cultural impact as discussed in Section 4.6.
    - As discussed in Section 4.7.4, in the updated Agricultural and Related Economic Impacts report conducted by Plasch Econ Pacific, LLC, taro farms in East Maui, including farms using water from the non-petitioned streams not subject to the CWRM D&O, are assumed take place in Honopou, Keʻanae and Wailuā, and would rely primarily on the taro streams ordered for full restoration. Further, all or nearly all of the additional taro cultivation will occur in existing/historical taro cultivation areas, not in new areas, given the barriers presented by terrain and the economic challenges of initiating new taro farms. Hence, under the Proposed Action, there is not anticipated to be significant impacts to existing or potential future taro farming in East Maui.

- Any personnel involved in access, maintenance, or any other related activities within the License Area should be informed of the possibility of inadvertent cultural finds, including human remains. Several participants expressed knowledge of cultural sites within the East Maui region and within the License Area, including agricultural terraces, trails, legendary sites, and human burials. Participants expressed concern regarding the proximity of these cultural sites to the EMI Aqueduct System, impacts from road maintenance work and repairs, and also suggest that past water diversion practices have increased stream bank erosion, thereby impacting cultural sites. In the event that any potential historic properties are inadvertently discovered within the License Area, any work in the immediate vicinity of the remains will be stopped, and these discoveries should be reported immediately to State Historic Preservation Division (SHPD) and the SHPD shall gather sufficient information to evaluate the significance of the historic property. In the event that *iwi kūpuna* and/or cultural finds are encountered, any work in the immediate vicinity of the remains will be stopped and the discovery will be immediately reported to the SHPD (during regular business hours) or to DOCARE (outside of regular business hours) and to the Maui Police Department (to include notification to the medical examiner) in accordance with HAR §13-300-40. It is also recommended that consultation with lineal and cultural descendants of the area ~~is also recommended~~.
    - CSH recommends any persons who are required to entire the License Area as part of the Proposed Action be made aware of the potential for discovery

of undocumented surface historic properties such as walls, trails, terraces, mounds, and/or caves. These structures should be avoided, protected, and reported to the SHPD. The SHPD will determine if additional mitigation measures are required.

- Currently, there is not an established access protocol into the License Area for cultural purposes, although no individual who has approached EMI has ever been denied access for cultural purposes. Notwithstanding the apparent lack of conflict or limitations on cultural access under current conditions, CSH nevertheless recommends that the State and the Water Lease lessee create an established procedure to handle cultural access and also consider signage that encourages cultural use pursuant to the State of Hawai'i Constitutions, Article XII.

- The access policy for the License Area include access by cultural practitioners via a process similar to what is used for hiking groups or via a consultation list of willing practitioners. CSH further recommends that any access policy be developed in consultation with the landowner (the State) and the Water Lease lessee and in consideration of applicable law related to traditional and customary Native Hawaiian rights.

The Social Impact Assessment (SIA), prepared by Earthplan, recommends measures intended to establish an ongoing working relationship between the community, Mahi Pono and EMI, and related public agencies, as well as work towards resolution with East Maui communities.

The SIA recommends that clearly defined interest groups, or stakeholder groups are established that include geographic communities, environmental, agriculture and business interests, and public agencies. Each group would be encouraged to reach consensus on their own needs, concerns, opportunities and possible solutions.

These groups should then be equitably represented in a "Core Working Group" that would serve as a forum for exchanging ideas and collaborative efforts, as well as to provide feedback and suggestions to Mahi Pono. Each member of the Core Working Group would be expected to reach out to their own networks to extend the discussion beyond the Core Working Group. While there would likely be strong differences in perspectives and opinions, the Core Working Group would need to find ways to establish core principles, common ground and manageable solutions.

The fundamental value that will help bring people to the same table is trust. Use of the water through the EMI Aqueduct System for sugarcane cultivation has elicited skepticism and distrust over many decades. Developing trust among the various groups is expected to be challenging, but being open about intent, plans, and activities can begin to establish credibility and open the door to dialogue.

Additionally, for the Ke'anae – Wailuānui community to move past historical impacts, there needs to be established a point of departure. Mitigation needs to go beyond the physical restoration of streams and needs to address the social context and include apology and reconciliation. This needs to be done within a cultural foundation that binds the community together, and key players, including Mahi Pono, public agencies and elected officials. The manner and forum for this process should be defined by the cultural leaders integral with the process.

Compatibility with Land Use Plans and Policies

The relationship of the Proposed Action to potentially applicable land use plans and policies was evaluated. It was determined that the Proposed Action is supportive or consistent with numerous applicable plans and policies. The following plans were evaluated:

- The Hawaiʻi State Plan, Chapter 226, HRS
- State Functional Plans
    - Agricultural State Functional Plan
    - Conservation State Functional Plan
    - Education State Functional Plan
    - Employment State Functional Plan
    - Energy State Functional Plan
    - Health State Functional Plan
    - Higher Education Functional Plan
    - Historic Preservation State Functional Plan
    - Housing State Functional Plan
    - Human Services State Functional Plan
    - Recreation State Functional Plan
    - Tourism State Functional Plan
    - Transportation State Functional Plan
- The State Land Use Law, Chapter 205, HRS (including the provisions regarding Important Agricultural Lands and State Conservation District Subzones)
- Forest Reserves, Chapter 183, HRS and related administrative rules
- Natural Area Reserves, Chapter 195, HRS and related administrative rules
- The Hawaiʻi Coastal Zone Management Program, Chapter 205A, HRS
- Governor Ige's Sustainability Initiative
- The Hawaiʻi Environmental Policy Act, Chapter 344, HRS
- The State Water Plan
    - Draft Maui Island Water Use and Development Plan (March 2019)
- The Maui Countywide Policy Plan
- The Maui Island Plan
- Maui County Zoning
- Maui Island Community Plans
    - Hāna Community Plan
    - Pāʻia-Haʻikū Community Plan
    - Makawao-Pukalani-Kula Community Plan
    - Wailuku-Kahului Community Plan

Listing of Permits and Approvals

The Proposed Action constitutes the issuance of a Water Lease after public auction by the DLNR/BLNR. Thus, the BLNR approval is necessary to implement the Proposed Action. While it is anticipated that the terms of the Water Lease would govern any modifications to the existing EMI Aqueduct System, there are no immediate plans for the construction of any additional facilities that would expand the EMI Aqueduct System within the License Area. Any work on the EMI Aqueduct System would be limited to repair and maintenance activities. Consequently, no additional permits and approvals are anticipated to be required to implement the Proposed Action.

Should the Water Lease be issued according to the Proposed Action, surface water will become available for the various domestic and agricultural uses. This would, in turn, will lead to construction activities such as for expanding the KAP and building facilities in support of

diversified agriculture in Central Maui. Such construction would be subject to various permits and approvals, depending on its location, proposed use and type of construction activity involved.

Irretrievable and Irreversible Commitments of Resources

The issuance of the Water Lease will not result in the irreversible use of the water resource because the Water Lease will be for a term, and not perpetual. Additionally, the Water Lease will be subject to the IIFS and the reservation in favor of the DHHL as discussed in Section 2.1.1, meaning that the water resource will not be exclusively and permanently committed to the Water Lease.[8] For the term of the Water Lease the water resource will be available to the identified uses, such as providing water to the agricultural fields in Central Maui and continuing to provide water to the MDWS for Upcountry Maui ~~and Nāhiku~~. To the extent such uses are not made, the water will not be diverted and will remain in the streams.

The impacts of use of the surface water resources associated with the Proposed Action will be offset by the considerable economic, social, and environmental benefits to the residents of the region, the County of Maui and the State of Hawai'i that would be supported by the issuance of the subject Water Lease, as discussed in Section 4.7.

The Water Lease does not involve new construction within the License Area. The operation of the EMI Aqueduct System does not require the use of nonrenewable resources because the transmission of water through the EMI Aqueduct System is conducted through gravity rather than through water pumping stations that require the use of nonrenewable energy sources for operations. The diversified agricultural operations planned for the Central Maui agricultural fields will involve the commitment of some resources for the modifications and improvements of the Central Maui Field Irrigation System ~~fields' irrigation system~~ and the construction of fencing, agricultural operating facilities and potentially renewable energy facilities as discussed in Section 2.1.4. Mahi Pono relies on two hydroelectric facilities that utilize water derived from the EMI Aqueduct System. Generating hydroelectric power is a non-consumptive use of water and the water can subsequently be used for agricultural purposes after flowing through the hydroelectric facilities. The power generated from the hydroelectric plants generate power to supply the many Mahi Pono's farm operations. Building materials (concrete, wood, metal, etc.) will be used along with energy resources related to the construction of those items. The use of such fuels and resources is not expected to be significant and the use of the Central Maui agricultural fields for diversified agriculture is considered to be beneficial because there would be considerably more green open space in Central Maui in the form of farms and irrigated pasture, a reduction in wildfires, and approximately three times as much food production, including greater food self-sufficiency and more exports, should the Water Lease be issued. There would also be more local jobs created directly and indirectly from the Proposed Action.

The implementation of the Proposed Action is consistent with existing and adjacent land uses, and would not prevent or curtail any uses allowable under applicable land use policies or controls. The amount of water allowed to be diverted by the Water Lease will be significantly less than the amount diverted for sugar cultivation. Mahi Pono's farm plan is based on the amount of water that will be available through the Water Lease. However, if more water were available, more crop

[8] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture.

options would also be available. The issuance of the Water Lease should not curtail the use and access to adjacent lands (e.g., for recreation, environmental research, etc.) as the EMI Aqueduct System has been in place for over 100 years.

The implementation of the Proposed Action is not associated with activities that could directly trigger potential environmental accidents, nor pose a significant risk for potentially triggering environmental accidents. Moreover, it is not anticipated that there would be any unavoidable impacts or probable adverse effects. The EMI Aqueduct System has been operating for over 100 years, and issuance of the Water Lease should ensure continued ~~contained~~ operations and maintenance of the EMI Aqueduct System.

Relationship Between Local Short-term Uses of Humanity's Environment and the Maintenance and Enhancement of Long-Term Productivity

The Proposed Action is the issuance of a Water Lease for a 30-year commitment of government-owned water collected by the EMI Aqueduct System from the License Area for various uses, including domestic and agricultural uses served by the MDWS in Upcountry Maui, the KAP ~~and the Nāhiku community in East Maui~~; continued diversified agricultural operations on approximately 30,000 acres in Central Maui; and, preservation of the EMI Aqueduct System. Moreover, The Proposed Action will also ensure the continued delivery of water for the Nāhiku community. While the Water Lease would be a new commitment of government-owned water diverted through the EMI Aqueduct System, the Water Lease essentially continues an activity that has been in place for over a century. In this new commitment, however, the amount of government-owned water that may be diverted out of the License Area has been limited by the CWRM D&O. The water would primarily go to support the Mahi Pono farm plan operations, and at full implementation of the farm plan it is expected that all surface water, less the amounts for MDWS, would be available for the farm plan operations (and subject to DHHL's reservation). However, it should also be noted that the amount of water actually used by Mahi Pono for its farm plan operations at any given point will vary (subject, of course, to the maximum diversion amounts that are permitted under the Water Lease), as only the amount of water actually needed, whether for the Mahi Pono farm plan operations, MDWS, or otherwise, will be diverted at any particular time.

Considering the Water Lease as a short-term use of humanity's environment, the beneficial gains over the term of the Water Lease include the benefits accrued to the various recipients of the water for domestic, commercial and agricultural uses. The Water Lease will maintain the lifestyle and livelihood of those who receive their water through the MDWS in Upcountry Maui and Nāhiku. In Central Maui the Water Lease will provide irrigation water for Mahi Pono to continue to develop diversified agriculture on former sugar land, with associated economic gains from the sale of crops, direct and indirect job creation, and increased local food sustainability.

As previously stated, the Water Lease will be limited by the requirements under the CWRM D&O. Through the CWRM D&O, CWRM ordered full restoration of ten streams for primarily taro growing areas for irrigation and for community and non-municipal domestic uses. Five "habitat streams" were ordered to have 64% of their BFQ_{50} restored, which generally represents the H_{90}, based on the biological diversity and habitat that already exists. Seven were ordered to have 20% of their BFQ_{50} restored to provide connectivity for migrating stream fauna. While the proposed Water Lease would have a term of 30 years, the IIFS requirements under the CWRM D&O and the associated benefits to the kalo growing areas, communities and environment, would not be

affected by the Water Lease term and if not otherwise revised by the CWRM, the IIFS requirements will continue indefinitely.

Regarding the non-petitioned streams that were not subject to the CWRM D&O, it is assumed that these streams will continue to be diverted as they have been in the past. These streams will continue to contribute to beneficial offstream uses accrued to various recipients of the water described herein for domestic, commercial, and agricultural uses. However, since these streams did not receive any flow restoration, they will experience a habitat decrease from the current condition, where water needs are low during the initial stages of implementation of the Mahi Pono farm plan and could lose potential beneficial instream uses such as recreational use and/or visual resources.

However, from a regional perspective, the License Area will experience an overall increase in habitat for native stream species, significant flow restored to historical and current areas of taro significant taro cultivation and community use, reducing or eliminating cultural impacts along the restored streams when compared to historical diversions during sugarcane operations. Hence, under the Proposed Action in compliance with the CWRM D&O, numerous instream and offstream beneficial uses are provided.

Without the Water Lease, even if EMI could find it economically feasible to continue maintaining the EMI Aqueduct System to divert non-governmental water for diversified agriculture in Central Maui, there may not be enough water to allocate much or any to the MDWS. This lack of water would exacerbate the effects of drought when other surface water sources are unreliable for the KAP and the Upcountry Maui Water System, as this ~~the Nāhiku, this~~ could eliminate their primary source of water. Insufficient water delivered to the County through the EMI Aqueduct System could have significant effects on health and safety of those who currently rely on that water delivery.

Without active, irrigated agriculture in the Central Maui agricultural fields, natural arid conditions would return, making the Central Maui fields susceptible to wind erosion and airborne dust, which could create a nuisance or potential health hazard under windy conditions. Dry windy conditions would also increase the potential for wildfires.

Unresolved Issues

Unresolved issues for the Proposed Action have to do with the steps that must be completed before the BLNR can issue the Water Lease.

The Water Lease must accommodate a reservation in favor of the DHHL, but the ~~that~~ amount approved by the Hawaiian Homes Commission in May 2019 (11,455,510 gpd) has not yet been requested for, or ~~determined and~~ approved by the CWRM, and the DHHL's timing for calling upon its reservation is not known. As noted above, the specific contents and parameters of the watershed management plan in connection with the proposed Water Lease remain unresolved, but since the publication of the DEIS the ~~Similarly, the content and parameters of a watershed management plan are not known at this time.~~ BLNR approved the minimum content requirements for a watershed management plan. A copy of the BLNR-approved DLNR report is attached as Appendix O-1. ~~However, both the DHHL reservation and the watershed management plan will be addressed before the BLNR can issue the Water Lease.~~

Other unresolved issues include the requirement for the BLNR to set the upset rental through appraisal of fair market value, and the requirement for the Water Lease disposition to be by public auction. As such, at this point the amount of rental payment that will be required under the Water Lease the selection ~~identity~~ of the awarded lessee, and the specific terms of the Water Lease are unknown, but these issues should be resolved prior to the issuance of the Water Lease.

Consultation

Various agencies, organizations, and individuals were consulted in scoping the DEIS, including scoping that took place prior to the preparation of the EISPN, and during the 30 day public comment period on the EISPN in the form of formal written consultation pursuant to HRS Chapter 343 and HAR Title 11, Chapter 200. Consultation also included meetings with elected officials, agencies, and stakeholders including two public scoping meetings held on Maui during the 30 day EISPN public comment period. A list of those who participated in the consultation process is provided in Chapter 9 and the comments, including the transcripts of the public meetings, and responses are reproduced in Appendix J. Moreover, those who submitted public comments on the published EISPN, and the corresponding responses are reproduced in Appendix M.

The DEIS was made available for public review in the Office of Environmental Quality Control's September 23, 2019 issue of *The Environmental Notice*. The deadline for written comments received or postmarked was November 7, 2019. Notification of the DEIS' availability and period for receiving comments was also emailed and/or physically mailed out to the agencies (Federal, State, and County), organizations, and individuals identified in Table 9-2. Several written comments were received from various agencies at the Federal, State, and County levels, as well as organizations, and individuals. A listing of those parties that provided comments in response to the DEIS is provided in Table 9-3. Copies of all written comment received, along with their respective responses are reproduced and included in the FEIS as Appendix N.

This FEIS has been prepared for the Proposed Lease (Water Lease) for the Nāhiku, Ke'anae, Honomanū, and Huelo License Areas (Proposed Action), taking into consideration the comments received during the 45-day public review and comment period for the DEIS. Notice of availability of the FEIS is being published in the Office of Planning and Sustainable Development - Environmental Review Program's and (formerly OEQC) *The Environmental Notice*.

Hard copies of the FEIS have been made available at the Hawai'i State Library (Hawai'i Documents Center), the Kahului Public Library, and the Hāna Public Library. The FEIS is also available for viewing and/or download on OEQC's website[9] and publication of *The Environmental Notice*. A link to OEQC's main website page is provided below where the FEIS document can be searched.

https://health.hawaii.gov/oeqc/

Notice of availability of the FEIS has been sent to those who participated in the EIS public review periods, as well as those required for distribution prescribed by HRS Chapter 343 as identified in Table 9-3. Parties that receive the notice of availability are directed to a link on OEQC's website where the FEIS can be searched and downloaded.

[9] Please note that the Office of Planning and Sustainable Development - Environmental Review Program website is still hosted on OEQC's website housed under the Department of Health and will eventually transfer under the Office of Planning. However, we are not aware when that transition will occur.

Chapter 1:
Purpose and Need of the Proposed Action

1. STATEMENT OF PURPOSE AND NEED OF THE PROPOSED ACTION

1.1 Purpose of the Proposed Action

The purpose of the Proposed Action (the Water Lease) is to enable the Board of Land and Natural Resources (BLNR)-awarded lessee the right, privilege and authority to enter and go upon State-owned lands for the purposes of developing, diverting, transporting and using government-owned waters. The requested Water Lease would allow the use of government-owned waters from the License Area (approximately 33,000 acres which includes lands within Nāhiku, Ke'anae, Honomanū, and Huelo portions of the License Area) through the East Maui Irrigation Company, LLC (EMI) Aqueduct System. Use of that surface water would allow the continued provision of water to enable approximately 30,000 acres of farmland in Central Maui to continue to fully transition to a diversified agricultural operation ~~to remain in agriculture~~. The Water Lease would also allow the continuation of a supply of water to the County of Maui Department of Water Supply (MDWS), which in turn provides water for domestic and agricultural water needs in Upcountry Maui, including agricultural users at Kula Agriculture Park (KAP), and the planned 262-acre KAP expansion, as well as for the Nāhiku community, which through the MDWS, ~~draws up 20,000 to 45,000 gallons per day, dependent on weather,~~ draws water sourced directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located on EMI owned land directly adjacent to the Koolau Ditch ~~Aqueduct System~~.

The MDWS's ~~s~~ Upcountry Maui Water System is the second largest in the County. It services the communities of Kula, Pukalani, Makawao Ha'ikū, Hali'imaile, Waiakoa, Kēōkea, Waiohuli, 'Ulupalakua, Kanaio, Olinda, 'Ōma'opio, Kula Kai, and Pūlehu. The Upcountry Maui Water System, which is comprised of three separate subsystems (the Upper Kula System, the Lower Kula System, and the Makawao System), is estimated to serve over 35,000 people, and the overall service area includes several businesses, churches, Kamehameha Schools, Hawaiian Homelands and government facilities. The County anticipates that the population served by the Upcountry Maui Water System will grow to approximately 43,675 by 2030 (discussed in further detail in Section 2.1.3.1).

The primary purpose of the Water Lease is to continue to provide water to service agricultural and domestic purposes. A need for the Water Lease is the lack of practicable alternative sources of water and the lack of alternative infrastructure to meet these demands (Draft Maui Island Water Use and Development Plan, March 2019, Updated 2020).

Moreover, the proposed Water Lease will ensure that the EMI Aqueduct System, which enabled the cultivation of naturally non-arable lands in Central Maui, will be maintained to continue to serve the community, continue Maui's rich agricultural heritage, and to enhance the sustainability and diversity of Maui's economy. In December of 2018 Alexander & Baldwin (collectively EMI and Alexander & ~~and~~ Baldwin will be referred to as "A&B") sold the majority of its former sugarcane lands in Central Maui to Mahi Pono.[1] Mahi Pono is affiliated with Canada's Public Sector Pension (PSP) Investment Board and California-headquartered Pomona Farming.

Mahi Pono's objective is to transition as much of the former sugarcane land as possible to diversified agriculture. Under the Proposed Action, the utilization of waters from the License

[1] MP Central A, LLC, MP Central B, LLC, MP CPR, LLC, MP East A, LLC, MP East B, LLC, and MP West, LLC ~~and MP EMI LLC and~~ acquired former sugarcane ~~sugar cane~~ and watershed lands, including the Central Maui agricultural fields, from A&B in December 2018. In early 2019, MP EMI, LLC acquired a 50% interest in EMI. Agricultural operations are centralized under Mahi Pono, LLC. All such entities are hereinafter referred to, whether individually or collectively, as "Mahi Pono".

Area delivered from the EMI Aqueduct System by virtue of the Water Lease will support ~~be an essential element to the success of any such~~ diversified agricultural pursuits in Central Maui.

1.2 Objectives of the Proposed Action

In general, the objectives of the ~~issuance of the~~ Proposed Action (issuance of the proposed Water Lease) are:

- Preserve and maintain the EMI Aqueduct System, including its access roads and trails
- Continue to meet domestic and agricultural water demands in Upcountry Maui
- Continue to provide water for agricultural purposes in Central Maui (specifically, to allow for the full transition of fields previously used for sugarcane ~~sugar cane~~ cultivation into new, diversified agricultural uses)
- Continue to serve community water demands in Nāhiku

1.3 Background - Historical Perspective

1.3.1 The EMI Aqueduct System

For more than a century, the East Maui watershed forests have provided water for off-stream uses through a surface-water diversion system, known as the EMI Aqueduct System. The system has been used to collect and transport water to meet consumptive needs and enable economic opportunities. The EMI Aqueduct System is owned and operated by the EMI. EMI was previously a wholly owned subsidiary of A&B. In February, 2019, Mahi Pono ~~MP EMI, LLC~~, became a co-owner of EMI. In addition to becoming the co-owner of the EMI Aqueduct System, as noted above in Footnote 1, Mahi Pono acquired former sugarcane and watershed lands, including the Central Maui agricultural fields, from A&B in December 2018. Agricultural operations are centralized under Mahi Pono, LLC (Mahi Pono).

The EMI Aqueduct System was constructed in phases, beginning in the 1870s and extending to its completion, as it currently stands, in 1923. Presently, it ~~It~~ consists of approximately 388 separate intakes, 24 miles of ditches, and 50 miles of tunnels, as well as numerous small dams, intakes, pipes, 13 inverted siphons and flumes. The EMI Aqueduct System collects surface stream water from approximately 50,000 acres of land (herein referred to as the Collection Area), of which approximately 33,000 acres are owned by the State of Hawai'i (which includes lands within Nāhiku, Ke'anae, Honomanū, and Huelo) (herein referred to as the License Area), and the remaining approximately 17,000 acres which are privately owned (See Figure 1-1). However, the revocable permits that BLNR approved for the year 2020, as well as the year 2021, removed the Hanawī Natural Area Reserve (NAR) from the License Area under the revocable permits. Thus, it is anticipated that the BLNR may remove the Hanawī NAR and/or other lands within the License Area from the eventual scope of the Water Lease under the Proposed Action. The Hanawī NAR comprises approximately 7,500 acres within the approximately 33,000-acre License Area, and is part of the Nāhiku portion of the License Area. It should be noted that no portion of the EMI Aqueduct System is within the Hanawī NAR and thus the area is not needed for the maintenance and operation of the EMI Aqueduct System (See Figure 1-2). BLNR has the discretion to set the geographic parameters of the eventual License Area under the Water Lease to an area that is smaller than the original, 33,000-acre License Area, but still maintains the safety and integrity of the EMI Aqueduct System.

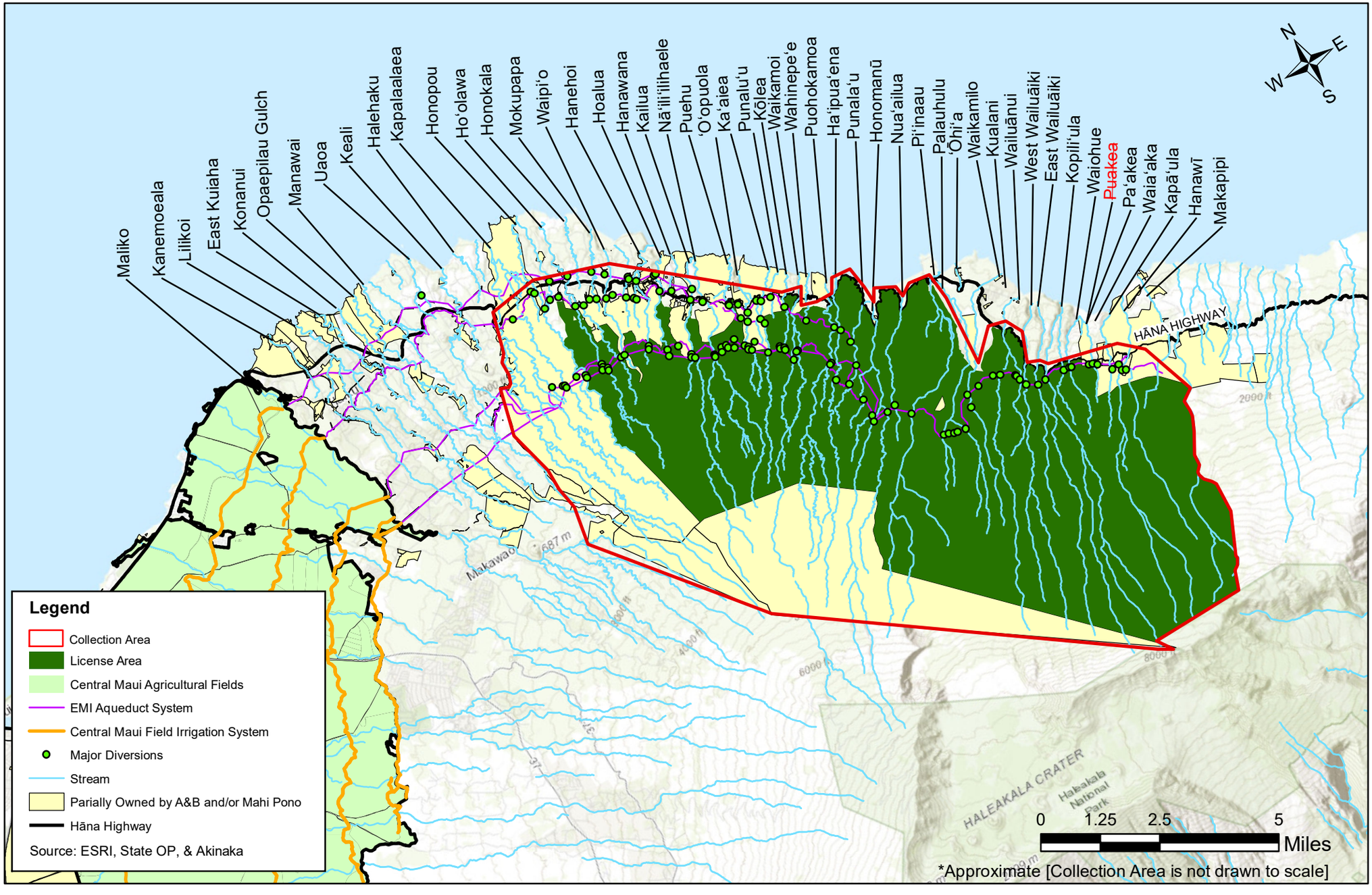


FIGURE 1-1

EMI AQUEDUCT SYSTEM COLLECTION AREA

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KEʻANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

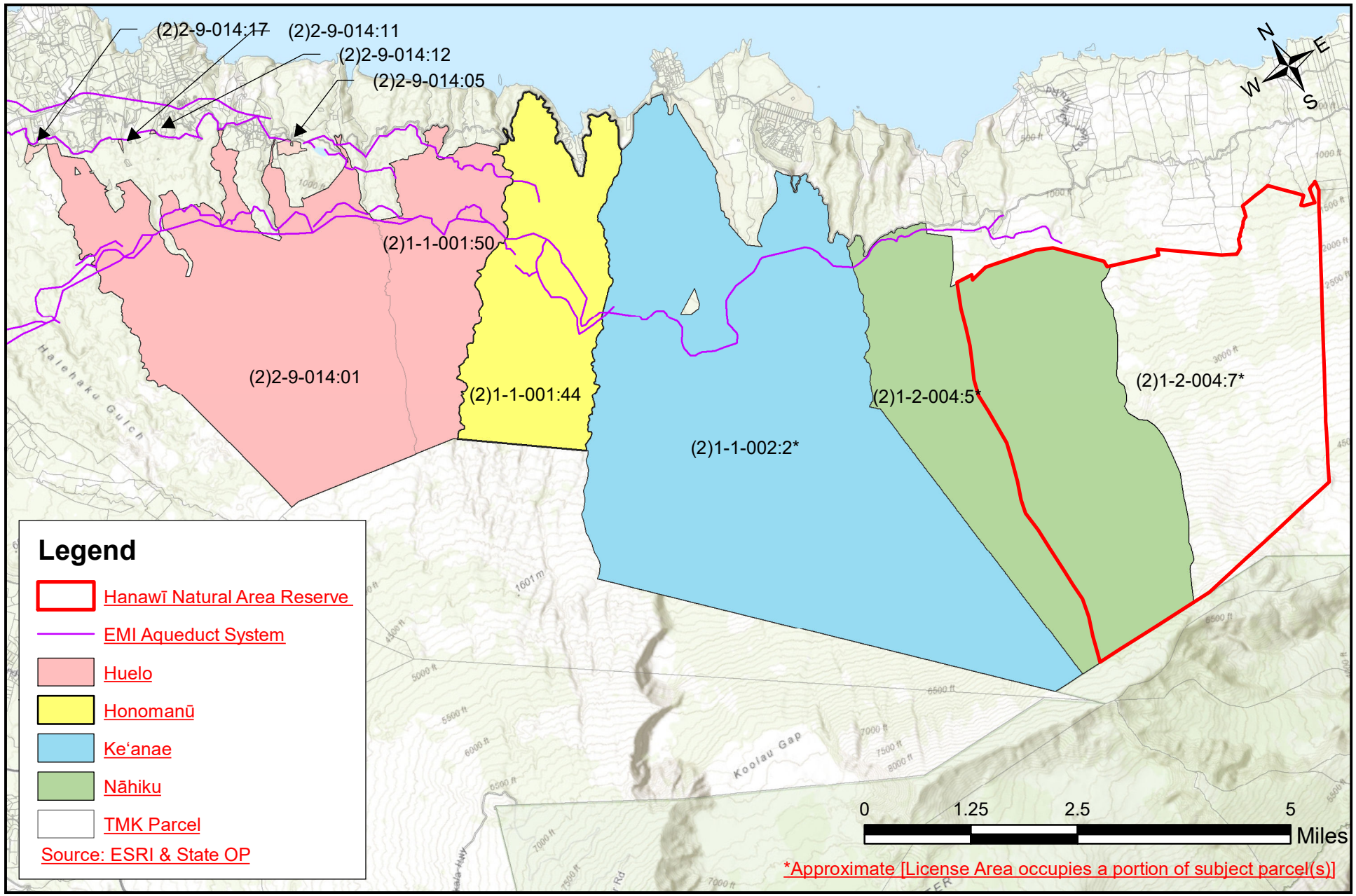


FIGURE 1-2

REMOVAL OF HANAWĪ NATURAL AREA RESERVE FROM REVOCABLE PERMIT LICENSE AREA

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

Figure 1-1 illustrates the EMI Aqueduct System overlaid on the Department of Land and Natural Resources (DLNR) Division of Aquatic Resources (DAR) geographic information system (GIS) data obtained from the State Office of Planning's GIS download portal.

An electronic drawing of the EMI Aqueduct System was georeferenced by Akinaka & Associates, Ltd. (Akinaka) to depict major diversions on East Maui streams shown on a United States Geological Survey (USGS) base layer map obtained from ESRI.[2] Due to the complexity of the EMI Aqueduct System and the level of detail that could be shown on the map, ~~not all of the~~ minor diversions ~~could be~~ associated with a stream or tributary were not depicted.[3] The stream names shown are from the DAR GIS database but a few of those stream names may differ from how some East Maui residents may refer to them. Moreover, certain streams that were identified during certain proceedings before the Commission on Water Resources Management (CWRM)[4] do not have associated GIS data and therefore could not be precisely located or depicted on the map.

Kualani (aka Hāmau) and Waiaʻaka streams do not have associated GIS data, but were identified in the CWRM proceedings. ~~Puakea Stream stream, which was recognized in the Instream Flow Standard Assessment Report for Hydrologic Unit 6061, Paʻakea, December 2009, is within the License Area but was not identified in the CWRM Decision and Order (D&O) also does not have GIS data.~~[5] Therefore, the approximate location of Kualani~~,~~ and Waiaʻaka, ~~and Puakea streams~~, based on the geographically sequential listing of stream names by CWRM, is shown in Figure 1-1.[4][6] The depiction of the EMI Aqueduct System shows the general alignment of the various ditches comprising the EMI Aqueduct System and their major diversions, which were georeferenced by Akinaka to coincide with the streams shown on the USGS base layer map, where possible. In some cases, the diversions may be on smaller tributaries that do not appear in the DAR GIS data.

1.3.2 History of Stream Diversion in East Maui

Built at a time when Hawaiʻi was still an independent kingdom, the EMI Aqueduct System was the first of its kind, both in the Pacific and on the West Coast of the United States. The initial construction of the first section of the EMI Aqueduct System by Samuel T. Alexander and Henry P. Baldwin under the name of the Hamakua Ditch Company began the 1870s, was named the Hamakua Ditch (considered the Old Hamakua Ditch now). This began the engineering trend of catchment ditches that would later fuel the sugar industry on Kauaʻi, Oʻahu, Hawaiʻi, and Maui, making sugar the major economic sector of Hawaiʻi for over a century. Over the course of the ensuing decade, A&B's plantation was incorporated as the Pāʻia Plantation and included Hāliʻimaile Plantation (also known as Grove Ranch), East Maui Plantation, and Seaside Farm. The first license granted by the Kingdom of Hawaiʻi to A&B and their partners in the Hamakua

[2] ESRI is an international supplier of geographic information system software, web GIS and geodatabase management application.

[3] Any reference to a stream or streams in the EIS is intended to include related tributaries unless stated otherwise.

[4] Petitions to Amend Interim Instream Flow Standards (IIFS) for numerous East Maui streams were filed with CWRM in 2001, and concluded with CWRM's issuance of its Findings of Fact, Conclusions of Law and Decision and Order in CCH-MA 13-01, on June 20, 2018 (CWRM D&O), which established the Interim Instream Flow Standards for numerous streams (the petitioned streams).

[5] The DEIS erroneously identified Puakea as a separate and distinct stream. However, it has since been determined that Puakea is a tributary of Paʻakea Stream.

[6] It should be noted that Hanawana is referred to as Hanahana in the CWRM D&O.

Ditch Company to divert water from East Maui lasted until September 30, 1898 – approximately 20 years following the completion date of the first ditch (Hamakua Ditch).

In 1876, Claus Spreckels, a sugar magnate and industrialist, closely followed the efforts of Samuel T. Alexander and Henry P. Baldwin. It was at this time that Spreckels conceived of an irrigation project inspired by Alexander and Baldwin's work on the Hamakua Ditch, one that would serve to irrigate and transform the dry and arid Central Maui Plains into thousands of acres of rich sugarcane. The second addition to the EMI Aqueduct System was the Spreckels Ditch, also known as the Haiku Ditch, constructed between 1879 and 1880. The lease granted to Spreckels by the Kingdom of Hawai`i gave him rights to all water not already in use by September 30, 1878, the same date as the deadline for the completion of the Hamakua Ditch. Taking advantage of his unrestricted access to all streams not currently under collection, the Haiku Ditch was twice as long, three times as large, carried 50 percent more water than the Hamakua Ditch, and stretched from Honomanū Stream to the Kīhei boundary (Wilcox, 1996). The ditch was 30 miles long and could deliver up to 60 million gallons per day (mgd), costing nearly half a million dollars by the time it was completed (American Society of Civil Engineers (ASCE), 2001). The breadth and scale of this endeavor would redefine standards of water collection for the sugar industry in Hawai'i. The massive Haiku Ditch was the first developed by a foreign engineer named Herman Schussler, a trend that would continue for all future additions to the EMI Aqueduct System (Wilcox, 1996). Schussler began construction on the Center Ditch in 1898, the Manuel Luis Ditch in 1900, and the Lowrie Ditch in 1899-1901 (ASCE, 2001).

In 1898, Spreckels lost controlling interest of Hawaiian Commercial and Sugar Company (HC&S), to A&B. With the acquisition of HC&S, the two corporate partners gained control of the vast majority of the sugar lands on the island of Maui as well as the numerous irrigation systems that enabled their cultivation. Immediately upon acquiring HC&S, their partners started construction on the Lowrie Ditch, which started in the rainforests of Kailua in the Makawao District of Maui. The Lowrie Ditch had two sources, the first was a reservoir at Pāpa'a'ea that was fed by two five- to six-mile ditches, and the second was Kailua Stream where a diversion intercepted the source of the older Haiku Ditch and ran parallel to that ditch. The Lowrie Ditch was named after William J. Lowrie, manager of HC&S's plantation and mills at Spreckelsville. Work on the ditch system was primarily accomplished by a team of Japanese laborers, with contracting beginning in 1899 and construction concluding in late 1900. Upon completion, the Lowrie Ditch accounted for a 22-mile system, three quarters of which was open ditch, and had a total capacity of 60 mgd, and was capable of irrigating up to 6,000 acres. The Lowrie Ditch, by means of inverted siphons, ended at the 475-foot elevation, 257 feet above the Haiku Ditch.

The next undertaking for the Hamakua Ditch Company was the construction of the Koolau Ditch, which was built over a two-year period from 1904-1905 by M. M. O'Shaughnessy. The Koolau Ditch extended the water collection system another 10 miles toward Hāna, around the Ko'olau Range to Makapipi Stream. The Koolau Ditch accounted for 7.5 miles of tunnel and 2.5 miles of open ditch and flume. The thirty-eight tunnels that are part of the Koolau Ditch ~~system~~ were all dug out of solid rock by laborers employing hand-drills and were 8 feet wide and 7 feet high. In length, the tunnels averaged 1,000 feet; the shortest of which was 300 feet and the longest was 2,710 feet. A total of 4.5 miles of 6-inch-thick concrete lining was used in the tunnel. The Koolau Ditch was later turned over to EMI, a new business entity that succeeded the Hamakua Ditch Company. While the Koolau Ditch originally fed into the New Hamakua Ditch at Alo, it was connected to the Wailoa Ditch upon its completion in 1923. By the time the Wailoa Ditch was completed in 1923 it was the highest capacity channel in the entire network of the EMI Aqueduct System. The Koolau Ditch was connected to the new Wailoa Ditch section, being

diverted away from the New Hamakua Ditch, and connected to a series of hydro-electric power plants on the north shore of Maui. The Wailoa Ditch ran parallel to, and above, the earlier New Hamakua and Kauhikoa Ditches (Wilcox, 1996).

In 1938, the Territory of Hawai'i and EMI ~~A&B~~ entered into an agreement intended to set the stage for competitive bidding when the existing water licenses expired. The 1938 Agreement ~~agreement~~ provides for the joint use of the EMI Aqueduct System, whereby both parties granted easements to each other for portions of the EMI Aqueduct System facilities that crossed their respective lands (See Appendix R) (discussed in further detail in Section 3.3).

Another aspect of the agreement set forth the manner in which the Territory was to charge for water collected. The amount charged was to be in inverse relation to the distance between the source and the delivery point. In other words, the further the distance, the less the amount paid. The reasoning behind this approach was that the value of the water to the lessee declined as the cost of conveying the water rose. Thus, the government received less for Nāhiku water, which had to travel the greatest distance to Central Maui agricultural fields, than it did for water taken from the Huelo portion of the License Area, which was closer to the Central Maui agricultural fields.

The revolutionary changes that occurred in the second half of the 19th century – in East Maui as well as elsewhere in the Hawaiian islands – served as the backdrop for the rise in the commercial cultivation of sugarcane ~~sugar cane~~, and encapsulates the essence of the plantation-era culture of old Hawai'i which laid the foundation for the diverse socio-cultural environment that exists in the islands today.

The signing of the Reciprocity Treaty with the United States in 1875, which allowed Hawai'i to sell sugar to the United States on an unrestricted basis, spurred Hawai'i based sugar planters to increase production. This was accomplished by extending their plantings to lands far removed from natural water courses, and the import of migrant workers by the tens of thousands – workers who, at the end of their contracts, stayed on in the islands to grow rice, open shops, and fill other economic niches. Moreover, the challenge of moving water from the wet-side of an island to its dry-side became one of the dominant preoccupations of sugar industrialists of the Plantation Era, and was an effort unto itself that demanded the collaborative efforts of an increasingly diverse workforce. The industrialization of agriculture served as a catalyst for radical social, cultural, and economic change that the islands experienced over the course of the latter half of the 19th century, and much of the 20th century.

Over the course of the past several decades, the users of the EMI Aqueduct System have grown to include non-potable water service for agricultural uses at the KAP as well as potable water service through the MDWS to domestic and agricultural users in Upcountry Maui~~, as well to a portion of the Nāhiku community below Hāna Highway in East Maui~~.[7]

1.3.3 Chronology of Water Lease and the Interim Instream Flow Standards

Since 1876, A&B, or its predecessors and affiliates, have been issued from the Kingdom, the Territory and then the State of Hawai'i, various leases, agreements, licenses, and permits that authorized the development, diversion, transportation and use of government-owned water from

[7] The DEIS mistakenly stated that the Nāhiku community that is served by MDWS received its water directly from the EMI Aqueduct System which is incorrect. The source of the Nāhiku community water is discussed in further detail in Section 2.1.3.3.

streams in East Maui. The water leases were for the 33,000 acres owned by the Territory/State (License Area).

The original lease traces back to a September 13, 1876 license from the Kingdom of Hawai'i. Subsequent leases have been governed by an agreement dated March 18, 1938 between the Territory of Hawai'i and EMI ~~A&B~~ (the 1938 Agreement). Over the course of the 20th Century, A&B retained the rights to the use of water from the License Area by being the successful bidder for water leases. The last long-term leases ~~licenses~~ were issued in the 1950s and 1960s, ultimately expiring in 1986. Since 1986, however, the BLNR has authorized holdover and/or annual revocable permits for the use of water, with the latest being approved on November 13, 2020 for the use of water in the year 2021 ~~November 9, 2018~~.

On May 14, 2001, A&B requested that the State, pursuant to Hawai'i Revised Statutes (HRS) ~~Section~~ § 171-58, offer a long-term (30 year) lease at public auction for the right, privilege and authority to enter and go upon State-owned lands at Ko'olau Forest Reserve and Hanawī Natural Area Reserve, Hāna and Makawao, Maui, for the purposes of developing, diverting, transporting and using government-owned waters. The requested lease would allow the use of government-owned waters from the License Area. The location of the approximately 33,000-acre License Area is on State-owned land identified by Tax Map Key (TMK) numbers in Table 1-1 and are illustrated in Figure 1-3 ~~1-2~~.

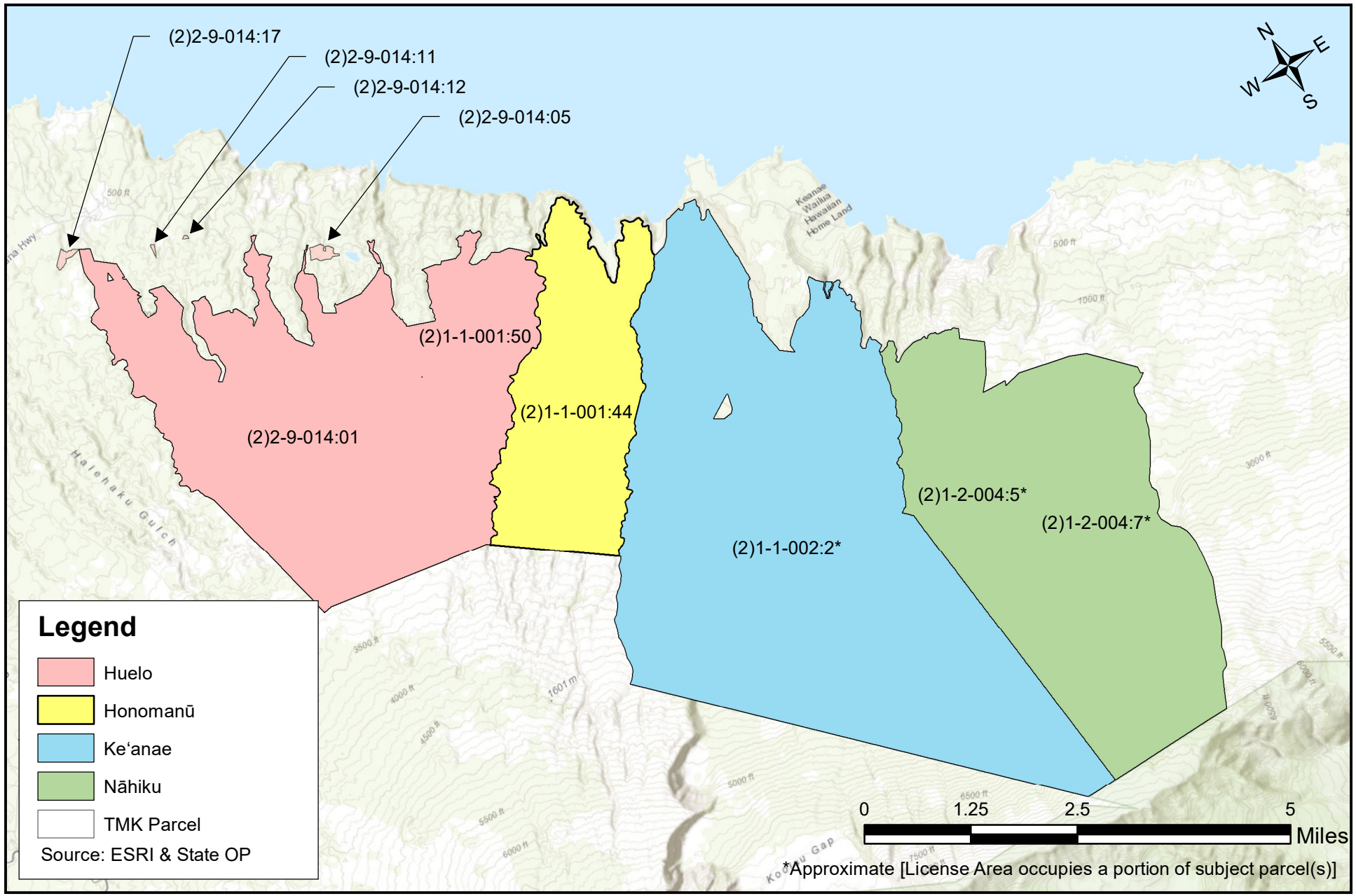
Shortly after the request was made, the Coalition to Protect East Maui Water, Maui Tomorrow Foundation, and Nā Moku Aupuni O Ko'olau Hui (Nā Moku) requested a contested case hearing on the lease matter, thereby delaying BLNR action. In recognition of the request for a contested case hearing, the BLNR deferred action on issuing a lease at public auction, and, in the interim, the BLNR approved a ~~month-to-month~~ holdover of the existing month-to-month revocable permits.

Table 1-1: License Area TMKs

Portion of License Area	Tax Map Key	Area (Approximate Acreage)
Nāhiku	(2) 1-2-004:005,007 (por.)[8]	7,832
Ke'anae	(2)1-1-002:002	13,007
Honomanū	(2)1-1-001:044	3,381
Huelo	(2)1-1-001:050, (2)2-9-014:001, 005, 011, 012, 017	8,753

Separate and apart from the Water Lease process, the Native Hawaiian Legal Corporation (NHLC) on behalf of Nā Moku, Beatrice Kepani Kekahuna, Marjorie Wallet, and Elizabeth Lehua Lapenia[5][9] (hereafter collectively referred to as "Nā Moku") filed with CWRM 27 petitions ~~Petitions~~ to amend ~~Amend~~ IIFS for various East Maui streams located within the License Area.

[8] Tax Map Key parcel (2) 1-2-004:007 is the Hanawī NAR which was removed from the 2020 and 2021 revocable permit License Area as discussed in Section 1.3.1 above.
[9] NHLC no longer represented Ms. Lapenia as of May 10, 2007



~~FIGURE 1-2~~ FIGURE 1-3

TAX MAP KEYS OF PROPOSED LICENSE AREA

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE‘ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

The State Water Code (Water Code), Chapter 174C, HRS, provides that the CWRM may adopt IIFS on a stream-by-stream basis or a general Instream Flow Standard (IFS) applicable to all streams within a specified area to protect the public interest in the waters of the State. The CWRM initially set IIFS for all streams in Hawai'i at their status quo condition as of June 15, 1988. In *In re Water Use Permit Applications*, 94 Hawai'i 97, 148, 9 P.3d 409, 460 (2000), the Hawai'i Supreme Court characterized that under the Water Code, "instream flow standards serve as the primary mechanism by which CWRM is to discharge its duty to protect and promote the entire range of public trust purposes dependent upon instream flows."

The Water Code defines an IFS as a "quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses." (HRS § ~~171~~ 174C-3).

At the time that NHLC filed the 27 petitions ~~Petitions~~, the IIFS for East Maui streams was as follows:

> The Interim Instream Flow Standard for all streams on East Maui, as adopted by the commission on water resource management on June 15, 1988 shall be that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard[.]

Hawai'i Administrative Rule (HAR) § 13-169-44. This IIFS is often referred to as a "status quo IIFS."

In considering a petition to amend an interim instream flow standard, the Water Code directs CWRM to "weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses." HRS ~~Section~~ § ~~171~~ 174C-71(2)(D). The Water Code (HRS § ~~171~~174C-3) defines "instream use" as:

> beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Instream uses include, but are not limited to:
>
> 1) Maintenance of fish and wildlife habitats;
> 2) Outdoor recreational activities;
> 3) Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation;
> 4) Aesthetic values such as waterfalls and scenic waterways;
> 5) Navigation;
> 6) Instream hydropower generation;
> 7) Maintenance of water quality;

8) The conveyance of irrigation and domestic water supplies to downstream points of diversion; and,
9) The protection of traditional and customary Hawaiian rights.

If the IIFS for the 27 petitioned ~~Petitioned~~ streams were amended, the maximum amount of water that could potentially be diverted from these streams by the EMI Aqueduct System would change (and did in fact change pursuant to the CWRM D&O that was issued in 2018). On July 23, 2001, the CWRM agreed to focus its proceedings first on eight "Priority Streams" identified by NHLC, which were Honopou, Hanehoi, Waiokamilo, Kualani, Pi'ina'au, Palauhulu, and Wailuānui (consolidated with Waikani Waterfall, East and West Wailuānui Stream), and Puolua (Huelo) ~~Stream~~, the tributary of Hanehoi Stream (Priority Streams) (CWRM D&O, Findings Of Fact (FOF) 2-3).

In cooperation with the CWRM, the USGS conducted a study (Gingerich, 2005) to assist in determining reasonable and beneficial noninstream and instream uses of surface water in Northeast Maui. These assessments were documented in various Instream Flow Standard Assessment Reports (IFSAR), which are compilations of the hydrology, instream uses, and noninstream uses related to a specific stream and its respective surface water hydrologic unit. The purpose of the IFSAR is to present the best available information for a given hydrologic unit. The IFSAR is also intended to act as a living document that should be updated and revised as necessary.

In 2007, A&B ceased all diversions on Waiokamilo Stream, fully restoring flows to the stream, in response to an interim order by the BLNR. In September 2008, the CWRM acted to amend the IIFS for the eight Priority Streams recognized by NHLC in 2001 (the Priority Streams D&O).

On May 25, 2010, the CWRM acted to address the remaining 19 petitioned streams, amending the IIFS for 6 of those streams, through a seasonal approach to address habitat availability for native stream animals, with winter total restorative amounts of 9.45 mgd, and summer restoration reduced to 1.11 mgd.[6][10] At the end of this meeting, the petitioners requested a contested case.

On June 3, 2010, Nā Moku filed a petition ~~Petition~~ for a contested case ~~Contested Case~~ with the CWRM for "Petitioners' right to sufficient stream flow to support the exercise of their traditional and customary Native Hawaiian rights to growing kalo and gathering in, among, and around East Maui streams and estuaries, and the exercise of other rights for religious, cultural, and subsistence purposes. Specifically, the rights of members to engage in such practices in, on, and near Waikamoi, Puohokamoa, Ha'ipua'ena, Punalau/Kōlea, Honomanū, West Wailuāiki, East Wailuāiki, Kopili'ula, and Pua'aka'a, Waiohue, Pa'akea, Kapā'ula, Hanawī streams from HRS § 1-1 and HRS § 7-1 and protected under HRS § 174-101." (CWRM D&O, FOF 13). The petitioners' request for a contested case identified 5 of the 6 streams that had their IIFS amended, and 8 of the 13 streams that had been left at status quo IIFS under the CWRM May 25, 2010 decision. The May 25, 2010 decision did not revisit the CWRM Priority Streams D&O.

Also on June 3, 2010, the MDWS filed a contested case petition to be a party in a contested case hearing before the CWRM citing the reasons that: 1) any decision will directly affect their ability to provide water for domestic and agricultural purposes; and 2) being the public water

[10] The six streams that were amended during this stage were Hanawī, Makapipi, Waikamoi, West Wailuāiki, East Wailuāiki, and Waiohue.

supplier for the County of Maui, they are in the best position to represent the public's interest in continued use of these resources for the Upcountry Maui public water supply. On October 18, 2010, the CWRM voted to deny the petitions filed by Nā Moku and MDWS.

On November 17, 2010, Nā Moku filed a notice of appeal, contending that the CWRM erred in: 1) concluding that Nā Moku had no right to a contested case hearing; and 2) reaching its underlying decision regarding IIFS amendment for the 19 streams at issue. The Intermediate Court of Appeals ordered the CWRM to proceed with a contested case hearing by decision issued November 30, 2012. (*In re Interim Instream Flow Standards for Waikamoi*, 128 Hawai`i 497, 291 P.3d 395 (Ct. App. 2012)).

On January 29, 2014, the CWRM appointed Dr. Lawrence Miike as Hearings Officer. He proposed that the contested case address all 27 streams in an integrative approach and not just the 13 streams named in the request for the contested case by the NHLC in 2010. On August 20, 2014, the CWRM voted to "*authorize, order, delegate, and direct*" the Hearings Officer to conduct a contested case hearing on the petitions ~~Petitions~~ to amend ~~Amend~~ the IIFS for all 27 streams filed by the NHLC in 2001.

Between March 2, 2015 and April 2, 2015, 15 days of hearings were held, during which 36 witnesses testified and an additional 16 witness statements and approximately 550 exhibits were introduced into evidence from various parties, including the Hearings Officer. (CWRM D&O, FOF 27). On October 2, 2015, Nā Moku and Maui Tomorrow Foundation jointly, HC&S, and MDWS submitted their proposed Findings of Fact, Conclusions of Law, and Decision & Order to the Hearings Officer.

On January 6, 2016, A&B announced that HC&S was ceasing sugarcane cultivation in Central Maui and was transitioning to a diversified agriculture farming model. (CWRM D&O, FOF 29).

On January 15, 2016, the Hearings Officer submitted his Proposed D&O to the CWRM and the parties. Dr. Miike's proposed IIFS would have increased flows in 12 of the 22 streams diverted by the EMI Aqueduct System that were subject to the contested case, restoring approximately 18 mgd to the streams (CWRM D&O, FOF 46-47). Six of the 12 streams would have had their flows returned to their undiverted, natural flows.

On March 10, 2016, the CWRM directed the Hearings Officer to "reopen the hearing to address A&B's decision of January 6, 2016 to change HC&S's business operations from farming sugar to a diversified agricultural model." (CWRM D&O, FOF 31). This is due to the fact that A&B's decision to change farming practices would have a different impact on surface waters and management strategies compared to the former sugar operations.

Shortly after the hearing reopened, on April 20, 2016, A&B announced it would voluntarily fully restore flow to the eight Priority Streams identified by the NHLC in its 2001 petitions ~~Petitions~~. These streams were, as noted above, Honopou, Hanehoi (including Puolua), Waiokamilo, Kualani (more correctly called East Waiokamilo Stream), Piʻinaʻau, Palauhulu, and East and West Wailuānui (CWRM D&O, FOF 33).

On July 28, 2017, the Hearings Officer submitted his Proposed D&O to the CWRM and the parties, and on August 2, 2017, he submitted his Amended D&O to the CWRM and the parties.

On June 20th, 2018, the CWRM issued its D&O for the 27 East Maui streams that had been subject to IIFS petitions ~~Petitions~~ that evolved through several CWRM proceedings since May 2001. The 2018 CWRM D&O is described in more detail in Section 1.3.4 ~~1.1.4~~.[7][11]

1.3.4 Interim Instream Flow Standard Decision and Order

The June 20, 2018 CWRM D&O establishes a quantity of water that must remain in each of the petitioned streams at specified locations ~~subject to the IIFS Petitions~~. The CWRM D&O does not specifically authorize or allocate amounts of water for offstream uses. The CWRM evaluated each of the petitioned streams ~~under the IIFS Petitions~~ individually, analyzing their flow characteristics, instream uses, offstream uses, habitat restoration potential for fish and other stream animals, recreational opportunities, and scenic values. Then the streams were looked at in an integrative approach with consideration for the overall ecological ramifications of the decision. The CWRM also considered the economic ramifications of its decision on offstream uses, with a specific focus on supporting public uses such as drinking water, as well as diversified agriculture.

Theoretical models of un-diverted total and base flows were used in the majority of the streams to set the IIFS. The IIFS is a numeric flow rate, measured in cubic feet per second (cfs) that must remain in the stream at a certain location. The CWRM used a median base flow (BFQ_{50}) to make their decision, which is an amount of stream flow that can be expected to be found in the stream at least 50% of the time. Base flow is a smaller component of the stream's total flow. Total flow includes water input from normal rainfall and storm events. Depending on the location, the base flow standard can vary, therefore it is typically measured at a lower elevation downstream that is more accessible.

To set the IIFS, the CWRM grouped the streams into four broad categories with different objectives and management strategies: (i) conveyance of water to kalo growing areas for community use; (ii) water for streams with high biological value, (iii) water for streams that have barriers to biological or ecological improvements, and (iv) noninstream use of water for municipal and agricultural uses. (See Figure 1-4 ~~1-3~~). The CWRM D&O significantly reduces the amount of water that can be diverted for offstream uses relative to the capacity and use of the EMI Aqueduct System when sugar was being cultivated. Ten streams were ordered to have no diversions at all (one of which, Waiokamilo, had stream flow fully restored in 2007) (referred to as "Fully Restored Streams" in Figure 1-4 ~~1-3~~), 5 were required to return 64% of BFQ_{50} in the stream at all times (CWRM D&O, COL 28) (referred to as "Habitat Streams" in Figure 1-4 ~~1-3~~), and 7 were required to have 20% of instream flow (CWRM D&O, COL 30) ~~BFQ^{50}~~ in the stream at all times (referred to as "Connectivity Streams" in Figure 1-4 ~~1-3~~). Only two of the petitioned streams that are diverted by the EMI Aqueduct System (Waia'aka and Wahinepe'e Streams) did not have their IIFS amended. Twelve diverted streams within the License Area were not subject to any petitions (the non-petitioned streams) and therefore maintain their status quo flow standards.

It should also be noted that the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within the EMI Aqueduct System. The

[11] The CWRM found that there were 24, not 27, streams that were the subject of the contested case. The difference being that (i) Waikani is not a stream but a waterfall of Wailuānui Stream; (ii) Alo is a tributary of Waikamoi Stream; (iii) Pua'aka'a is a tributary of Kopili'ula Stream; and (iv) Pi'ina'au and Palauhulu are separate streams that join together before reaching the ocean (CWRM D&O, FOF 56).

information obtained is reported to CWRM on a monthly basis. Moreover, in conjunction with the revocable permits, EMI submits quarterly reports that summarize water usage for that particular quarter, including the distribution of that water on the Central Maui agricultural fields by crop type, location and acreage, and additional information that includes (but is not limited to) the following:

1. That EMI is in compliance with the June 20, 2018 order of CWRM establishing the IIFS for East Maui.
2. That no water is wasted, and if the BLNR finds that a use of water is not reasonable and beneficial and does not comply with the permitted uses, such water uses shall be ceased within a timeframe determined by the DLNR.
3. A status update as to the degree to which the flow of each stream has been restored, and which structures have been removed as required by CWRM.
4. An update on meetings of an interim committee established by the BLNR to discuss water usage issues in the License Area. This committee consists of five members, representing A&B, Maui Farm Bureau, Office of Hawaiian Affairs, Native Hawaiian Legal Corp, and the County of Maui. Pursuant to the conditions of the 2021 revocable permits, a member of the Huelo Community Association was added to the committee.
5. An estimate of water requirements for each crop per acre per day

Conveyance of Water to Kalo Growing Areas for Community Use

The CWRM ordered that all diversions on the following streams cease to allow for all water to flow to the taro growing areas or for community and non-municipal domestic uses: Honopou, Huelo/Puolua, Hanehoi, Pi'ina'au, Palauhulu, Waiokamilo, Wailuānui, West Wailuāiki, Waiohue, ~~'Ōhi'a/Waianu, Kualani/Hāmau,[12]~~ and Makapipi. (see CWRM D&O at 268-269, and see CWRM D&O, Conclusions of Law (COL) 138).[13] All diversions for these streams are required to be modified so that no out-of-watershed transfers will occur from these streams, which will have uninterrupted free flowing water to the communities that depend upon them. It was not the CWRM's intent to regulate where and how much water will be used for traditional kalo agriculture or how the water will be apportioned amongst the kalo lo'i. The CWRM's approach does not automatically set precedents for other areas, but provides a model of water use that integrates traditional culture with modern natural resource management (CWRM D&O, COL 138-145).

Water for Streams With High Biological Value

Some of the petitioned streams have the potential to benefit greatly from the restoration of flow to 64% of the median base flow (BFQ_{50}), which generally represents the flow necessary to restore 90% of the habitat in a stream (H_{90}), based on the biological diversity and habitat that already exists. These streams were ordered to be restored to allow the stream species to flourish and reproduce, benefitting not only the natural environment but also allowing for better opportunity for the exercise of traditional and Hawaiian right (CWRM D&O, COL 131). These streams are: ~~Pi'ina'au, Wailuānui,~~ Honomanū, Punalau/Kolea, Waikamoi, ~~Nua'ailua,~~ East

~~[12] Although this stream continues to be referred to as "Kualani", it is in fact the easternmost tributary of Waiokamilo Stream and now known as "East Waiokamilo Stream." Kualani Stream is below the EMI Aqueduct System and has never been diverted (CWRM D&O, FOF 62,184,186).~~

[13] Waiohue and West Wailuāiki Stream are "Habitat Streams" ordered to be fully restored as they will be used as reference streams to be studied in the future to see the impact, if any, of full restoration versus habitat restoration.

Wailuāiki, and Kopili'ula, ~~and Waiohue~~ (see CWRM D&O at 268-269, and see CWRM D&O, COL 131).

Moreover, the CWRM determined that West Wailuāiki present a unique research opportunity to collect valuable information regarding the impact of full restoration of a stream versus habitat restoration (H_{90}). East and West Wailuāiki lie in close proximity to each other with similar biological values and similar habitat biota. The CWRM intends for these two streams to be studied in the future in combination with one another to see the impact, if any, of full restoration versus habitat restoration (CWRM D&O, COL 135). Thus, West Wailuāiki Stream is ordered to be fully restored pursuant to the CWRM D&O.

Honomanū Stream is a gaining stream from above the Lower Kula Ditch to ~~Spreckles~~ Spreckels Ditch. Below the ~~Spreckles~~ Spreckels Ditch it becomes a losing stream most likely as a result of the diversion. Honomanū Stream, despite having several diversions on it, has a high biological rating with a potential for high natural habitat gains with the restoration of flow to the dry reaches. Thus, the CWRM ordered that Honomanū Stream should have full streamflow restoration below the Lower Kula Ditch diversion, which provides water for the MDWS system that is used for domestic and agricultural uses. (CWRM D&O, COL 136).

Water for Streams That Have Barriers to Biological or Ecological Improvements

Various streams within the License Area have low biological ratings and or do not have the potential to improve drastically with increased flows. To allow for some movement of biota, these streams should allow for a minimum connectivity flow across diversion structures to allow for passage of biota upstream. This minimum connectivity flow would be twenty percent (20%) of the instream flow ~~These streams were set at connectivity flow which is twenty percent (20%) of the instream flow~~ (CWRM D&O, COL 30). Streams that are set at connectivity flow are: Kapā'ula, Pa'akea, Pua'aka'a, Puohakamoa, Ha'ipua'ena, Nua'ailua, ~~Waia'aka,~~ and Hanawī. (CWRM D&O at 268-269, and see CWRM D&O, COL 146). None of these streams have registered diversions for taro cultivation nor is there taro cultivation known to occur on these streams (CWRM D&O, COL 147).

Noninstream Use of Water for Municipal and Agricultural Uses

The CWRM acknowledged that in the context of a proceeding to set the IIFS, it does not have the authority to determine how much water may be used for noninstream use for municipal and agricultural uses. That authority lies with the BLNR in issuing a water lease pursuant to HRS § 171-58, which water ~~the~~ lease would be subject to the IIFS set by the CWRM. (CWRM D&O, COL 148). Recognizing that the noninstream uses, especially municipal use, are valued uses, the CWRM set the IIFS to allow the MDWS to continue to divert water through its Upper and Lower Kula pipelines. (CWRM D&O, COL 149). In not requiring full restoration of all streams, the CWRM has allowed some streams to continue to be diverted so that the BLNR may continue to license the diversion of water not needed to meet the IIFS from those streams for noninstream uses. The available water would also include freshets and stormwater which are not included in the calculation of the IIFS. (CWRM D&O, COL 150).

The CWRM recognized that the EMI Aqueduct System remains a valuable asset that delivers noninstream public trust benefits, such as drinking water, as well as other reasonable and beneficial uses. The reduction in diversions does not, by itself, compromise the structural integrity of the EMI Aqueduct System so long as it continues to be maintained as a single coordinated system. CWRM considered factors that contribute to the operational capacity of the

existing EMI Aqueduct System by allowing some water diversions from streams in the higher elevation eastern portion of the watershed. (CWRM D&O, COL 151).

The CWRM recognized that the stream water that may be leased/licensed by the BLNR from the petitioned East Maui streams may not be sufficient to satisfy the full implementation of a diversified agricultural plan for Central Maui. However, the CWRM expected that a sufficient amount of noninstream water would be available to provide the initial phase of allowing lands already designated as Important Agricultural Lands (IAL) under HRS Chapter 205 in Central Maui to be developed for diversified agriculture. (CWRM D&O, COL 152).

The CWRM D&O does not require the removal or modification of every diversion. The CWRM's intent is that diversion structures only need to be modified to the degree necessary to accomplish the IIFS, and not for the complete removal of diversions, unless necessary to achieve the IIFS. The CWRM's intent is to allow for the continued use and viability of the EMI Aqueduct System (CWRM D&O at p. 269).

Tables 1-2 and 1-3 below~~,~~ show the streams that are within the License Area as presented in the Environmental Impact Statement Preparation Notice (EISPN) and the CWRM D&O, and a discussion reconciling the difference between Tables 1-2 and 1-3. Table 1-3 includes ~~the CWRM D&O regarding~~ the 24 streams subject to the IIFS Petitions as presented in the CWRM D&O. Streams are listed from East to West, starting with those in the Nāhiku portion of the License Area.

1.3.4.1 CWRM IIFS D&O Stream Identification

Due to discrepancies in names used in reference to various streams, tributaries and a waterfall in the License Area, for this ~~Draft~~ Final Environmental Impact Statement (FEIS) ~~(DEIS)~~, the stream names used in the CWRM D&O are used in the text, tables, maps and the various appended studies, to the extent possible. The discrepancies in stream names between what was used in the CWRM D&O and what was contained in the EISPN~~,~~ are reconciled in Table 1-2 below, which lists in the left column the streams considered to be within the License Area as presented in Table 1-2 of the EISPN. Table 1-2 lists a total of 40 items, 39 of which are considered streams and one of which (Waikani) is a waterfall. In contrast, the CWRM D&O specified 36 streams in the License Area.~~9~~[14]

In this FEIS ~~DEIS~~, the CWRM D&O listing of streams and nomenclature will be used; however, diacritical markings, which are inconsistently used in the CWRM D&O, have been retained or added, as appropriate. Moreover, some of the stream names even had different spelling variations. The EIS used the nomenclature that was most consistent throughout the CWRM D&O. The items highlighted are those that differ in some way from the CWRM D&O. The highlighted items are explained in the Notes column.

Table 1-2: License Area Streams as presented in Table 1-2 in the EISPN (February, 2017) Reconciled with Stream Names Used in the CWRM D&O (June 20, 2018)

[14] ~~This~~ The DEIS identified ~~identifies~~ 37 streams within the License Area. Puakea Stream was not identified by in the CWRM D&O as a stream within the License Area that is diverted by the EMI Aqueduct System. In the DEIS stage, Puakea Stream was assumed to be an individual stream. However, it has since been determined that Puakea is in fact a tributary to Pa'akea Stream.

Table 1-2: License Area Streams as presented in Table 1-2 in the EISPN (February, 2017) Reconciled with Stream Names Used in the CWRM D&O (June 20, 2018)				
License Area	**No.**	**Stream Name**	**Notes: Reconciliation with CWRM D&O**	**Revised Count**
Nāhiku	1	Makapipi		1
Nāhiku	2	Hanawī		2
Nāhiku	3	Kapā'ula		3
Ke'anae	4	Wai'aka	Referenced "Waia'aka" per CWRM D&O	4
Ke'anae	5	Pa'akea		5
Ke'anae	6	Puakea	Not identified in the License Area under CWRM D&O. This is a tributary to Pa'akea Stream	~~6~~5A
Ke'anae	7	Waiohue		~~7~~6
Ke'anae	8	Puaka'a	Referenced as "Kopili'ula (Pua'aka'a tributary with a separate restoration status)" per CWRM D&O	~~N/A~~7A
Ke'anae	9	Kopili'ula		~~8~~7
Ke'anae	10	East Wailuā-iki		~~9~~8
Ke'anae	11	West Wailuā-iki		~~10~~9
Ke'anae	12	East and West Wailuānui	Referenced "Wailuānui" per CWRM D&O	~~11~~10
Ke'anae	13	Waikani	Due to Waikani being a waterfall it was combined with Wailuānui above	N/A
Ke'anae	14	Kualani	Referenced as "Kualani (or Hāmau)" per CWRM D&O	~~12~~11
Ke'anae	15	Waiokamilo		~~13~~12
Ke'anae	16	Palauhulu	Transposed sequence with 'Ōhi'a (or Wainu) below	~~15~~14
Ke'anae	17	Waianu/'Ōhi'a	Referenced as "'Ōhi'a (or Waianu)" per CWRM D&O and, transposed sequence with Palauhulu above	~~14~~13
Honomanū	18	Pi'ina'au	EISPN noted Pi'ina'au in the Honomanu	~~16~~15

Table 1-2: License Area Streams as presented in Table 1-2 in the EISPN (February, 2017) Reconciled with Stream Names Used in the CWRM D&O (June 20, 2018)				
			License Area; CWRM D&O has it in Keʻanae License Area	
Honomanū	19	Nuaʻailua		~~17~~16
Honomanū	20	Honomanū		~~18~~17
Honomanū	21	Kōlea/Punalaʻu		~~19~~18
Honomanū	22	Haʻipuaʻena		~~20~~19
Huelo	23	Puohokamoa		~~21~~20
Huelo	24	Wahinepeʻe		~~22~~21
Huelo	25	Alo	Combined with Waikamoi below as a tributary	
Huelo	26	Waikamoi	Referenced as "Waikamoi (Alo tributary)" per CWRM D&O	~~23~~22
Huelo	27	Kōlea		~~24~~23
Huelo	28	Punaluʻu		~~25~~24
Huelo	29	Kaʻaiea		~~26~~25
Huelo	30	ʻOʻopuola	Referenced as "ʻOʻopuola (Makanali tributary)" per CWRM D&O	~~27~~26
Huelo	31	Puehu		~~28~~27
Huelo	32	Nāʻiliʻilihaele	Nāʻiliʻilihaele (diacritical markings added)	~~29~~28
Huelo	33	Kailua/Ohanui		~~30~~29
Huelo	34	Hanauana	Referenced as "Hanahana (Ohanui tributary)" per CWRM D&O, also referred to as Hanawana	~~31~~30
Huelo	35	Hoalua		~~32~~31
Huelo	36	Pualoa/Hanehoi	Referenced as "Hanehoi (Huelo (also known as Puolua) with a separate restoration status) tributary" per CWRM D&O	~~33~~32
Huelo	37	Waipiʻo		~~34~~33
Huelo	38	Mokupapa		~~35~~34
Huelo	39	Hoʻolawa-Liʻili/Hoʻolawa-Nui	Referenced as "Hoʻolawa (Hoʻolawa ʻili	~~36~~35

Table 1-2: License Area Streams as presented in Table 1-2 in the EISPN (February, 2017) Reconciled with Stream Names Used in the CWRM D&O (June 20, 2018)				
			and Ho'olawa nui tributaries)" per CWRM D&O	
Huelo	40	Honopou	Referenced as "Honopou (Puniawa tributary)" per CWRM D&O	~~37~~36

1.3.4.2 IIFS D&O Table

Table 1-2 in the EISPN also indicated which of the listed streams[15] were subject to the petitions ~~Petitions~~ for IIFS. Table 1-3 below indicates which of the ~~37~~ 36 streams within the License Area are subject to the CWRM D&O and also shows ~~what~~ the required restoration status and location of the IIFS under the CWRM D&O. (See generally CWRM D&O, FOF 59, and CWRM D&O, Order at page 268-269). Table 1-3 below also identifies the non-petitioned diverted streams within the License Area.

Table 1-3 Petitioned and Non-Petitioned Streams – 2018 IIFS D&O Flow Restoration Table ~~Streams In The License Area as Presented in CWRM D&O~~						
Area	**#**	**Stream Name**	**~~Subject to IIFS~~ Petitioned Stream**	**CWRM Ordered Restoration Status**	**Median Base Flow at IIFS (cfs)**	**IIFS Location**
Nāhiku	1	Makapipi	Yes	Full	1.3	Above Hāna Highway
	2	Hanawī	Yes	Connectivity	4.6	Below Hāna Highway
	3	Kapā'ula	Yes	Connectivity	2.8	On Diversion at Koolau Ditch
Ke'anae	4	Waia'aka	Yes	~~None~~ Status Quo	0.77	Above Hāna Highway
	5	Pa'akea	Yes	Connectivity	0.9	At Hāna Highway
	~~6~~	~~Puakea~~	~~No~~	~~N/A~~	~~N/A~~	~~N/A~~
	~~7~~6	Waiohue	Yes	Full	5	At Hāna Highway

[15] Any reference to a stream or streams in the EIS is intended to include related tributaries unless stated otherwise.

Table 1-3 Petitioned and Non-Petitioned Streams – 2018 IIFS D&O Flow Restoration Table ~~Streams In The License Area as Presented in CWRM D&O~~						
Area	**#**	**Stream Name**	**~~Subject to IIFS~~ Petitioned Stream**	**CWRM Ordered Restoration Status**	**Median Base Flow at IIFS (cfs)**	**IIFS Location**
	~~8~~7	Kopili'ula	Yes	~~Limited~~ Habitat (H_{90})	~~H90 (64% of the Median Base Flow)(For Habitat Restoration)~~ 5.0	Below Hāna Highway
	~~8~~7A	Pua'aka'a Tributary of Kopili'ula	Yes	Connectivity	1.1	Above Hāna Highway
	~~9~~8	East Wailuāiki	Yes	~~Limited~~ Habitat (H_{90})	~~H90 (64% of the Median Base Flow)(For Habitat Restoration)~~ 5.8	At Hāna Highway
	~~10~~9	West Wailuāiki	Yes	Full	6	Above Hāna Highway
	~~11~~10	Wailuānui (Waikani Waterfall)	Yes	Full	6.1	At Hāna Highway
	~~12~~11	Kualani (or Hāmau) (Below Ditch System)	Yes	~~None~~ Status Quo (Never Diverted)	N/A	N/A
	~~13~~12	Waiokamilo	Yes	Full	3.9	Below Diversion at Koolau Ditch
	~~14~~13	'Ōhi'a (or Waianu) (Below Ditch System)	Yes	~~None~~ Status Quo (Never Diverted)	4.7	N/A

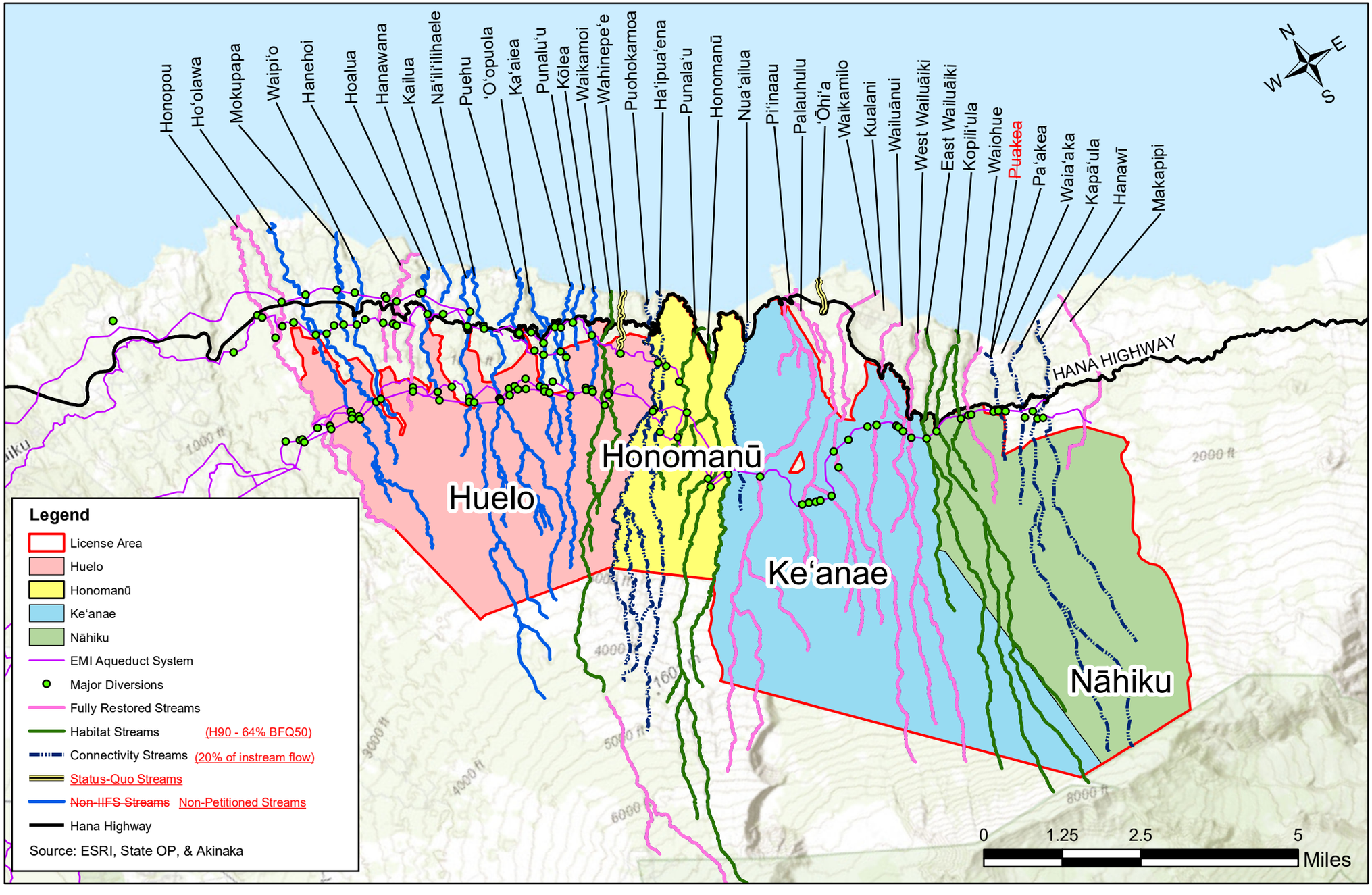
Table 1-3 Petitioned and Non-Petitioned Streams – 2018 IIFS D&O Flow Restoration Table ~~Streams In The License Area as Presented in CWRM D&O~~						
Area	**#**	**Stream Name**	**~~Subject to IIFS~~ Petitioned Stream**	**CWRM Ordered Restoration Status**	**Median Base Flow at IIFS (cfs)**	**IIFS Location**
	~~15~~14	Palauhulu (Hau'oli Wahine and Kano Tributaries)	Yes	Full	11	Above Hāna Highway
	~~16~~15	Pi'ina'au	Yes	Full	14	Above Hāna Highway
Honom-anū	~~17~~16	Nua'ailua	Yes	Connectivity	0.28	TBD
	~~18~~17	Honomanū	Yes	~~Limited~~ Habitat (H_{90})	~~H90 (64% of the Median Base Flow)(For Habitat Restoration)~~ 4.2	Above Hāna Highway
	~~19~~18	Punala'u (Kōlea and Ulunui Tributaries)	Yes	~~Limited~~ Habitat (H_{90})	~~H90 (64% of the Median Base Flow)(For Habitat Restoration)~~ 4.5	Above Hāna Highway
	~~20~~19	Ha'ipua'ena	Yes	Connectivity	4.9	Below Hāna Highway
Huelo	~~21~~20	Puohokamoa	Yes	Connectivity	8.4	Below Hāna Highway
	~~22~~21	Wahinepe'e	Yes	~~None~~ Status Quo	0.9	Above Hāna Highway

Table 1-3 Petitioned and Non-Petitioned Streams – 2018 IIFS D&O Flow Restoration Table ~~Streams In The License Area as Presented in CWRM D&O~~						
Area	**#**	**Stream Name**	**~~Subject to IIFS~~ Petitioned Stream**	**CWRM Ordered Restoration Status**	**Median Base Flow at IIFS (cfs)**	**IIFS Location**
	~~23~~22	Waikamoi (Alo Tributary)	Yes	~~Limited~~ Habitat (H_{90})	~~H90 (64% of the Median Base Flow)(For Habitat Restoration)~~ 6.7	Above Hāna Highway
	~~24~~23	Kōlea	No	~~None~~ Status Quo	N/A	N/A
	~~25~~24	Punalu'u	No	~~None~~ Status Quo	N/A	N/A
	~~26~~25	Ka'aiea	No	~~None~~ Status Quo	N/A	N/A
	~~27~~26	'O'opuola (Makanali Tributary)	No	~~None~~ Status Quo	N/A	N/A
	~~28~~27	Puehu	No	~~None~~ Status Quo	N/A	N/A
	~~29~~28	Nā'ili'ilihaele	No	~~None~~ Status Quo	N/A	N/A
	~~30~~29	Kailua	No	~~None~~ Status Quo	N/A	N/A
	~~31~~30	Hanahana (Ohanui Tributary – also known as Hanawana and Hanauna)	No	~~None~~ Status Quo	N/A	N/A
	~~32~~31	Hoalua	No	~~None~~ Status Quo	N/A	N/A
	~~33~~32	Hanehoi	Yes	Full	2.54	Upstream of Lowrie Ditch
	~~33~~32A	Huelo (also known as Puolua) Tributary	Yes	Full	1.47 at Huelo	Downstream of Haiku Ditch at Huelo
	~~34~~33	Waipi'o	No	~~None~~ Status Quo	N/A	N/A

Table 1-3 Petitioned and Non-Petitioned Streams – 2018 IIFS D&O Flow Restoration Table ~~Streams In The License Area as Presented in CWRM D&O~~						
Area	**#**	**Stream Name**	**~~Subject to IIFS~~ Petitioned Stream**	**CWRM Ordered Restoration Status**	**Median Base Flow at IIFS (cfs)**	**IIFS Location**
	~~35~~34	Mokupapa	No	~~None~~ Status Quo	N/A	N/A
	~~36~~35	Hoʻolawa (Hoʻolawa ili and Hoʻolawa nui Tributaries)	No	~~None~~ Status Quo	N/A	N/A
	~~37~~36	Honopou (Puniawa Tributary)	Yes	Full	6.5	Below Hāna Highway

*Some of these streams may be identified by other names. The listed names are based on the June 20, 2018 CWRM D&O identified by the CWRM and the State Office of Planning's GIS data.
*H_{90} is 64% of the median base flow at that stream. These streams are for habitat restoration
*cfs – Cubic Feet per Second, the IIFS numeric flow rate at the IIFS location.
*Huelo is considered to be a tributary to Hanehoi Stream but is identified for "Full" restoration.

Figure 1-4 ~~1-3~~ corresponds with the Table 1-3 above and depicts the CWRM D&O status of each stream as to whether streamflow has been or will be fully restored, partially restored for habitat restoration, and those that may be diverted for offstream uses ("Noninstream Use of Water for Municipal and Agricultural Uses"). As previously discussed, some of these streams may be identified by a different name. The names used in Figure 1-4 ~~1-3~~, are those used in the CWRM D&O matched against the names used in the State Office of Planning's GIS data layer for streams. However, two streams identified in the CWRM D&O, Kualani and Waiaʻaka, do not have associated GIS data and, therefore, could not be precisely located on the map. Puakea Stream, which was not expressly ~~a stream within the License Area that was not~~ identified in the CWRM D&O, and does not have associated GIS data, is a tributary of Paʻakea Stream. For these streams, their approximate locations are shown, based on the geographically sequential listing of stream names in the CWRM D&O.



~~FIGURE 1-3~~ FIGURE 1-4

CWRM IIFS DECISION & ORDER MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KEʻANAE, HONOMANŪ, AND HUELO LICENSE AREAS

1.4 Chapter 343, Hawai'i Revised Statutes (Hawai'i EIS Law)

Compliance with the requirements of HRS Chapter 343~~, HRS~~ is necessary prior to the BLNR's issuance of a Water Lease. Under HRS ~~Section~~ § 343-5(e), whenever an applicant proposes an action specified by HRS § 343-5(a) that requires approval of an agency, and that action is not declared exempt under HRS § 343-6, the applicant must engage in the environmental review process set forth under HRS Chapter 343. Under HRS § 343-2, "approval" means a discretionary consent required from an agency prior to actual implementation of an action, and the term "discretionary consent" means a consent, sanction, or recommendation from an agency for which judgment and free will may be exercised by the issuing agency, as distinguished from a ministerial consent. The BLNR's decisions related to the requested issuance of a water lease at public auction in accordance with HRS Chapter 171, will be an exercise within the BLNR's discretion. The applicable "trigger" requiring compliance with HRS Chapter 343~~, HRS~~, includes the proposed continuing use of State lands in the License Area, including water resources from those lands.

For the purposes of HRS Chapter 343, the applicant for the Water Lease is A&B, pursuant to orders of the BLNR in April and June of 2016, directing A&B to prepare an EIS. In accordance with the HAR of the State of Hawai'i Department of Health (DOH), ~~Section~~ § 11-200-4(b), the BLNR, as the executive board of the DLNR, is the accepting authority for the proposed EIS because the DLNR is the agency initially receiving and agreeing to process the request for the issuance of a Water Lease at public auction.

In connection with its May 2001 submittal, A&B offered to perform the environmental review required under HRS Chapter 343. However, as part of its request for a contested case hearing on the lease matter, the NHLC on behalf of Nā Moku objected to A&B undertaking the environmental review process, and asserted that the HRS Chapter 343 documents had to be prepared by the BLNR. NHLC did not withdraw its objection regarding the preparation of the HRS Chapter 343 environmental documents until oral arguments before the BLNR in May 2015, which withdrawal was then documented in the April 14, 2016 order issued by the BLNR, directing A&B to commence the environmental review process and provide a scope of work for the preparation of an environmental review document pursuant to HRS Chapter 343. The BLNR instructed that the scope of work should distinguish between those matters that could be undertaken prior to issuance of the CWRM D&O, and those matters that required the final CWRM D&O.

On June 9, 2016, A&B submitted to the BLNR a Scope of Services for Preparation of a Chapter 343, HRS Environmental Impact Statement for Proposed Lease for the Nāhiku, Ke'anae, Honomanū, and Huelo License Areas. By order dated July 8, 2016, the BLNR acknowledged that the scope of work provided the information requested and instructed that "A&B and EMI should proceed with the preparation of an environmental impact statement (EIS) in as expeditious manner as possible." The EISPN was published on February 8, 2017. Public scoping meetings were held on Maui on February 22, 2017 in Kahului, and February 23, 2017 in Ha'ikū for the DEIS (See Chapter 9 and Appendices K-1, K-2, L, and M). The CWRM D&O setting forth its decisions on the IIFS petitions ~~Petitions~~ was issued on June 20, 2018.

1.5 The Public Trust Doctrine

Several comments received during the DEIS 45-day public review and comment period raised questions about the Public Trust Doctrine as it relates to the Proposed Action. Surface water

being a public trust resource, the Proposed Action requires the BLNR, as the public trustee of the water sources proposed for Water Lease to comply with the State of Hawai'i constitutional and statutory provisions that, together with relevant case law, comprise the Public Trust Doctrine. The dual roles of the BLNR and its sister agency, the CWRM, as public trustees with regard to the amount of surface water that the Public Trust Doctrine requires to be left undiverted from the streams within the License Area, is one of the subjects of the still-pending contested case hearing on A&B's 2001 request that the BLNR issue the subject long-term Water Lease at public auction (Proposed Action). As such, it is anticipated that the BLNR, in its decision-making regarding the requested issuance of the long-term Water Lease, will follow the judicial guidance that has been given regarding what is necessary for the BLNR to comply with the requirements of the Public Trust Doctrine.

In its October 10, 2003 *Order Affirming in Part and Reversing in Part BLNR's Finding of Fact and Conclusions of Law and Order dated January 10, 2003*, the Circuit Court of the First Circuit, ruled that:

> [T]he BLNR is not required to conduct a parallel investigation [with CWRM]. In the process of determining whether there is any surplus water which would be in the best interest of the state to lease for 30 years, the BLNR is entitled to rely on and use any determination of the CWRM to establish instream flow standards, whether as a result of Appellant Na Moku Aupuni O Ko`olau's filing of 27 petitions to amend interim instream flow standards, or any other request, or pursuant to CWRM's exercise of its statutory obligations to protect riparian rights, native Hawaiian rights, or in the discharge of any of its other obligations. However, if there is no CWRM determination to amend instream flow standards, then any BLNR investigation it could itself perform on these issues would not be parallel to the CWRM. If the BLNR believes it does not have the requisite expertise to investigate, then it should wait until the CWRM has acted or make its own application to establish instream flows reflecting the diversion it proposes to make, before authorizing the diversion.
>
> In any case, given the provisions of the Hawai'i Constitution, neither the BLNR nor this Court can rubber-stamp any determination of the CWRM. Rather, the BLNR is obligated to make a truly independent investigation as to whether it's in the state's best interest to authorize the diversion of water from East Maui streams.

As noted in Section 1.3.4 above, on June 20, 2018 the CWRM issued the CWRM D&O which "establishes a quantity of water that must remain in each stream at specified locations subject to the IIFS Petitions." In doing so, the CWRM noted that it was required by HRS, § 174C-71(2)(D), to "*weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses."* (CWRM D&O, COL 20).

Therefore, it is expected that the BLNR will consider the CWRM's instream flow determinations, as further informed by the data and analyses contained in this EIS, together with such other information as may otherwise be developed by or presented to the BLNR, to comport its decision-making on the Proposed Action with the Public Trust Doctrine. The balancing that the BLNR is required to perform under the Public Trust Doctrine was described at length by the

Hawai'i Supreme Court in *In Re Water Use Permit Applications*, 94 Hawai'i 97, 9 P. 3d 409 (2000) (Waiahole I):

> This court has described the public trust relating to water resources as the authority and duty "to maintain the *purity and flow* of our waters for future generations *and* to assure that the waters of our land are put to *reasonable and beneficial uses*." . . . Similarly, article XI, section 1 of the Hawai'i Constitution requires the state both to "protect" natural resources *and* to promote their "use and development." The state water resources trust thus embodies a dual mandate of 1) protection and 2) maximum reasonable and beneficial use.

Waiāhole I, 94 Hawai'i 97 at 138-39, 9 P.3d at 450-51 (emphases in original) (citation omitted).

> The water resources trust also encompasses a duty to promote the reasonable and beneficial use of water resources in order to maximize their social and economic benefit to the people of this state.

Id.

> The State "shall promote the development and utilization of [water] resources *in a manner consistent with their conservation* and in furtherance of the self-sufficiency of the State."

Id.

> The public has a definite interest in the development and use of water resources for various reasonable and beneficial public and private offstream purposes, including agriculture. *See generally* Haw. Const. art. XI, § 3. Therefore, apart from the question of historical practice, reason and necessity dictate that the public trust may have to accommodate offstream diversions inconsistent with the mandate of protection, to the unavoidable impairment of public instream uses and values.

Id. at 94 Haw. at 141, 9 P.3d at 453.

> We have indicated a preference for accommodating both instream and offstream uses where *feasible*. . . . In times of greater scarcity, however, the state will confront difficult choices that may not lend themselves to formulaic solutions. Given the diverse and not necessarily complementary range of water uses, even among public trust uses alone, we consider it neither feasible nor prudent to designate absolute priorities between broad categories of uses under the water resources trust. Contrary to the Commission's conclusion that the trust establishes resource protection as "a categorical imperative and the precondition to all subsequent considerations," we hold that the Commission inevitably must weigh competing public and private water uses on a case-by-case basis, according to any appropriate standards provided by law.

Id. at 94 Haw. 97, 142, 9 P.3d 409, 454 (2000).

The BLNR is requiring preparation of this EIS and it is intended that the data and analysis herein will assist the BLNR to fulfill its Public Trust obligations in the future, after acceptance of this FEIS, when it is deliberating on the proposed Water Lease.

Chapter 2:
Proposed Action

2. PROPOSED ACTION

2.1 Proposed Action

The Proposed Action constitutes the issuance of one long-term (30-year) Water Lease from the BLNR that grants the lessee the *"right, privilege, and authority to enter and go upon"* the License Area for the *"purpose of developing, diverting, transporting, and using government owned waters"* through the existing EMI Aqueduct System which supplies water to domestic and agricultural water users. The Water Lease, which will be awarded by public auction, will enable the lessee to enter upon lands owned by the State of Hawai'i in order to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System Secondarily, it will facilitate the provision of water to noted locations/water users. For example, it ~~, and~~ will allow for the continued operation of the EMI Aqueduct System to deliver water to the MDWS for domestic and agricultural water needs in Upcountry Maui, including the agricultural users at the KAP and the planned 262-acre KAP expansion.~~, as well as for the Nāhiku community,~~ The Proposed Action will also ensure the continued delivery of water for the Nāhiku community which, through the MDWS, ~~draws up 20,000 to 45,000 gallons per day (gpd), dependent on weather,~~ draws water sourced directly from EMI's West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located on EMI land directly adjacent to the Koolau Ditch. Deliveries for the Nāhiku community have ranged between 8,345 (2018) to 40,925 (2007) gallons per day (gpd) on an average daily basis (MDWS, 2007 – 2018) ~~the EMI Aqueduct System.~~ It will also allow the continued provision of water to approximately 30,000 acres of agricultural lands (formerly in sugarcane) owned by Mahi Pono in Central Maui for Mahi Pono's diversified agricultural operations (which includes agriculture related industrial uses) through Mahi Pono's Central Maui Field Irrigation System. The Proposed Action will not require the use of public funds. A substantial amount of private funds will be used to maintain and operate the EMI Aqueduct System. For the EMI Aqueduct System ~~Total~~ total operational costs for labor, fringe benefits, materials, professional services, taxes, maintenance, anticipated rental payments to the State for the Water Lease, and other expenses are projected to be approximately $2.2 ~~$2.5~~ million per year (Munekiyo, Updated 2020 ~~2019~~).

Independent of the Proposed Action, on June 20, 2018, the CWRM issued its D&O setting IIFS for numerous streams and tributaries of streams in the License Area, which includes water originating and flowing from both State and privately owned lands within East Maui.[1] The CWRM D&O establishes a quantity of water that must remain in each stream at specified locations. The CWRM D&O ordered full stream restoration for 10 streams and partial flow restoration on 12 additional streams (Please refer to Section 1.3.4). Therefore, the maximum amount of water that can be awarded through the Water Lease is what is available for diversion after compliance with the CWRM D&O ~~is implemented~~. This is the premise of the Proposed Action. However, under the Proposed Action, the amount of water diverted at any period will be only what is actually needed at that time.

[1] The CWRM found that there are 24, not 27, streams that were subject to the IIFS contested case because:

- Waikani is not a stream but a waterfall of Wailuānui Stream
- Alo is a tributary of Waikamoi Stream
- Pua'aka'a is a tributary of Kopili'ula Stream

The amount of water awarded by the Water Lease is subject to all applicable requirements under HRS § 171-58. HRS § 171-58(c), (d), and (e) articulate terms for the disposition of the Water Lease. HRS § 171-58(e) requires that any new lease of water rights "shall contain a covenant that requires the lessee and the department of land and natural resources to jointly develop and implement a watershed management plan. The board shall not approve any new lease of water rights without the foregoing covenant or a watershed management plan."

At the March 22, 2019 meeting of the BLNR, the DLNR staff proposed a watershed management cost share formula and contribution for leases of water rights pursuant to HRS § 171-58(e). The BLNR deferred decision-making on the staff's proposal, the consensus was that compliance with the watershed management provision of HRS § 171-58(e) should be determined on a case-by-case basis for each individual water lease. On October 11, 2019, the BLNR approved the minimum content requirements for a watershed management plan. A copy of the BLNR-approved DLNR report is enclosed as Appendix O-1. The components of an acceptable watershed management plan include the following:

1. Purpose, mission, or vision statement
    a. Explains why the plan is needed
    b. Describes what success will look like
2. Watershed inventory
    a. Establishes baseline conditions relative to stated vision
    b. Characterizes the condition and health of the biotic and abiotic components of the watershed
3. Threat and vulnerability assessment
    a. Identifies and prioritizes threats to biological integrity
    b. Identifies and prioritizes vulnerabilities, such as elements at risk due to external factors
4. Goals
    a. Identifies priority outcomes essential to maintain or restore biological integrity to the maximum extent practicable. Generally including, but not limited to:
        i. Removal and control of non-native hooved animals (pigs, goats, deer, sheep, cattle) from important watershed forests.
        ii. Removal or containment of damaging invasive plants and animals that threaten important watershed forests.
        iii. Monitoring and controlling other forest threats including fires, predators, and plant diseases.
        iv. Restoring and out-planting native species in important watershed areas and buffer zones.
        v. Communication, outreach and community education to build capacity for citizen-based watershed protection.
5. Objectives
    a. Description of specific management actions needed to achieve goals
    b. Description of location targeting where the action will occur
    c. Implementation schedules and timeframe
    d. Identification of specific outcomes and performance metrics expected

6. Methods
    a. Identification of strategy, approach, and methods to be employed
    b. Identification of roles and who is responsible for the action
7. Adaptive management
    a. Establishment of measurable objectives, including performance metrics to measure and report the degree to which management actions have been successful in achieving goals and objectives
    b. Monitoring performance metrics to track success
    c. Establishment of a systematic process to review results and employ adaptive management approaches to improve results where needed
8. Budget
    a. An estimate of costs and categories of expenditures needed
    b. Potential sources of funding for implementing the actions
9. References, Sources and Appendices
    a. Literature cited and supporting documents

It is important to note that not all areas face the same threats or require the same type of management and that each watershed management plan will need to be site specific requiring unique management actions. As part of satisfying the minimum content requirements of § 171-58(e), the DLNR will work with each individual water lessee to determine the specific management actions, based on site-specific needs, that will result in the prevention and degradation of surface water and groundwater quantity and quality within the particular water lease area. Moreover, actions to be described in a watershed management plan will be informed by existing watershed management plans (such as the East Maui Watershed Partnership (EMWP) Management Plan, discussed below). To that end, the BLNR delegated authority to the DLNR staff to jointly develop watershed management plans with water lessees to ensure that the watershed management plan aligns with the goals of watershed protection to maintain watershed function and water yield and to restore or maintain a certain level of biological integrity that is the foundation of a healthy watershed.

A&B was a founding member of the ~~East Maui Watershed Partnership (~~EMWP~~)~~, which was the first watershed partnership in the State of Hawai'i and which served as a model for other watershed partnerships throughout the State. Since the founding of the EMWP in 1991, A&B, on its own and through EMI, has actively participated in watershed partnership activities through monetary contributions and in-kind services. The existing EMWP Management Plan was prepared in July 2009 and amended in July 2018, and is attached to the EIS as Appendix O. The EMWP Management Plan describes the watershed area of approximately 100,000 acres of the Makawao and Hāna Districts of Maui. It identifies resources such as water, cultural / physical resources, native flora and fauna resources, and recreational resources. The EMWP Management Plan identifies the watershed threats and management objectives for the East Maui Watershed. Feral animals and invasive plant species were identified as the most significant threats to the East Maui Watershed. Since many weeds gain a foothold in the forest by sprouting in areas opened by feral animals, feral animal control is a necessary starting point for threat abatement and control programs. The management objectives and goals under the EMWP Management Plan include ungulate management, vegetation management, watershed resource monitoring, outreach and education, and providing and maintaining

appropriate management infrastructure to allow for effective management. The EMWP Management Plan also includes a budget for fiscal years 2018 through 2022 to support those goals and objectives (FY 2020 was projected at $911,999). It should also be noted that the EMWP is actively managed by several agencies and organizations, including the EMWP, Maui Invasive Species Committee (MISC), DLNR, etc. in partnership with EMI. Under the Proposed Action, it is anticipated that EMI and/or Mahi Pono will continue to pursue watershed management activities.

2.1.1 Department of Hawaiian Homelands Water Reservation

The Water Lease is also subject to the Department of Hawaiian Home Lands' (DHHL) rights to reserve water sufficient to support current and future homestead needs as provided by ~~Section~~ § 221 of the Hawaiian Homes Commission Act. Until that reservation is physically claimed, however, it is assumed within the assessment of this EIS that the water will be available for use by the lessee. However, the DHHL has cautioned that in light of the fact that no water leases have been issued under HRS § 171-58, and the manner in which reservations are to be actualized has yet to be determined, in addition to any specifications made by the CWRM and BLNR regarding the Water Lease, a separate agreement between the lessor and the DHHL will be necessary to allow any temporary use of water reserved for DHHL. For all proposed state water leases, HRS § 171-58(g) provides:

> The department of land and natural resources shall notify the department of Hawaiian home lands of its intent to execute any new lease, or to renew any existing lease of water rights. After consultation with affected beneficiaries, these departments shall jointly develop a reservation of water rights sufficient to support current and future homestead needs. Any lease of water rights or renewal shall be subject to the rights of the department of Hawaiian home lands as provided by section 221 of the Hawaiian Homes Commission Act.

The DHHL water reservation process involves several steps before a water reservation is formally requested. One step is to hold a DHHL consultation with the beneficiaries in accordance with DHHL's Beneficiary Consultation Policy. Then, following acceptance by the Hawaiian Homes Commission of the Beneficiary Consultation Report and authorization to the Chairperson of the Hawaiian Homes Commission to formally request a water reservation, the Chairperson submits a request for a water reservation to CWRM. CWRM approval is required to establish a DHHL water reservation for purposes of a water lease.

~~In order to help implement this provision, and in accordance with the DHHL policies, the~~ The DHHL held a Beneficiary Consultation on the proposed Water Lease and the DHHL's water reservation on January 14, 2019 at the Paukūkalo Community Center on Maui. Presentations were made by representatives of A&B and Mahi Pono, the DLNR's Land Division, and the DHHL staff and consultants, followed by a question and answer and discussion period. Approximately 40 individuals were in attendance, of whom 24 signed in and 11 voluntarily identified as beneficiaries.

The purpose of the Beneficiary Consultation was to: (1) share information on the request for the BLNR's issuance of a water lease; (2) explain the BLNR's water lease process;

and (3) discuss the DHHL's water needs in the relevant area, including how the DHHL's water needs are identified, the identification of existing water reservations in favor of the DHHL, and other matters necessary to identifying a water reservation for purposes of the State's proposed East Maui Water Lease.

The DHHL has a two-fold interest in state water leases. First, state water leases shall contain reservations of water for the DHHL tracts of land, as described in HRS § 171-58(g) above. Second, thirty percent (30%) of the revenues derived from all water leases issued by the State are deposited into the Native Hawaiian Rehabilitation Fund pursuant to Hawai'i State Constitution Article XII, ~~Section~~ § 1, and is used to fund programs as prioritized in the Native Hawaiian Development Program Plan adopted by the Hawaiian Homes Commission.

In regards to this Water Lease, the DHHL's lands in Ke'anae, Wailuānui, Kēōkea and Waiohuli, and Pulehunui all have, or have had, some relationship with the EMI Aqueduct System.

In identifying its water needs, the DHHL is guided by the DHHL's planning system, which is comprised of the following plans:

- DHHL General Plan
- DHHL Water Policy Plan
- DHHL Maui Island Plan
- DHHL Regional Plans
- DHHL Development Plans

Formulating a water reservation for this proposed Water Lease for purposes of HRS § 171-58(g) is also influenced by the State Water Projects Plan (SWPP) (part of the Hawai`i Water Plan approved by the CWRM), and groundwater reservations for the DHHL that have already been approved by the CWRM pursuant to the SWPP.

The DHHL's Maui Island Plan identifies land use designations for 31,000 acres on Maui and water demands for the different types of land uses (e.g., subsistence agriculture, residential). The SWPP (last adopted by CWRM in June 2020 ~~May 2017~~) calculates water demands based on the DHHL plans and relevant standards (e.g. Maui County Water System Standards). Both the Maui Island Plan and the State Water Projects Plan project water needs over 20-year time frames. The DHHL's water reservation, however, addresses the DHHL water needs in their entirety, beyond the 20-year time frame.

The DHHL has previously secured from the CWRM the following reservations of groundwater:

- 3,000 gpd for Ke'anae-Wailuānui
- 813,000 gpd for Kēōkea-Waiohuli
- 1,734,000 gpd for Pulehunui

Non-potable water needs for the DHHL's lands in Ke'anae-Wailuānui amount to 6,868,000 gpd. Although the DHHL holds a reservation for 3,000 gpd of potable water for this area for development over the next 20 years, another 7,000 gpd of potable water may be required for longer-term development. Thus, a potential reservation for this area amounts

to 6,875,000 gpd. Ke'anae is fed by Pi'ina'au and Palauhulu Streams; Wailuānui is fed by Wailuānui and Waiokomilo Streams. These four streams are, or will soon be, fully restored. The proposed Water Lease, therefore, would not be affected by such reservations of water for the DHHL.

For its agricultural and residential lots in Kēōkea-Waiohuli, the DHHL has already secured a potable water reservation from the CWRM. Non-potable water demand amounts to 10,428,000 gpd for which a water reservation would have to be secured.

Until 2016, the DHHL's Pulehunui lands in Central Maui had been leased to HC&S, cultivated in sugar cane, and, thus served by the irrigation system situated in the Central Maui agricultural fields, which will herein be referred to as the Central Maui Field Irrigation System ~~field irrigation system.~~ The DHHL's current plans for these lands include agricultural, commercial, industrial and civic uses. A reservation of 1,734,000 gpd of ground water has already been secured from the CWRM. A non-potable water demand of 1,027,510 gpd has been identified, and water delivered through the EMI Aqueduct System has been identified as a potential source of this water.

The DHHL staff has identified 11,455,510 gpd (10,428,000 gpd for Kēōkea-Waiohuli + 1,027,510 gpd for Pulehunui) of water as their recommendation for a reservation of water rights sufficient to support current and future homestead needs related to this proposed Water Lease.

~~The DHHL has indicated that reserved water may be available for other purposes until the DHHL has an actual need for the water.~~ For its Kēōkea-Waiohuli and Pulehunui lands, the DHHL will be dependent on the EMI Aqueduct System collecting and transporting East Maui stream waters, in order to get waters to its lands. Should an agreement between the lessor and DHHL be made, it is assumed that until ~~Until~~ actual need materializes, the DHHL would receive payments related to lease rents paid by the lessee for those waters should EMI use a portion/all of the DHHL's Water Reservation, and the DHHL could receive other possible compensation or consideration.

Following the January 2019 Beneficiary Consultation, beneficiaries were given a month to provide additional written comments to the DHHL staff. Thereafter, the DHHL staff would formulate a recommended water reservation for approval by the Hawaiian Homes Commission before it is presented to the CWRM as a request for a water reservation for the East Maui Water Lease, pursuant to HRS § 171-58(g). The results of the Beneficiary Consultation were presented to the Hawaiian Homes Commission on May 30, 2019, as agenda item G-2. A motion was passed by the Hawaiian Homes Commission to accept the Beneficiary Consultation Report on a water reservation related to the EMI Aqueduct System's request for a long-term Water Lease from DLNR, and to reauthorize the Chairman to formally request a related water reservation from the CWRM for Hawaiian Home Lands on the island of Maui. The reservation request approved by the Hawaiian Homes Commission related to the EMI Aqueduct System is for 11,455,510 gpd (which is comprised of 10,428,000 gpd of non-potable water for Kēōkea-Waiohuli and 1,027,510 gpd of non-potable water for Pulehunui), which is consistent with the amount of the DHHL

reservation identified in the DEIS. It should be noted that at this time a reservation request has not yet been made to the CWRM.[1]

The Proposed Action also incorporates the proposed use of the water, as discussed previously, in Upcountry Maui and in Central Maui. The discussion below expands upon the Proposed Action spanning the three geographic areas of East Maui, Upcountry Maui, and Central Maui.

2.1.2 East Maui/License Area

The Proposed Action would allow the lessee the *"right, privilege, and authority to enter and go upon"* the License Area for the *"purpose of developing, diverting, transporting, and using government owned waters"* through the existing EMI Aqueduct System which supplies water to domestic and agricultural water users. The Water Lease will enable the lessee to enter upon lands owned by the State of Hawai'i in order to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System, and will allow continued operation of the EMI Aqueduct System. Specifically, maintenance and repair activities involve keeping the waterways clear of trees, weeds, rocks, dirt and anything that will potentially impede the flow of water. This includes not only in ditches, but in tunnels and flumes as well. Some activities are performed by hand and other activities require small tractors and or specialized equipment. It should be noted that EMI continually maintains the EMI Aqueduct System. It evaluates areas of the EMI Aqueduct System regularly to identify where maintenance / repair activities are necessary and adds them to a list of maintenance projects. EMI has established a number of standard operating procedures to address the clean-up of trash and debris within the License Area. Besides recognizing unnecessary debris in the field during routine maintenance tasks, EMI has conducted specific identification and removal operations of debris that has been observed from previous field work. EMI also has in place a practice of removing any equipment and excess materials it brings into the License Area to perform work on the EMI Aqueduct System as soon as the job(s) is completed Moreover, in response to comments received on the DEIS, EMI staff have been conducting sweeps to locate and remove unnecessary debris from the License Area.

The EMI Aqueduct System spans the State-owned License Area which includes four areas in East Maui, known as the Nāhiku, Ke'anae, Honomanū, and Huelo. The EMI Aqueduct System consists of approximately 388 separate intakes, 24 miles of ditches, and 50 miles of tunnels (including development tunnels) as well as numerous small dams, intakes, pipes, 13 inverted siphons and flumes. The EMI Aqueduct System collects surface stream water from approximately 50,000 acres of land (Collection Area), of which approximately 33,000 acres are owned by the State of Hawai'i (License Area), and the remaining approximately 17,000 acres are privately owned by EMI and Mahi Pono.

The EMI Aqueduct System starts at Makapipi Stream, in the Nāhiku portion of the License Area, with the Koolau Ditch. The Koolau Ditch traverses westward across the Ke'anae portion of the License Area and into the Honomanū portion of the License Area where it

[1] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture.

crosses paths with the ~~Spreckles~~ Spreckels Ditch. This is where streams had multiple diversions at different levels to supply water to the EMI Aqueduct System. Separating higher elevation ditches allows them to maintain the very slight slope necessary to convey flows by gravity over long distances to irrigate higher elevation fields. This avoids the cost of energy required to pump water up from ditches delivering water at lower elevations. As the system continues westward, the Koolau Ditch transitions at the boundary between the Honomanū and Huelo portions of the License Area to the Wailoa Ditch. Makai of the Koolau/Wailoa Ditch, are the Manuel Luis and the Center Ditch. At Waikamoi Stream, the New Hamakua Ditch begins, running parallel to the Wailoa Ditch, but at a lower elevation.

The ~~Spreckles~~ Spreckels Ditch terminates its mauka segment at Waikamoi Stream, and begins its makai segment at Ka'aiea Stream, until it converges with the Lowrie Ditch at Nā'ili'ilihaele Stream. Makai of Lowrie Ditch is the Haiku Ditch. At Honopou Stream, the water collected within the License Area by the EMI Aqueduct System exits the License Area into privately owned lands. Crossing this western boundary of the License Area in descending elevation are the Wailoa Ditch, the New Hāmākua Ditch, the Lowrie Ditch, and the Haiku Ditch. West of Honopou Stream, the EMI Aqueduct System traverses land that was largely owned by A&B and which lands are now ~~and is now largely~~ owned by EMI and/or Mahi Pono. Additional flows from streams located on this land are diverted by the EMI Aqueduct System until it crosses Māliko ~~Maliko~~ Gulch beyond which there are no more stream diversions. Crossing Māliko ~~Maliko~~ Gulch in descending elevation are the Wailoa Ditch, Kauhikoa Ditch, Lowrie Ditch, and the Haiku Ditch. Figure 2-1 depicts the EMI Aqueduct System in East Maui identifying the system's ditches, and major stream diversions within and outside the License Area. Figure 2-2 depicts the major ditches that transport water to the agricultural fields in Central Maui where the EMI Aqueduct System transitions into the Central Maui Field Irrigation System. There are several gauging stations located in several of the ditches across the License Area to monitor and manage ditch flows into the EMI Aqueduct System. It should be noted that these gauging stations measure the flow in the various ditches only. EMI has 12 gauging stations located in several ditch locations across the License Area to monitor and manage East Maui ditch deliveries. These gauges measure the flow in the ditches only, using a system that includes optical encoders with float tape and data loggers. It is not feasible to measure flow in the streams, as there are limited areas that contain the necessary control points to accurately measure streamflow. EMI's 12 gauging stations includes seven gauges that were formerly operated and maintained by the USGS to calculate the total amount of water diverted from each of the four sections of the License Area. Those gauges were also in the ditches, not on individual streams. Due to USGS cost cutting, in 1986 EMI took over the responsibility of operation and maintenance of those seven former USGS gauges. EMI contracts with the USGS to conduct quarterly discharge measurements to verify the accuracy of the gauges at the Honopou boundary of the License Area, which measure the total water withdrawn from the Collection Area. It is not feasible to measure the amount of water diverted on a stream by stream, or stream section by stream section, basis. Prior efforts by the CWRM to measure water diversions involved the installation of water gauges in certain streams, which proved entirely impractical due to the flashy nature of the streams, which caused gauges to wash away. As noted in the CWRM D&O, Finding of Fact (FOF) 50, EMI takes measurements at the boundary of each section of the License Area and at its gauging stations at Māliko Gulch. However, for the purpose of measuring the aggregate flow from entire License Area, the measurements taken at the Honopou boundary were used.

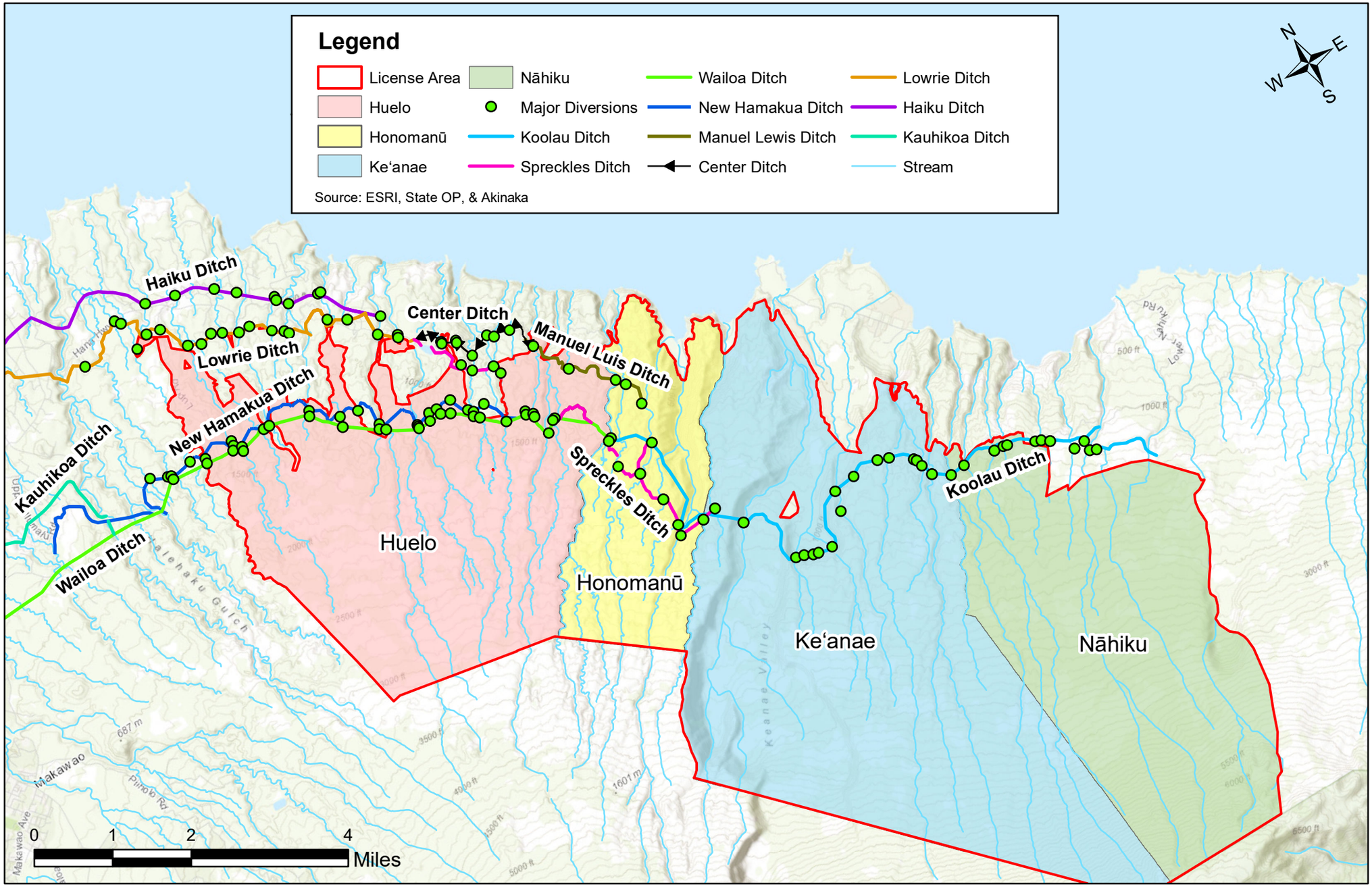


FIGURE 2-1

EMI AQUEDUCT SYSTEM ~~AQUEDUCT~~ - EAST MAUI

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE‘ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

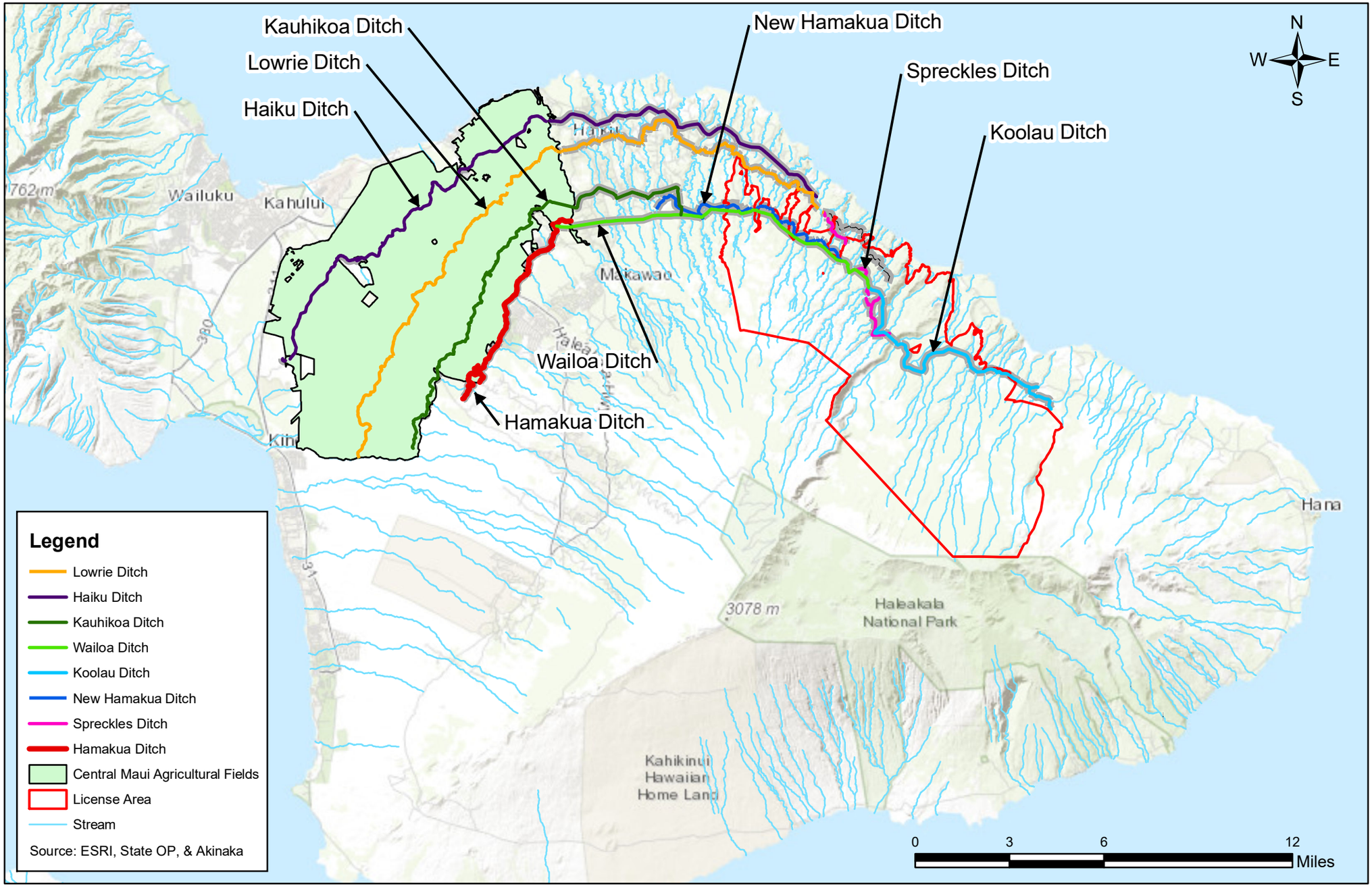


FIGURE 2-2

WILSON OKAMOTO CORPORATION

EMI AQUEDUCT SYSTEM & Major Ditches in Central Maui

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

The EMI Aqueduct System was designed and is intended to be operated to capture and convey a major portion of the base flow from streams in the License Area to supply the former sugarcane operations in Central Maui. The EMI Aqueduct System is not designed to capture and convey short periods of high streamflow known as freshets that occur when it rains heavily in the upslope areas of the watershed. Such larger flows quickly overtop or bypass the diversions and remain in the streams. The system will only divert up to the capacity of the ditches to convey slow moving water along the very slight slopes of the ditches. Up until 1986, when the first return of water was made to the East Maui streams, the long-term average delivery by the EMI Aqueduct System was approximately 165 mgd (CWRM D&O, FOF 519) before any use of the water by the MDWS or HC&S. In 2001, the CWRM began the process toward its D&O for several East Maui streams that further changed the amount of water available for delivery to Upcountry Maui and to the Central Maui agricultural fields. Based on these changes to the system, a more recent history of flow deliveries from the EMI Aqueduct System was computed from 1987 to 2006 (20 year time period). When analyzing the delivery data at Honopou Stream and Māliko ~~Maliko~~ Gulch, the median (Q50) flow at these areas for this time period was 135.58 mgd at Honopou Stream and 146.64 mgd at Māliko ~~Maliko~~ Gulch (Akinaka, 2019).

The EMI Aqueduct System is highly efficient. A 2012 United States Geological Survey (USGS) study, entitled "Measurements of Seepage Losses and Gains, East Maui Irrigation Diversion System, Maui, Hawai'i", that was prepared in cooperation with the CWRM and cited in the 2018 CWRM D&O, concluded that it was unclear whether net seepage losses even occur in the EMI Aqueduct system, due to the large amount of tunnel in the system, as well as the seepage gains that enter the system. CWRM D&O, FOF 715, 723.

Compliance with the June 2018 CWRM D&O require~~s~~ modifications to many of the stream diversion works that are part of the EMI Aqueduct System. Streams requiring partial restoration of flow have required adjustments to their diversions. Full stream flow restoration has required closure of the stream diversions. These compliance requirements must be met irrespective of whether the Water Lease is issued. East Maui, specifically the License Area, has already been affected by increased stream flows resulting from less offstream diversions due to the closure of sugar operations in December 2016. ~~Currently, the EMI Aqueduct System is only diverting approximately 20 mgd.~~ As of the date of the DEIS, the EMI Aqueduct System was diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd. This reflects the growing water needs as Mahi Pono pursues implementation of its farm plan. As a result, very little surface stream water is currently being diverted relative to what would be allowed should the Water Lease be awarded per the Proposed Action.

However, the amount of water actually used by Mahi Pono for its farm plan at any given point will vary. Averages do not tell the story of the day to day, month to month variation due to variations in evapotranspiration and the hydrology occurring in in East Maui as well as the seasonal variations in temperature and rainfall in both East Maui and Central Maui. However, under the Proposed Action, only the amount of water actually needed, whether for the Mahi Pono farm plan, MDWS, or otherwise, will be diverted at any particular time.

However, the amount of water that may be diverted, should the Water Lease be issued, is substantially less than the amount that was diverted during normal sugar production. For example, in 2006 it is estimated that the EMI Aqueduct System delivered approximately 156.69 mgd at Māliko ~~Maliko~~ Gulch, whereas after compliance with ~~under~~

the CWRM D&O, it is estimated that the delivery at Māliko ~~Maliko~~ Gulch will be approximately 92.32 mgd (Akinaka, 2019).

The median flow required by the CWRM D&O provides an estimated available median flow at Honopou Stream of 87.95 mgd, where the EMI Aqueduct System leaves the License Area. It should be noted that the ditch flow estimates also include water provided by various EMI development tunnels within the License Area. Beyond the License Area, the diverted streams only provide supplemental ditch flow when License Area diversions are low. The amount that can be added is relatively low because when rainfall is high in East Maui, the ditches are fuller and there is little needed to supplement the flow. And, when rainfall is low in East Maui, the streams west of Honopou Stream have less flow in them as they are in an area that receives less rainfall than areas further east. During drier (low flow) periods, it is estimated that 4.37 mgd is available to supplement the EMI Aqueduct System between Honopou Stream and Māliko ~~Maliko~~ Gulch. With this added flow, the estimated median flow available beyond Māliko ~~Maliko~~ Gulch for use in Upcountry Maui and the Central Maui agricultural fields is estimated to be 92.32 mgd (Akinaka, 2019).

With the issuance of the Water Lease under the Proposed Action, the EMI Aqueduct System ~~would~~ could divert only up to the maximum allowable amount after compliance with ~~under~~ the CWRM D&O from streams within the License Area, which is estimated to be approximately 87.95 mgd. The EMI Aqueduct System is estimated to divert an additional 4.37 mgd from the point that it leaves the License Area at Honopou Stream and collects water from streams on privately owned land to its last diversion at Māliko ~~Maliko~~ Gulch. Thus, under the Proposed Action, an estimated total of approximately 92.32 mgd ~~would~~ could be conveyed to supply the MDWS for users in Upcountry Maui~~, Nāhiku,~~ and the agricultural fields in Central Maui.

Table 2-1: Surface Water Supply and Allocation

Water Available at Māliko Gulch	92.32 mgd
Water Allocations (MDWS Upcountry Maui Water System, KAP and KAP Expansion)	7.1 mgd
Gross Total Potentially Available for Central Maui Agricultural Fields	**85.22 mgd**

2.1.3 MDWS Water Service Sourced from the EMI Aqueduct System

The MDWS is the main municipal water provider for the County of Maui. The MDWS operates and maintains five separate water systems on the island of Maui. The second largest of these systems is the "Upcountry Maui Water System" which services the communities of Kula, Pukalani, Makawao Ha'ikū, Hali'imaile, Waiakoa, Kēōkea, Waiohuli, 'Ulupalakua, Kanaio, Olinda, 'Ōma'opio, Kula Kai, and Pūlehu (See Figure 2-3). In Upcountry Maui, the MDWS serves customers' water needs (homes, schools, hospitals, churches, businesses and agriculture) for both domestic (approximately 60% of use) and agricultural (approximately 40% of use) purposes, including the agricultural users at the

KAP. The MDWS also serves a portion of the Nāhiku community via the Ko'olau Water System, which is not located in Upcountry Maui. For the purposes of this assessment ~~the Proposed Action~~, however, this service is included because the MDWS Nāhiku Service Area ~~service area~~ portion of the Ko'olau Water System is sourced by the EMI West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located directly adjacent to the Koolau Ditch, and is contingent upon the issuance of the Water Lease ~~Aqueduct System~~. With the issuance of the Water Lease in the Proposed Action, the amount of water the MDWS would receive through the EMI Aqueduct System through the Wailoa Ditch is assumed to be consistent with prior use, identified in the CWRM D&O as an average of 7.1 mgd. Per the 1973 Memorandum of Understanding, 6 cents per thousand gallons has been the rate at which EMI charges the County of Maui for accessing raw, untreated water. This includes water for the Nāhiku community as well as the water drawn from the Wailoa Ditch at Kamole-Weir and both of the Haʻikū Uka systems (which are not soured by the EMI Aqueduct System). The total annual amount collected by EMI from deliveries sources ranges between approximately $70,000 and $150,000, depending on the demand for the year (Munekiyo, Updated 2020).

2.1.3.1 Upcountry Maui Water System

The Upcountry Maui Water System, which is comprised of three separate subsystems (the Upper Kula System, the Lower Kula System, and the Makawao System) (See Figure 2-4), relies on three surface water treatment plants (WTP) ~~sources~~, which accounts for approximately 80-90 percent ~~(13 mgd)~~ of water delivered through the Upcountry Maui Water System (CWRM D&O, FOF ~~799~~ 808). The production capacity of these three surface water sources is approximately 13 mgd (CWRM D&O, FOF 810) and their average daily production is approximately 7.7 mgd (CWRM D&O, COL 92). One of the three surface water sources is delivered directly by the EMI Aqueduct System, through the Wailoa Ditch to the MDWS Kamole-Weir WTP, which is the primary source of water for the Makawao System, but can also serve as back up for the Upper and Lower Kula Systems during times of drought. Average daily use by the MDWS from the Wailoa Ditch is about 7.1 mgd, which includes water processed by the Kamole-Weir ~~Water Treatment Plant (~~WTP~~)~~ (discussed in further detail below) and non-potable water for the KAP, which receives water from ~~Reservoir 40~~ the Hamakua Ditch (an extension of the Wailoa Ditch).

The other two surface water sources are not supplied by the EMI Aqueduct System, but are fed by streams located on lands ~~previously owned by A&B and now owned~~ owned by Mahi Pono / EMI. Under a contractual agreement with EMI, these waters are diverted and transported by two MDWS high-elevation aqueducts (Upper and Lower Waikamoi Flumes) that are also situated on land ~~that was previously owned by A&B and now~~ owned by ~~Mahi Pono~~ EMI, located above the License Area (Haʻikū Uka Watershed). These high-elevation aqueduct systems deliver water to the MDWS' Olinda and Pi'iholo WTPs ~~Water Treatment Plants~~ (See Figure 2-5 ~~2-4~~) which source the Upper Kula and Lower Kula Systems.

These two high-elevation aqueducts are maintained by EMI. However, these sources are not part of the proposed Water Lease being addressed by this ~~DEIS~~ FEIS as they are outside the License Area. The water received at the higher elevation is preferred by the MDWS because it can be delivered to users at higher elevations without the cost of pumping from a lower elevation source like the Wailoa Ditch.

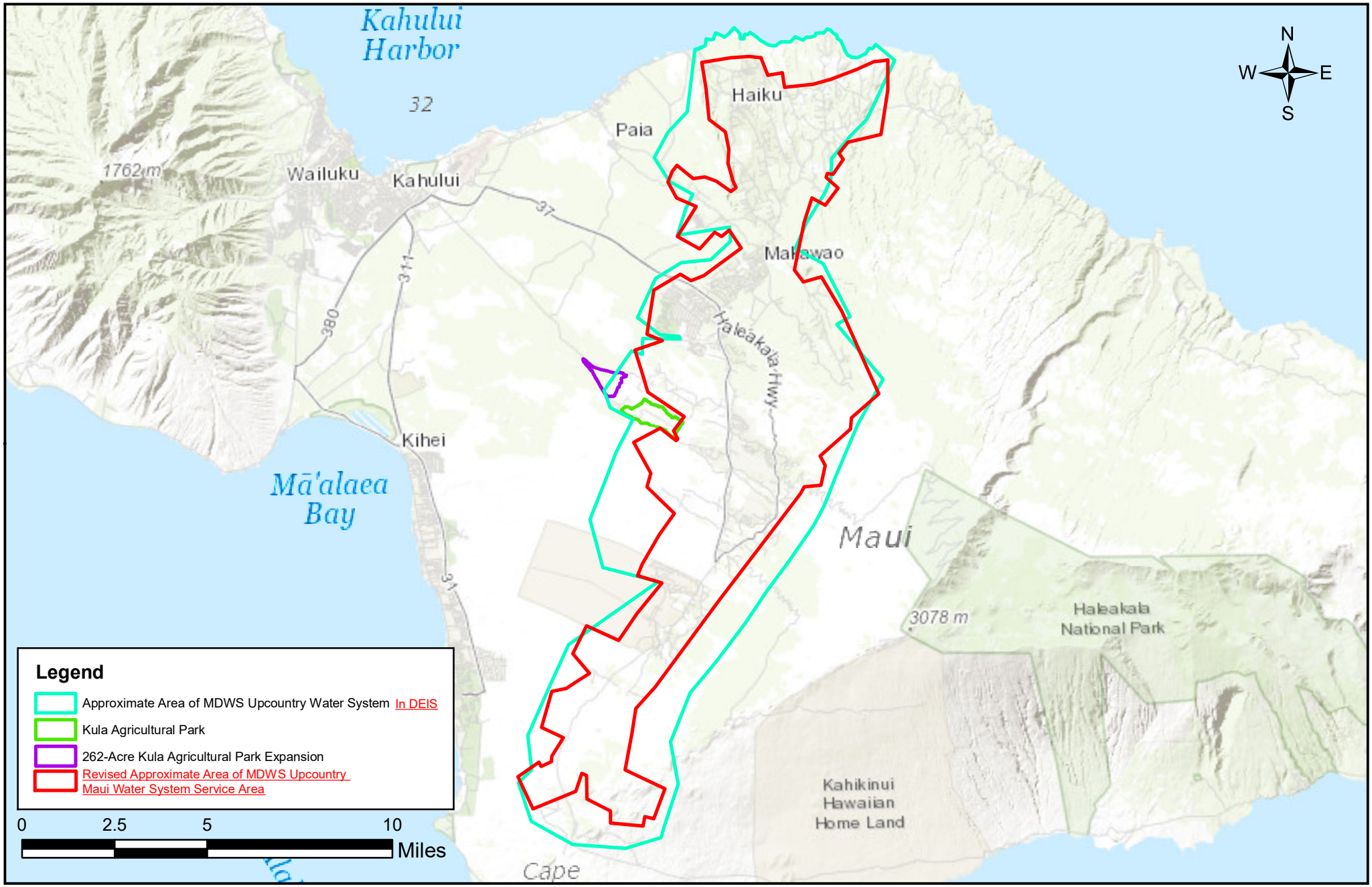


FIGURE 2-3

REVISED UPCOUNTRY MAUI WATER SYSTEM SERVICE AREA

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

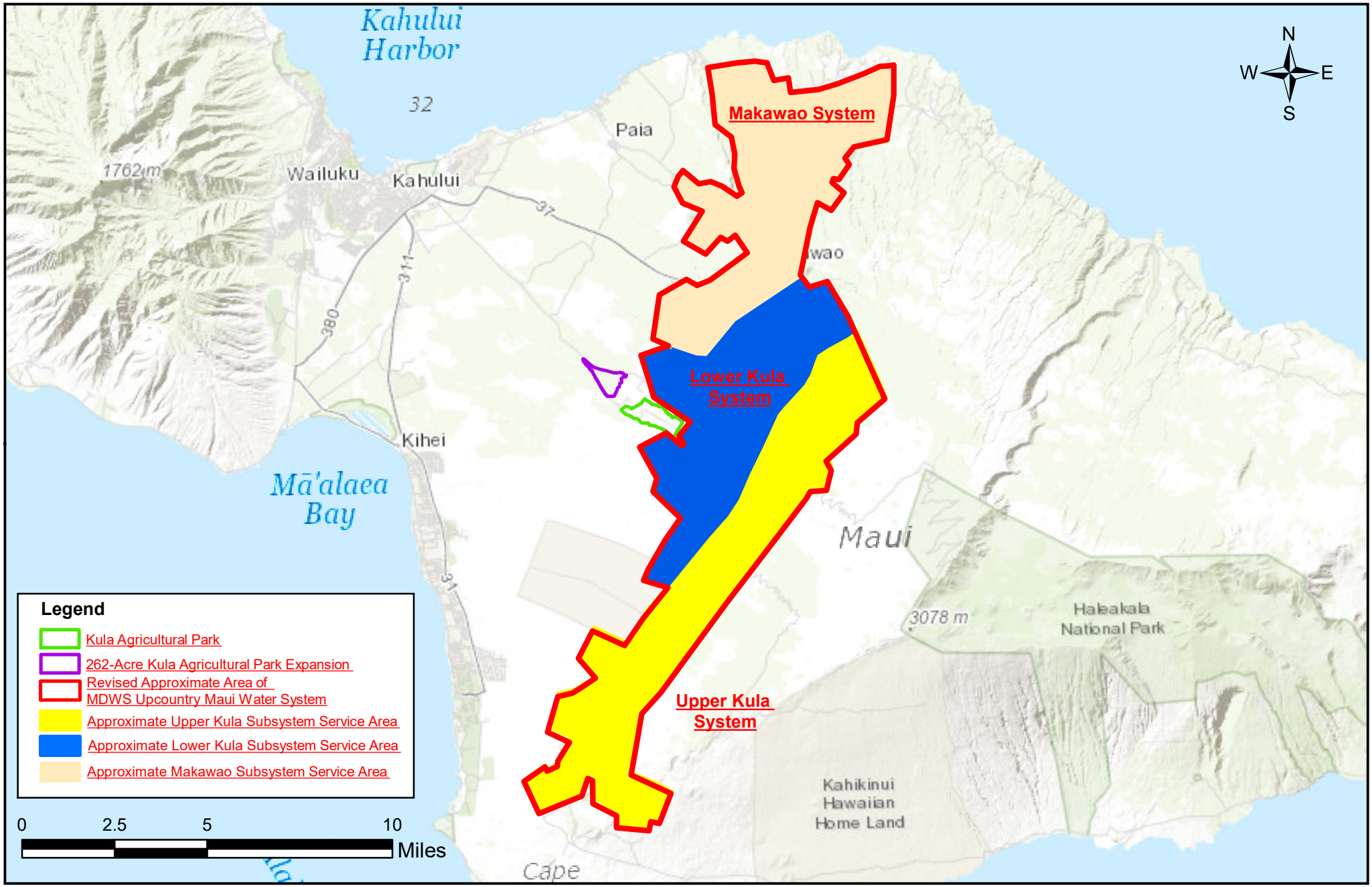
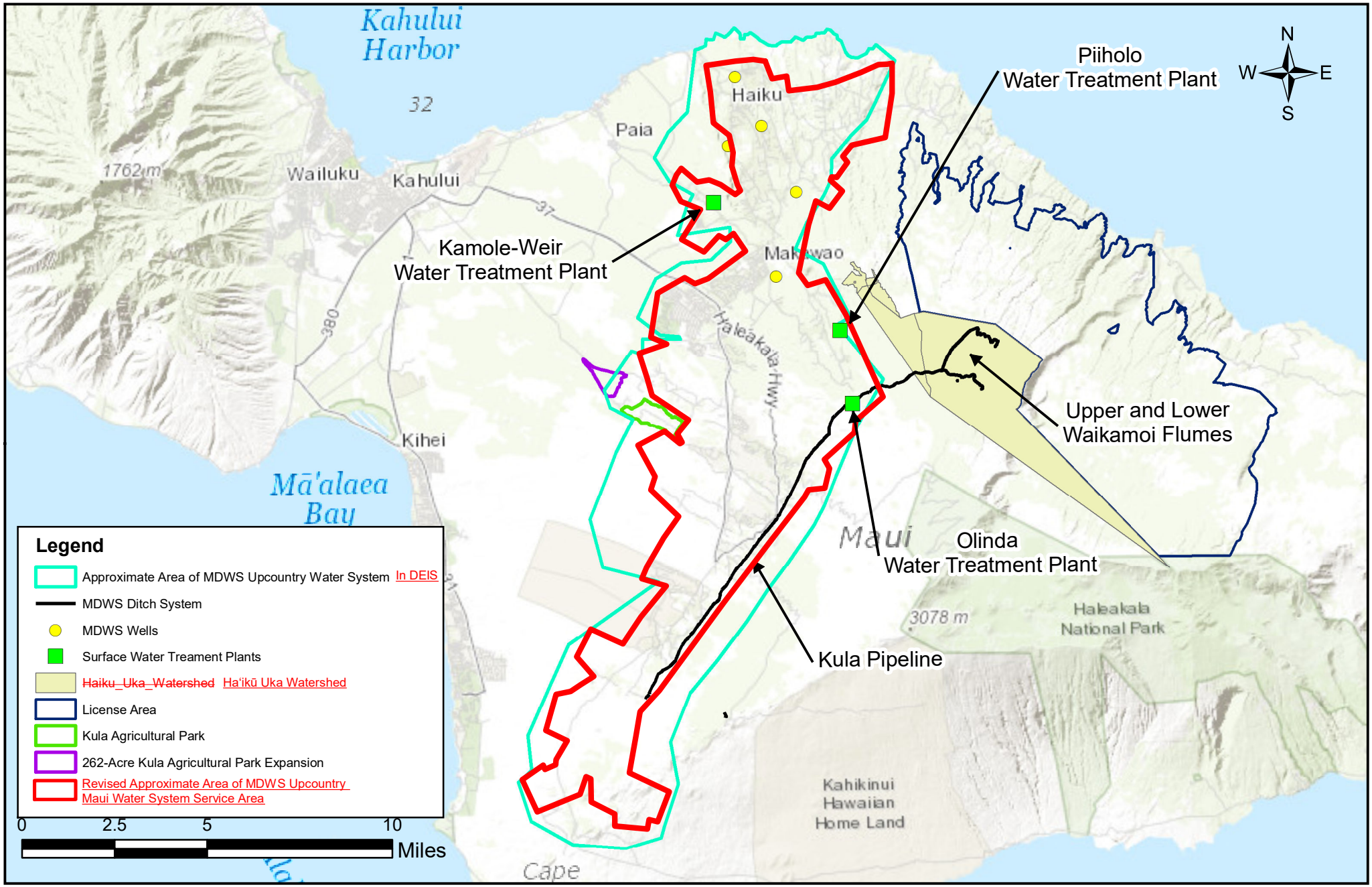


FIGURE 2-4

UPCOUNTRY MAUI WATER SUBSYSTEM SERVICE AREAS

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS



~~FIGURE 2-4~~ FIGURE 2-5

UPCOUNTRY MAUI WATER SYSTEM INFRASTRUCTURE

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

The remaining approximately 10-20 percent of water delivered through the Upcountry Maui Water System comes from a series of basal aquifer wells: the Ha'ikū Well, Po'okela Well, and the ~~two~~ Kaupakalua Well ~~wells~~.

The Ha'ikū and Kaupakalua Wells are the primary sources for the Ha'ikū portion of the Makawao System, which is one of the three subsystems of the Upcountry Maui Water System. The Po'okela Well serves as a temporary back-up for the Makawao, Upper Kula, and Lower Kula Systems during periods of drought or during periods of repair and maintenance at the WTPs. The Ha'ikū and Kaupakalua Wells have a total pump capacity of 2.1 mgd. The Po'okela Well is capable of providing approximately 1.2 mgd. As confirmed by the MDWS in a letter dated July 24, 2020 (See Appendix P). Together, ~~These four~~ these three wells account for a total of about ~~4.9~~ 3.3 mgd of water production capacity ~~delivered~~. However, it should be noted that the CWRM D&O mistakenly (CWRM D&O, FOF 808) states that there are two Kaupakalua Wells and that the pumping capacity of Po'okela Well is 1.3 mgd rather than 1.2 mgd as noted by the MDWS in Appendix P. In times of emergency, the Upcountry Maui Water System can draw up to 1.5 mgd from the Hāmākuapoko Wells (CWRM D&O, FOF ~~808~~ 809). However, there is concern over this water due to the presence of pesticides from former pineapple production. The total combined production capacity of the available water sources for the Upcountry Maui Water System (surface and groundwater) is approximately 17.9 mgd but~~,~~ the reliable capacity is approximately 9.1 mgd due to limitations and maintenance requirements (CWRM D&O, FOF 811). Water from wells is also more expensive as it must be pumped.

The MDWS has been able to receive its surface waters from all three Upcountry Maui water sources through a series of agreements with EMI. Because the EMI agreements with the MDWS provide that water supplied to the MDWS is contingent upon the Water Lease (or revocable permits) being issued, for purposes of this EIS, no water is presumed to be provided to the MDWS if the Water Lease is not issued. Currently the MDWS is being charged 6¢ per 1,000 gallons to receive East Maui surface water for the KAP, at Kamole-Weir, Nāhiku, and for the Waikamoi waters that feed the Upper and Lower Kula water systems ~~and other Upcountry Maui farm areas~~.

The Upcountry Maui Water System serves a total population of approximately 35,200 ~~35,251~~, and the County anticipates the population will grow to approximately 44,000 ~~43,675~~ by 2035 ~~2030~~ (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). As there is no "excess" supply of water for Upcountry Maui, the MDWS customers have been required to adhere to strict conservation measures during periods of drought (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).[2] In fact, on July 25, 2021, the MDWS issued a Notice of Declaration of Stage 1 Water Shortage, enabling prohibitions of water usage during certain times, for certain uses for all customers of the MDWS Upcountry Maui Water System. Customer usage, based on meter readings between 2005 and 2013, averaged approximately 7.9 mgd, varying between 6 mgd and 10 mgd. The MDWS anticipates that the projected population growth would add an additional need for 1.65 mgd of water. Moreover, there is a long waiting list of Upcountry Maui residents seeking water meters, some of whom have been waiting for over a decade. Currently, there are approximately 10,090 ~~9,865~~ water

[2] It should be noted that the March 1990 Maui Water Use and Development Plan remains in effect. The March 2019 Draft Maui Water Use and Development Plan updated is still a working document that is pending review and approval by the Maui County Council and the CWRM.

meters ~~connections~~ to the Upcountry Maui Water System serving approximately, with approximately 1,800 ~~1,852 applicants on~~ requests for the County's ~~waiting list for~~ new water connections (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).

While the MDWS has worked diligently in recent years to bring additional sources of water online for Upcountry Maui users, the County's dependence on water received through the EMI Aqueduct System cannot be overstated. The MDWS asserts that if all connections were to be made, the water demand of the Upcountry Maui Water System would increase by ~~about~~ approximately 3.6 mgd to 7.3 ~~7.5~~ mgd, or approximately 95 percent of the current usage of 7.9 mgd because many of the 1,800 requests ~~1,852 applicants~~ are asking for multiple meters for subdivisions. Therefore, the 1,800 requests ~~1,852 applicants~~ represent many more meters. However, historically, approximately 50% of the requests are withdrawn or denied. The MDWS expects it will need to develop between 4.2 mgd and 7.95 mgd, in addition to the approximately 7.1 mgd long-term average provided through the EMI Aqueduct System, ~~by~~ through 2035 ~~2030~~ to meet demands of future population growth, new connections from the current list of water meters, as well as present uses (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).

Currently, the MDWS has no plans to drill new production wells to serve the Upcountry Maui communities as they are costly to develop and operationally use a large amount of energy due to the elevation that the water would need to be pumped (CWRM D&O, FOF 825). See also MDWS letter (Appendix P) stating that MDWS has no current or anticipated future expansion or improvement of the system at this time). New basal well development would involve construction of new wells at the 1,300-foot elevation and/or wells at the 1,800-foot elevation, along with transmission pipelines, storage tanks, and booster pump stations. The costs of any new well development would also be passed on to MDWS customers. Moreover, there are legal issues that would need to be resolved before the MDWS could proceed with well development.[~~2~~3] The EMI Aqueduct System continues to serve a critical role in providing Upcountry Maui with water, and should the delivery of water from the EMI Aqueduct System to the MDWS be curtailed, Upcountry Maui may be left without a reliable source of water.

The Upcountry Maui Water System's reliance on surface water (80-90%) makes the system extremely vulnerable to drought and presents as a challenge for the MDWS. For decades, the Upcountry Maui region has experienced voluntary and mandatory water use restrictions imposed on residential and agricultural users during droughts, primarily during the dry season, often negatively impacting the productivity of the farmers. Droughts are a natural phenomenon that have been historically experienced throughout the Hawaiian Islands, however, drought events have become more intense over the years, and are expected to intensify in the future.[~~3~~4] As noted above, on July 25, 2021, the MDWS issued

[~~2~~3] In 2003 the County entered into a consent decree in the matter of *The Coalition to Protect East Maui Water Resources et al. v. Board of Water Supply et al*. that requires that the MDWS conduct rigorous cost/benefit analyses of other water source options before developing groundwater in the East Maui Region. In that case, the plaintiffs demanded that before looking to East Maui as a source of groundwater, the MDWS must look first to surface water drawn from the Waikapu, 'Īao, and/or Waihe'e hydrologic units, and the MDWS must meet several other criteria before pursuing groundwater development in the East Maui area.

[~~3~~4] Discussed in further detail in Section 4.3.1

a Notice of Declaration of Stage 1 Water Shortage, enabling prohibitions of water usage during certain times, for certain uses for all customers of the MDWS Upcountry Maui Water System.

Droughts in Maui are a part of the regular climate cycle, and have been occurring on average every 3 to 4 years (Akinaka, 2019). These periods of low rainfall have even affected the normally lush East Maui area. Historical occurrences as noted in the recently updated Hawai'i Drought Plan (2017) have occurred many times within the past 70 years. Since 1950, droughts occurred in East Maui in 1953, 1962, 1971, 1981, 1984, 1999, 2006, and most recently a long period of 2008 to 2013. During these times, the EMI Aqueduct System has delivered less than 50,000 million gallons annually to the County of Maui. The average of the delivery over the past century has been 61,000 mg per year (Akinaka, 2019). Historically, Kamole-Weir WTP is the primary source of water for all of Upcountry Maui during times of drought as the Upper and Lower Kula Systems needed to be supplemented with water from the Kamole-Weir WTP. However, the facility lacks raw water storage and is restricted to how much water that the facility can treat or how much water that can be delivered through the Wailoa Ditch (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).

The recent CWRM D&O for East Maui streams would result in decreased base flows for Wailoa Ditch, which is the main source of water for the Kamole-Weir WTP (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). With the IIFS established, surface water under extended low flow/drought conditions (Q90), is not sufficient to meet the projected municipal demand of the MDWS Upcountry Maui Water System (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). Typically, during drought periods, the average daily demand increases per user. Even with decreased offstream use resulting from the proposed diversified agricultural use in Central Maui (which will use less water than historically used for sugar cultivation), water shortage in droughts will likely continue as long as the Upcountry Maui Water System relies on surface water as its primary source. Peak demands for Upcountry Maui's projected needs must be accounted for to ensure a reliable water supply. Should the EMI Aqueduct System be curtailed, MDWS will need to expand existing water resources and seek the development of alternative water resources.

~~There are~~ All three MDWS Upcountry Maui water treatment facilities ~~that~~ rely on water from either the EMI Aqueduct System or water from the privately-owned Ha'ikū Uka Watershed to ~~that~~ supply the Upcountry Maui Water System Service Area with municipal water: the Kamole-Weir WTP (supplied by the EMI Aqueduct System; subject to the Water Lease), the Pi'iholo WTP, and the Olinda/Upper Kula WTP (supplied by Waikamoi Flumes sourced and situated in the Ha'ikū Uka Watershed; not within the License Area but access subject to Water Lease). In turn, these three MDWS water treatment facilities supply water to the three subsystems of the MDWS Upcountry Maui Water System: the Upper Kula System, the Lower Kula System, and the Makawao System which serve the communities of Upcountry Maui as further detailed below (See Figure 2-4).

The Kamole-Weir WTP receives surface water from the Wailoa Ditch, which, in turn receives water from diversions of various streams extending as far east as Makapipi Stream at the eastern border of the License Area. The streams that supply the Kamole-Weir WTP are Honopou, Hanehoi, Puolua, Alo, Waikamoi, Puohokamoa, Ha'ipua'ena, Kōlea, Punalau, Honomanū, Nua'ailua, Pi'ina'au, Palahulu ~~Paluhulu~~, East and West

Wailuānui, East and West Wailuāiki, Kopili'ula, Pua'aka'a, Waiohue, Pa'akea, Waia'aka, Kapā'ula, Hanawī, and Makapipi. It should be noted that some of the aforementioned streams have either been fully restored or will have limited diversions in compliance with the CWRM D&O as discussed in Section 1.3.4. The Kamole-Weir WTP supplies water to the Makawao System which serves the communities of Makawao, Pukalani, Hali'imaile/Pā'ia, and Ha'ikū. The facility uses micro-filtration technology and is the largest surface water facility on the island of Maui. The average daily production at this facility is about 3.6 mgd, but it can process up to 6 mgd at maximum capacity. However, there is no raw water storage at Kamole-Weir WTP. The MDWS is considering development of a 100- to 200 mg reservoir at the Kamole-Weir WTP, which does not currently have a reservoir. No funds have been allocated towards design or construction of the potential new reservoir at this time. As required by the CWRM D&O, the MDWS will need to update the CWRM on the status of their plans for Kamole-Weir WTP. As explained above, Kamole-Weir WTP is also the primary source of water for all of Upcountry Maui during times of drought as the Upper and Lower Kula Systems need to be supplemented with water from the Kamole-Weir WTP. The Kamole-Weir has four booster pumps to move water up to the 2,800 foot evelvation, where it can be pumped to the highest service elevation areas at 4,500 feet.

The Pi'iholo WTP relies on water through the Lower Waikamoi (Kula) Flume, which diverts water from various streams in the Ha'ikū Uka Watershed (Waikamoi, Puohokamoa, Ha'ipua'ena, and Honomanū), owned by EMI ~~previously owned by A&B and now owned by Mahi Pono,~~ and supplies water to the Lower Kula System which serves the Lower Kula community. Water for this facility is stored in a reservoir with a capacity of 50 mg. Average daily production at the Pi'iholo Water Treatment Plant is 2.5 mgd, but it can process up to 5 mgd at maximum capacity.

The Olinda/Upper Kula WTP relies on water from the Upper Waikamoi (Kula) Flume, which diverts water from various stream diversions in the Ha'ikū Uku Watershed (Waikamoi, Puohokamoa, and Ha'ipua'ena), and supplies the Upper Kula System which serves the Upper Kula, Ulupalakua, and Kanaio communities. Water for this facility is stored in the 30 mg Waikamoi Reservoir and the 100 mg Kahakapao Reservoir. The average daily production of the Olinda/Upper Kula WTP is 1.6 mgd, with a maximum capacity of 2 mgd.

With the issuance of the Water Lease in the Proposed Action, the amount of water the MDWS could receive through the EMI Aqueduct System at its Kamole-Weir WTP is assumed to remain at an average of 3.6 mgd (average daily use by the MDWS from the Wailoa ditch is 7.1 mgd, which includes water for the Kamole-Weir WTP and the KAP). Therefore unless, other water sources can be developed or storage capacity increased, the potential for growth would continue to be limited and the voluntary and mandatory restrictions during droughts will continue.

2.1.3.2 The MDWS Kula Agricultural Park

The MDWS also serves KAP with non-potable water from diversions of the same streams that serve the Kamole-Weir WTP through the Wailoa Ditch. Non-potable water for the KAP is pumped from a pump station located at the inlet to Reservoir 40, which is fed by ~~the end of~~ the Hāmākua ditch, an extension of the Wailoa Ditch ~~near Reservoir 40 to the KAP~~. The KAP is owned by the County of Maui and is managed by the County's Office of Economic

Development for the purposes of promoting the development of diversified agriculture by providing appropriately sized agricultural lots at a reasonable cost per Maui County Code (MCC) ~~Section~~ § 22.04A.030. The KAP currently consists of 31 farm lots, ranging in size from 10 to 30 ~~7 to 29~~ acres, for a total of approximately 445 acres, and supports 26 farmers. Each individual lot at KAP is metered and billed by the MDWS. The diverted stream water that is used to supply the KAP is stored in two reservoirs with a combined total capacity of approximately 5.4 mg.

Presently, water demands at KAP are served by the MDWS ~~County~~, which, by contractual agreement, is entitled up to 1.5 mgd at KAP from the EMI Aqueduct System. Current configuration of the KAP water system, however, requires that 3.5 mgd be made available at Reservoir 40 through the Hāmākua Ditch to enable the consumption of 1.5 mgd at KAP. ~~is able to draw up to 1.5 mgd from the end of the Hāmākua Ditch and to utilize a former plantation reservoir to serve KAP~~. As noted previously, the ~~Hāmākua~~ Hamakua Ditch is fed directly by the EMI Aqueduct System through the Wailoa Ditch. As of late 2015, the Maui County Office of Economic Development calculated that the current use for the KAP is approximately 548,191 gpd of which 80-90 percent of delivered water is from surface water sources with the remaining portion from basal aquifer wells. ~~Due to the current design of the County's KAP distribution system (pump system in the reservoir), 1.5 mgd must be delivered to the County in order for it to provide the needed 548,191 gpd to the KAP users.~~

In 2018, A&B sold 262 acres to the County for the expansion of the KAP, and agreed that the irrigation water needed for this expansion area would come from the EMI Aqueduct System, subject to the continuation of State permits or issuance of the Water Lease. The needed water allocation will result from infrastructure improvements to the reservoir and pumps that serve the KAP, to enable existing deliveries from the EMI Aqueduct System to be used more efficiently. Thus, the current level of water deliveries to the KAP will suffice for both the existing and expanded KAP areas.

2.1.3.3 The MDWS Nāhiku

A portion of the Nāhiku community is also served by the MDWS ~~directly through the EMI Aqueduct System~~ via EMI's West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located on EMI's land, directly adjacent to ~~in~~ the Koolau Ditch near Makapipi Stream. The West Makapipi Tunnel 2 is also known as the "Nāhiku Tunnel." ~~The tunnel draws between 20,000 to 45,000 gpd, dependent on weather,~~ Per a 1973 Memorandum of Understanding, as amended, MDWS, can draw only up to 20,000 gallons of water per twenty-four hour day to serve the Nāhiku community. EMI continues to deliver water to the MDWS for the Nāhiku community pursuant to the agreement. However, that water delivery is premised upon EMI's continued receipt of permits or a lease from the State BLNR. Even though the agreement provides the MDWS a right to up to 20,000 gpd per twenty-four hour day, EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). Currently, this is the sole source of water for the MDWS Nāhiku Water Service Area. ~~, directly from the EMI Aqueduct System.~~ The area is at a lower elevation where the water system for the Nāhiku community has sufficient pressure for residential service. The Nāhiku community overlies the Ke'anae and Kuhiwa aquifers and is an area of high rainfall, receiving approximately 219 inches annually at ~~Hana~~ Hāna

Highway and nearly 300 inches at higher elevations. ~~The MDWS purchases water delivery for domestic use from EMI's West Makapipi Tunnel 2, Well No. 4806-07, which is also known as from the "Nāhiku Tunnel" (Draft Maui Island Water Use and Development Plan, March 2019).~~ The water from the Nāhiku Tunnel is conveyed through an intake pipe that exits the tunnel into a 4" pipe, two pressure break tanks, a 2" pipe, and into the Lower Nāhiku Tank. The MDWS Nāhiku Water Service Area is then fed from the Lower Nāhiku Tank through 4" and 2" pipes (See Figure 2-6).[4] MDWS owns and maintains three tanks that are sourced from the Nāhiku Tunnel (one makai of Hāna Highway along Lower Nāhiku Road and two mauka of Hāna Highway) (See Appendix P). The water serves 43 water meters located along Nāhiku Road. One meter is classified as an agricultural use while all the others are classified as single-family use. ~~Water from the tunnel is chlorinated at the Upper Nāhiku Tank before it is serviced to the users.~~ Based on water use in the MDWS Nāhiku Water Service Area ~~Nāhiku portion of the Ko'olau Water System~~, there is sufficient source to accept new meter service applications to meet future demands. However, the cost for water service, storage, and transmission is borne by the meter applicant (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).

2.1.4 Central Maui Field Irrigation System

A&B cultivated sugarcane on the fields of Central Maui for over a century up until the termination of operations in 2016. Approximately 30,000 acres of the agricultural fields in Central Maui are irrigated by waters diverted by the EMI Aqueduct System and delivered into the agricultural fields in Central Maui which includes a system of reservoirs and ditches originally designed to service the cultivation of sugarcane ~~sugar cane~~ (See Figure 2-7 ~~2-5~~). Recently, these agricultural fields were sold to Mahi Pono, which plans to continue to cultivate these fields with various diversified agriculture crops.

Over its history, the long-term average delivery of water by the EMI Aqueduct System has been approximately 165 mgd (prior to any use of water by the MDWS or by/through HC&S ~~on the agricultural fields~~). Since 1999, however, deliveries have declined significantly. In the ten year period from 2004 to 2013, the average delivery was 126 mgd from the EMI Aqueduct System to HC&S ~~the Central Maui agricultural fields~~ (CWRM D&O, FOF 519).

In addition to the surface water imported from the EMI Aqueduct System to the Central Maui Field Irrigation System ~~field irrigation system~~, the Mahi Pono irrigation infrastructure currently includes ten (10) ~~fifteen~~ brackish water wells that can supplement surface water to approximately 17,200 acres of the agricultural fields ~~plantation~~ at the lower elevations ~~(CWRM D&O, FOF 738)~~.[5]

[4] Note that information provided by the MDWS on the MDWS Nāhiku Water Service Area was limited and consequently Figure 2-6 of the Final EIS does not depict all of the infrastructure described in Section 2.1.3.3.

[5] Note that the CWRM D&O in-text citation was re1moved as it is not accurate to how many wells can irrigate the Central Maui agricultural fields discussed in this FEIS. The reference to 15 brackish wells was derived from the CWRM D&O, FOF 738, as that was the number of brackish wells that HC&S utilized during its sugar cane operations. However, one of the 15 wells referred to, State Well No. 5128-002, does not serve the Central Maui agricultural fields and four of the other brackish wells are on lands that are not owned by Mahi Pono. As such, Mahi Pono has access to only 10 such wells. Figure 2-7 has been revised, to more accurately depict the water infrastructure within the Central Maui agricultural fields that is available to Mahi Pono to support its farm plan for the Central Maui agricultural fields.

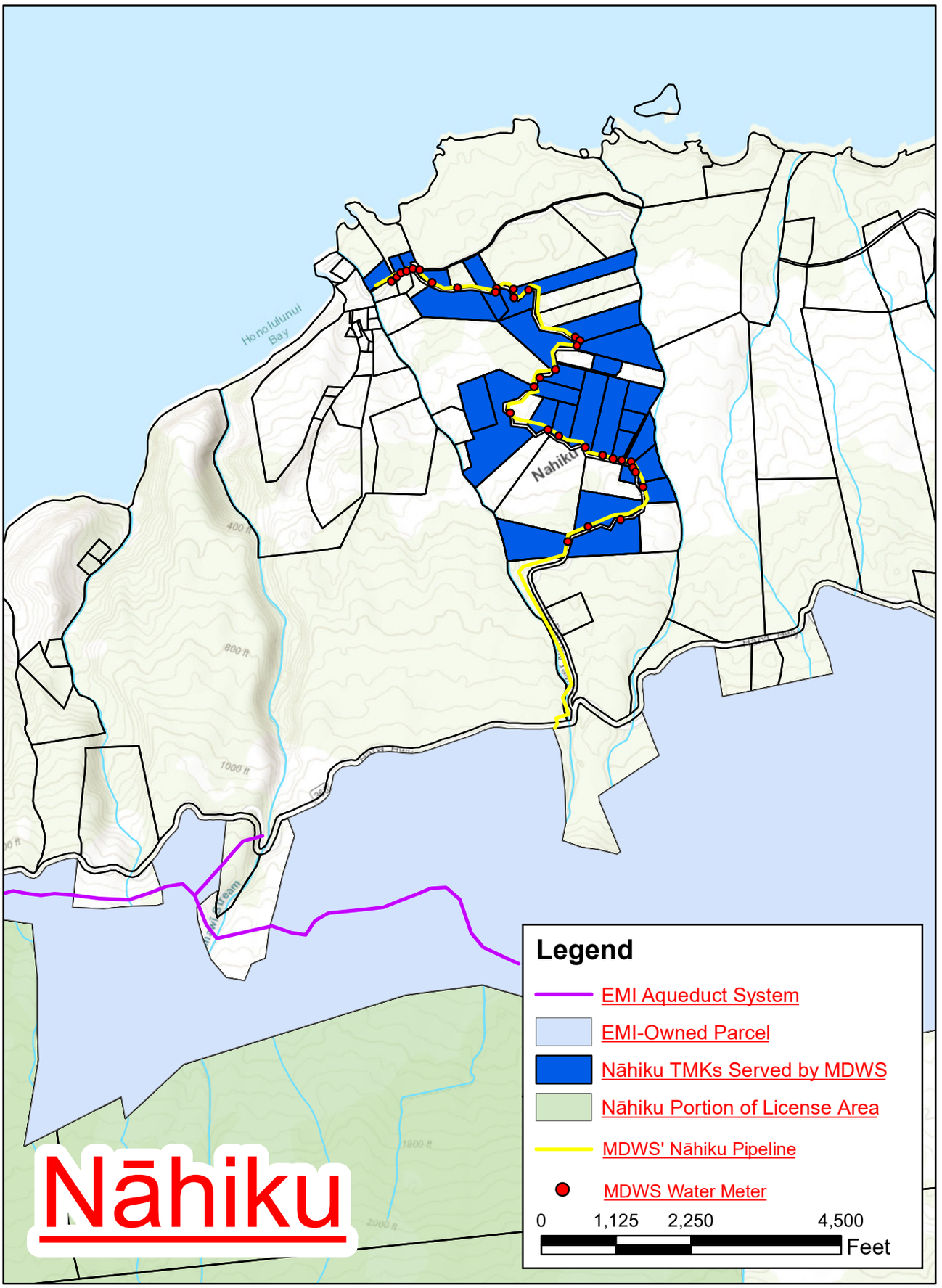
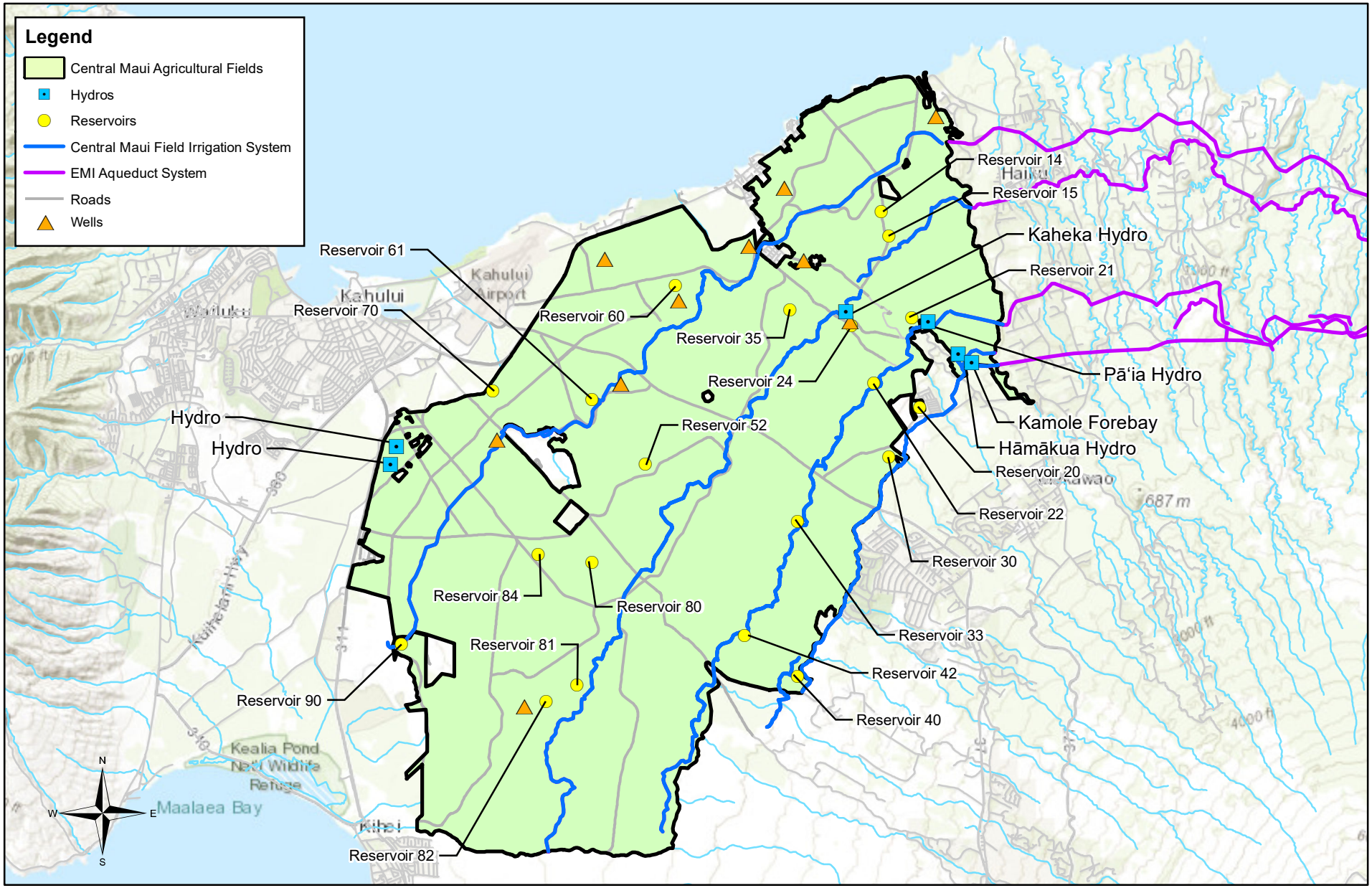


FIGURE 2-6

THE MDWS NĀHIKU WATER SERVICE AREA

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION



WILSON OKAMOTO CORPORATION

0 5,500 11,000 22,000 Feet

0 0.5 1 2 3 4 Miles

1 inch = 11,000 feet

Source: ESRI, State OP, & Akinaka

FIGURE 2-7 ~~FIGURE 2-5~~

CENTRAL MAUI INFRASTRUCTURE MAP

Proposed Lease for Nāhiku, Ke'anae, Honomanū and Huelo License Areas

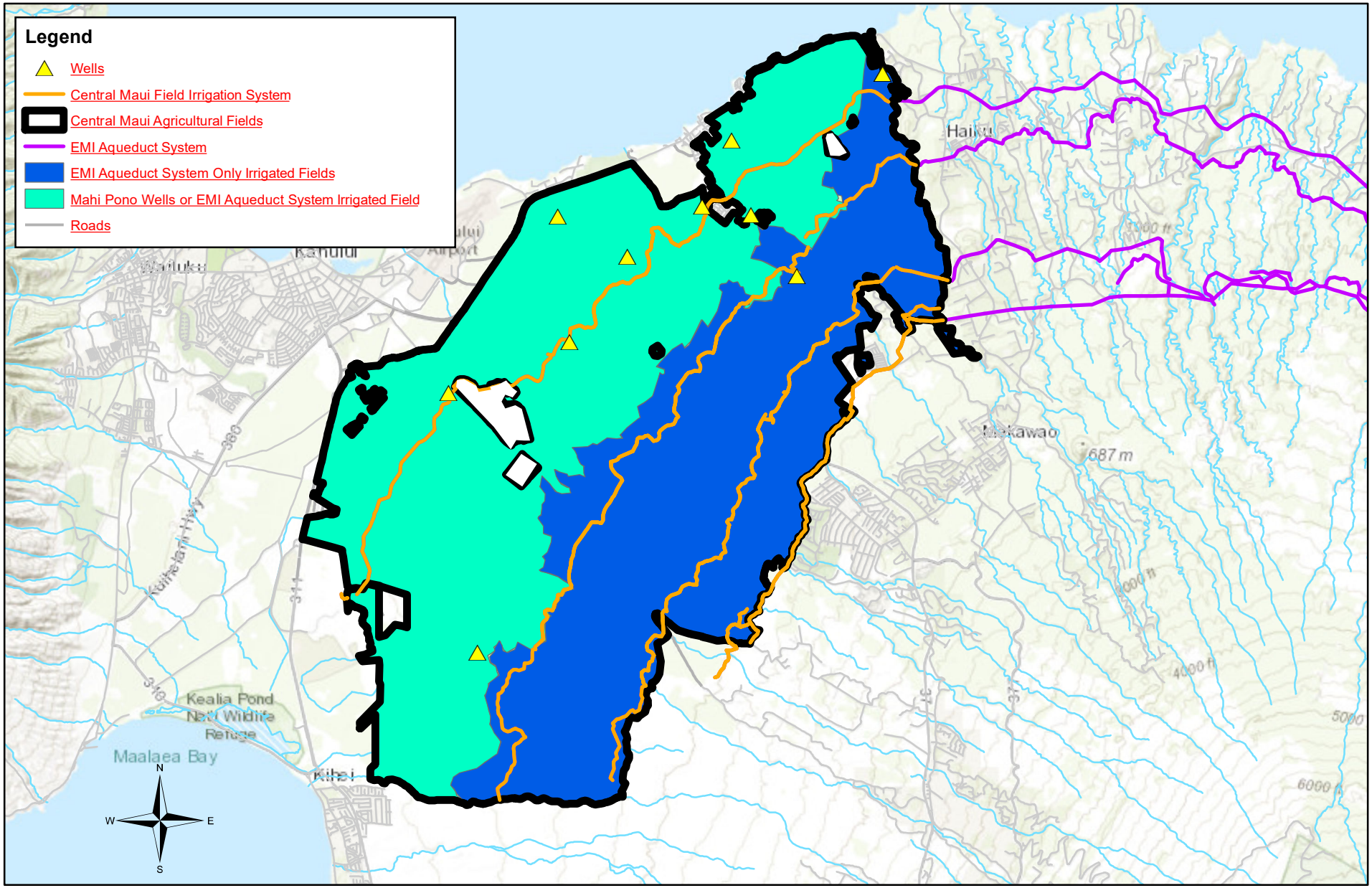
These brackish wells extract groundwater from the subsurface aquifers lying beneath the agricultural lands, and which are cyclically dependent on recharge derived from the irrigation of the overlying lands by water from the EMI Aqueduct System

The remaining approximately 12,800 acres cannot be serviced by pumped ground water on a consistent basis due to their higher elevation, which makes the land uneconomical to reach with pumped water. Groundwater, however, can be delivered to 7,000 acres at higher elevations via a shared pipeline that served as a penstock line for a hydroelectric unit (CWRM D&O, FOF 739) (See Figure 2-8).

This pump station was designed and built to be an emergency water source for the high-elevation fields in the event of extreme drought. The combined installed pumping capacity of these 10 ~~fifteen~~ brackish water wells is approximately 156 ~~228~~ mgd of brackish water. However, installed pumping capacity is not an indication of how much water can be reliably provided by these wells. The true instantaneous pumping capacity of the wells – the most that can be pumped over 3 to 5 days – was 115 mgd during sugar cultivation, after which sump levels start to decline, and that figure is based upon HC&S' 15 wells. From 1986 to 2013, A&B pumped an average of 71 mgd from the brackish water wells; during the 2008-to-2013 period, these wells delivered about 70 mgd of brackish groundwater to the lower-elevation fields. This was a suitable source of water for sugarcane during droughts because sugarcane can tolerate periodic use of water with higher salinity levels. When the sugarcane fields were in cultivation, well water was being applied typically during dry periods, when surface water was not available for sustained periods. Sugarcane ~~Sugar cane~~ was cultivated in a twenty-four month crop cycle, providing ample time for the crop to recover from a prolonged use of brackish water. The crops planned for Mahi Pono's diversified agricultural operation may have a shorter crop cycle and be much less tolerant than ~~sugar cane~~ sugarcane of higher salinity levels. Thus, the planned crops will generally be more vulnerable to the negative impacts on crop growth associated with prolonged exposure to brackish water and lower crop yields.

The supplementation of water demands by these brackish wells presents a significant constraint to the viability of the future implementation of diversified agriculture. Under sugar cultivation, the full needs of the 30,000 acres of Central Maui agricultural fields could not be met by stream waters diverted by the EMI Aqueduct System at all times of the year. Therefore, every month HC&S would be required to utilize its brackish wells to supplement available surface water supplies to meet the demands of its sugar cultivation operations in Central Maui. Brackish wells will also be an important source of water for the Mahi Pono farm plan. However, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from Kamole-Weir to the agricultural fields and also within those fields). As part of this upgrade, Mahi Pono's irrigation engineering team is also implementing high-efficiency irrigation systems. These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycling and re-using all water used in Mahi Pono's processing plants; and (3) integrating various live technology feeds to constantly monitor plant, soil, and tree health, thereby making a more sustainable use of the water resources.

Mahi Pono has also implemented several water saving strategies for the Central Maui agricultural fields and continues to evaluate additional methods. Mahi Pono water saving strategies include the following:



WILSON OKAMOTO CORPORATION

0 5,500 11,000 22,000 Feet

0 0.5 1 2 3 4 Miles

1 inch = 11,153 feet

Source: ESRI, State OP, & Akinaka

FIGURE 2-8

MAHI PONO FIELD WATER SOURCES MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

- Planting windbreaks in the fields.
- Incorporating significant uses of weed mat along plant lines, which will reduce evapotranspiration and erosion.
- Mowing rather than plowing inter-rows to preserve organic matter and keep cover to prevent soil erosion.
- Operating within the terms of a Conservation Plan from NRCS, which includes swales and diversions for erosion protection.
- Practicing rotational grazing of livestock.
- Planting permanent tree crops that will develop canopies that will assist with soil moisture retention and reduce evapotranspiration.

Currently, the majority of the Central Maui agricultural fields are no longer in active cultivation, and approximately 20-25 mgd of water is being diverted by the EMI Aqueduct System. As of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd for use in Central and Upcountry Maui. Those uses included the MDWS' take for its Kamole-Weir WTP and the KAP and use by Mahi Pono and its lessees for agricultural, reservoir, and industrial needs (including dust control, hydroelectric, and fire suppression needs). The COVID-19 pandemic has resulted in some delays in the projected farming activities and therefore actual water use in 2020 was lower than what was projected.

Seepage loss occurs within the Central Maui Field Irrigation System, which water is recharged back into the groundwater of the Central Maui aquifer system. Note that system the losses do not take place within the EMI Aqueduct System (there is no net seepage loss in the EMI Aqueduct System up to the Kamole-Weir). ~~takes place beyond the last stream diversion at Maliko Gulch, and accounts for approximately~~ As noted in the CWRM D&O, FOF 736, 737, it is assumed that approximately 22.7% of the water delivered to the Central Maui agricultural fields (~~at Maliko Gulch~~) is accounted for as system losses in the Central Maui Field Irrigation System (i.e., water lost to seepage and evaporation, and including other water uses, such as water used for reservoirs, fire protection, dust control, and hydroelectric uses).[6]

To allow for the identification and analysis of impacts, alternatives considered, proposed mitigation measures, and to discuss all reasonably foreseeable consequences of the Proposed Action (i.e., primary, secondary, and cumulative) ~~action~~, this FEIS ~~DEIS~~ incorporates Mahi Pono's farm plan which projects its 2030 vision (See Figure 2-9 ~~2-6~~). For the purpose of this FEIS ~~DEIS~~, Mahi Pono's farm plan projects use of the total amount of water available after compliance with the IIFS requirements of the CWRM D&O, although it is understood that the DHHL ~~will eventually convert its~~ also has rights to a water reservation ~~to active use~~.[7] Mahi Pono's water use will be incremental and will increase

[6] The assumption of 22.7% for system losses, including other water uses, such as water used for reservoirs, fire protection, dust control, and hydroelectric uses, does not take into account any improvements to the on-farm irrigation system that could reduce the total amount of system losses

[7] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction as follows:
Land Use, Central Maui
- Crops: decreased by 1,906 acres (11 mgd × 173.31 acres/mgd)
-Irrigated pasture: decreased by 161 acres (11 mgd × 14.62 acres/mgd)

over time until full implementation of the farm plan, as diversified agriculture continues to be ~~is~~ brought back to Central Maui. For the purposes of EIS analysis, 2030 is the target year based upon the anticipated timeframe for full implementation of the Mahi Pono farm plan.

Mahi Pono's farm plan is, like any responsible farming plan, a fluid and responsive plan that responds to the ever-changing agricultural market demands and the type of agricultural activity to be pursued (i.e., orchard crops, tropical fruits, row and annual crops, energy crops, pasturage etc.), as well as responding to other variables such as the availability and cost of water for crop irrigation. All of these things must be considered when developing an evolving and feasible diversified agricultural plan for Central Maui.

Another factor in developing the farm plan is to be sensitive to the existing local farming community. Mahi Pono does not want to displace local farmers by planting competing crops or artificially accelerating the ramp-up of operations, both of which could have the potential to drive local farmers out of the market. Mahi Pono's goals for its diversified farm plan will be guided by its core principles of using reasonable and environmentally responsible "best management practices", planting non-GMO crops, and growing food for local consumption.

Water Lease Limited to CWRM D&O Farm Plan

At full implementation, the ~~The~~ Mahi Pono farm plan assumes the following:

- The total surface water available for use after system losses within the Central Maui Field Irrigation System is estimated to be approximately 65.88 mgd.

- Surface water can be supplemented by a brackish groundwater amount equal to 20 percent of ~~surface water~~ the total irrigation need. Taking into account the CWRM D&O's impact on the amount of surface water, it is estimated that there could be up to 16.47 mgd of brackish groundwater used after system losses in the Central Maui agricultural fields. (Plasch, Updated 2020 ~~2019~~)

- After compliance with ~~Under~~ the CWRM D&O, the total water available, including both surface and groundwater sources, for use on the Central Maui agricultural fields after system losses is approximately ~~82.35~~ 82.34 mgd (Some water would be used for agriculture related industrial activities (e.g., the washing of crops), but the amount is not estimated).[8]

-Unirrigated pasture: increased by 2,067 acres (11 mgd × 187.93 acres/mgd)
Sales (Mahi Pono and tenants):
- decreased by $18.4 million per year (11 mgd × $1.673 million/mgd)
Employment (Mahi Pono and tenants):
- decreased by 93 jobs (11 mgd × 8.447 jobs/mgd)
Payroll (Mahi Pono and tenants):
- decreased by $3.33 million per year (11 mgd × $0.303 million/mgd)

[8] Mahi Pono's projected industrial uses are separate from the historic and industrial uses that are anticipated to continue during the interim period and phase out over time such that they are no longer receiving water at the point of full implementation of the Mahi Pono farm plan.

- That total amount of water will be delivered to approximately 30,000 acres. Of those 30,000 acres:
  - Approximately 15,950 acres would be used for farming, including 12,850 acres for orchard crops and 3,100 acres for other crops.
  - Approximately 13,800 acres would be used for pasture, of which about 4,700 acres would be irrigated.
  - Approximately 250 acres would be used for green energy, such as ~~a~~ one or more solar farm(s).

Because there is insufficient surface water to support the entire farm plan, brackish groundwater will also be used.

Given these figures and assumptions, a farm plan consistent with the amount of water estimated to be available after compliance with ~~under~~ the CWRM D&O (and prior to any reductions due to the DHHL reservation or otherwise) is shown in the table below:

Table 2-2 ~~2-1~~ Mahi Pono Farm Plan

Proposed Use	Acres	Gallon Per Acre a Day	Surface MGD	Ground water MGD	Total MGD (rounded)	Annual MGD	% of Total
Community Farm	800	3,392	1.89 ~~1.87~~	0.82 ~~0.83~~	2.71 ~~2.70~~	989 ~~987~~	3.28%
Orchards (citrus, mac nuts, beverage crops)	12,850	5,089	53.36 ~~53.39~~	12.03 ~~12.04~~	65.39 ~~65.43~~	23,866 ~~23,883~~	79.48 %
Tropical Fruits	600	4,999	2.13 ~~2.07~~	0.87	3.00 ~~2.94~~	1,485 ~~1,073~~	3.57%
Row and Annual Crops	1,200	3,392	3.12 ~~3.14~~	0.95	4.07 ~~4.09~~	1,491	4.96%
Energy Crops	500	3,392	1.18	0.53	1.70	622	2.07%
Pasture, irrigated	4,700	1,161	4.20	1.27 ~~1.25~~	5.46	1,997 ~~1,992~~	6.63%
Pasture, unirrigated	9,100	0	0	0	0.00	0	0.00%
Green Energy	250	0	0	0	0.00	0	0.00%
TOTAL	30,000	~~2,744~~	65.88 ~~65.86~~	16.47	82.34 ~~82.33~~	30,054 ~~30,047 .77~~	100.00 %

This farm plan would consist of the following:

- Approximately 20,650 acres of irrigated farm land, including 12,850 of orchard crops, 600 acres of tropical fruit, 1,200 acres of row and annual crops, in addition to 800 acres for a community garden and limited non-GMO energy crops and an area for green energy, and irrigated pasture.
- Approximately 13,800 acres of cattle pasture, comprised of 4,700 acres of irrigated pasture, and 9,100 acres of unirrigated pasture. This should fit the proposed model of grass-finishing on irrigated pasture. The unirrigated acreage is less than 10,000 acres, which helps ensure that ~~that~~ the entire area ~~devoted to unirrigated pasture~~ will remain productive.

Current Farming Activities

As of October 2020, an average of 23.3 mgd was being diverted from East Maui streams through the EMI Aqueduct System for use in Central and Upcountry Maui. Those uses included the MDWS' take at Kamole-Weir WTP and the KAP and use by Mahi Pono and Central Maui lessees for agricultural, reservoir, system losses, dust control, industrial, hydroelectric, and fire suppression needs.

As of November 2020, Mahi Pono projected that by the end of the calendar year 2021, it could be cultivating the following within Central Maui as depicted by Figure 2-10:

a. 4,920 acres in orchard crops, including lemons, limes, oranges, avocadoes, coffee, macadamia nuts

b. 633 acres in row crops

c. 102 acres in tropical fruits

d. 12,000 acres in cattle operations

Based on the above planned estimates, Mahi Pono projected that its total water needs from the East Maui watershed/streams over the course of 2021 would be approximately 32.3 mgd. The 2021 revocable permits cap water withdrawals from the License Area at 45 mgd on an annual average basis. The water uses include not only the crop needs in Central Maui, but also water that will be used for agricultural processing, historical lessees, fire protection, reservoirs, dust control, and hydroelectric uses, and for the County of Maui's needs. Table 2-3 below indicates the anticipated use of East Maui surface water for the year 2021 as of October 2020. As noted above, the COVID-19 pandemic resulted in some delays from the previously projected 2020 farming activities, and continues to insert an additional degree of unpredictability. Nevertheless, the general pattern and plan for the development of the Mahi Pono farm plan during this early stage, and the estimated water use, is expected to be consistent with Mahi Pono's projections assuming management or recovery from COVID- 19 impacts.

Table 2-3 Expected Water Uses Over 2021

	Mahi Pono Div. Ag.	MDWS	KAP	Historical/ Industrial Requirements	Reservoir/Fire Protection/System Losses/ Dust Control/Hydroelectric	Total (mgd)
Year 2021	11.5	4.0	3.1	1.1	12.6	32.3

However, as with any agricultural project of this scale, actual water usage varies over time, and will continue to increase as development of the Mahi Pono farm plan continues to full buildout. Hence, the amount of water diverted at any given time will be only what is needed to meet actual needs.

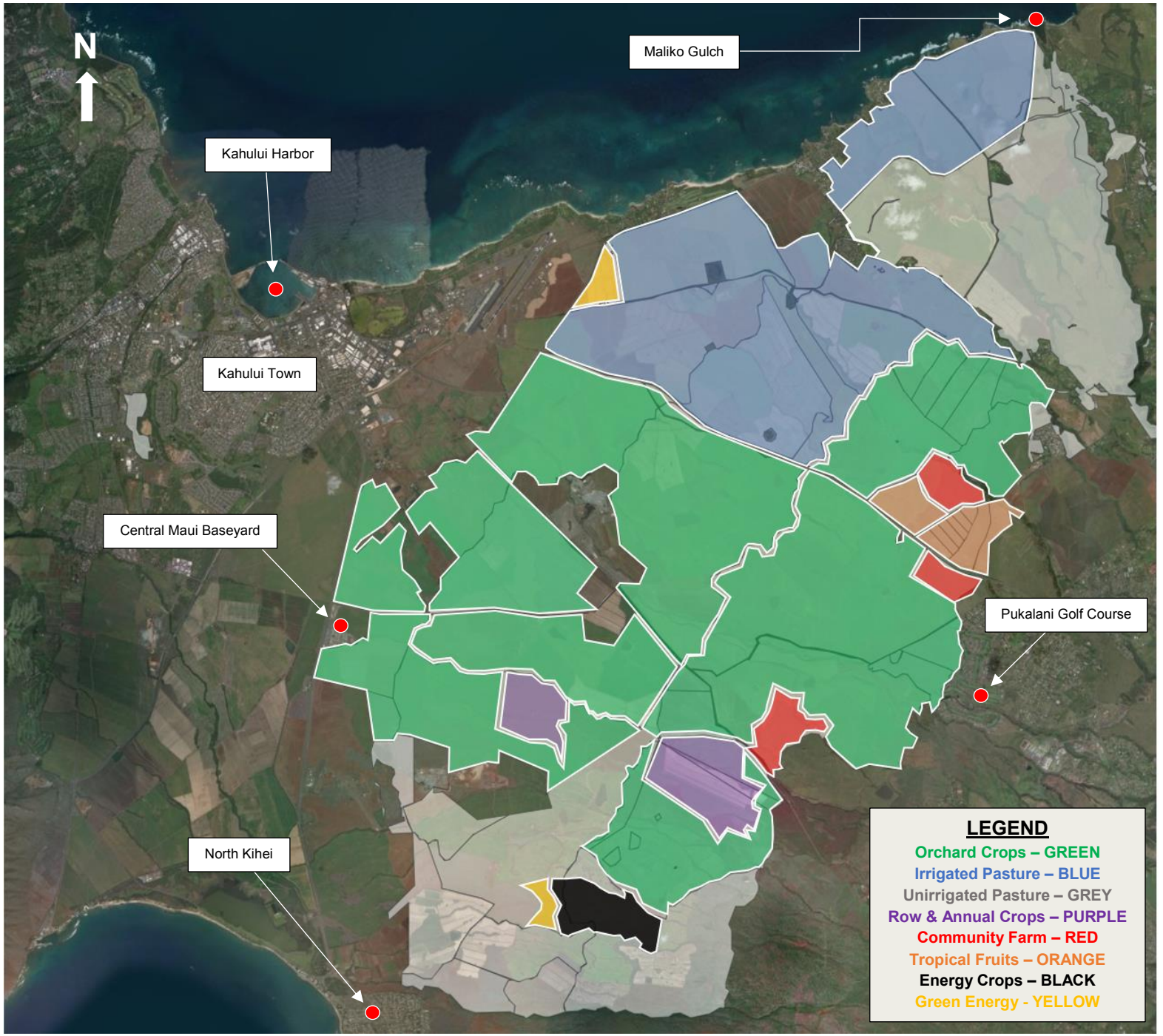


Figure 2-9 ~~2-6~~ Mahi Pono Farm Plan

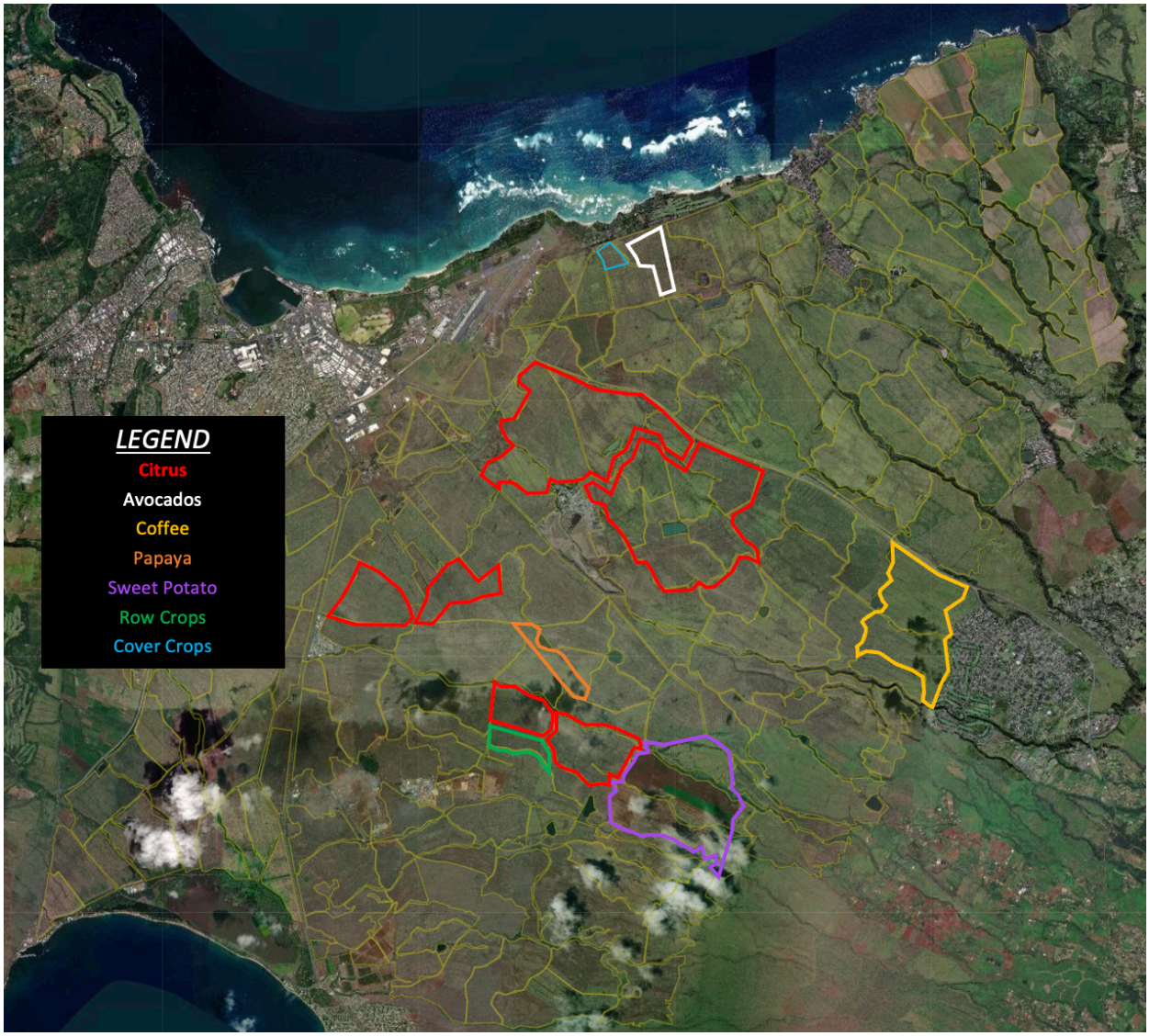


Figure 2-10. Mahi Pono 2021 Year-End Farm Projection

Plasch Econ Pacific LLC provided map that depicts Mahi Pono's near-term plantings

2.1.5 Phasing and Timing of the Proposed Action

After this ~~the Final EIS (~~FEIS~~)~~ is published and accepted by the BLNR, the State of Hawai'i will conduct appraisals of the water from the License Area, produce lease agreements and a Watershed Management Plan (refer to Section 2.1). Once this is complete the Water Lease will be put to public auction. Once the Water Lease is issued by the BLNR, under the Proposed Action, Mahi Pono can proceed with a plan that achieves full implementation of ~~implement~~ its proposed farm plan, projected to be done in 2030.

As stated in Section 2.1.4, the Mahi Pono's farm plan is, like any responsible farming plan, a fluid and responsive plan that responds to the ever-changing agricultural market demands and the type of agricultural activity to be pursued (i.e., orchard crops, tropical fruits, row and annual crops, energy crops, pasturage etc.), as well as responding to other variables such as the availability and cost of water for crop irrigation. All of these things must be considered when developing an evolving and feasible diversified agricultural plan for Central Maui. A viable diversified agricultural plan needs to have flexibility—to change crops, acreages of crops, marketing of crops (fresh vs. processed) and timing, to name a few factors—as the farmer will need to adjust to unforeseen changes. These include changes arising from weather, new pests, disease, market conditions, transportation disruptions, rising costs, etc.—factors completely out of control of the farmer, none of which can be predicted at this time.

An estimated 10 years will be required for Mahi Pono and its lessees to remove volunteer sugarcane and weeds from the approximate 30,000 acres, amend soils, install field improvements, build warehouses and other structures, and plant crops. The predominant crops will be various types of orchard trees (avocado, coffee, citrus, macadamia nuts, etc.), which reflect a long-term commitment to farming. About 5 to 12 years will be required for orchard trees to reach full maturity, after which the trees will provide yields for 35 to over 100 years (Plasch, Updated 2020 ~~2019~~).

In order for Mahi Pono and other farmers to justify the very substantial investment in a 30,000-acre farm, a long-term water lease will be required. A short-term lease would derail development of the Mahi Pono farm plan because of the risk of not being able to farm for a long enough period to recover their planned investment (Plasch, Updated 2020 ~~2019~~). Moreover, given the considerable time and expense it takes to develop a diversified farm plan such as the one Mahi Pono is proposing, a shorter term Water Lease could result in a reduced range of crops, and the reduced cultivation of Important Agricultural Lands (IAL) in Central Maui.

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Chapter 3:
Alternatives

3. ALTERNATIVES

Under ~~Section~~ § 11-200-17(f), HAR, ~~a DEIS~~ an EIS must include a section discussing alternatives which could attain the objectives of the action regardless of cost, in sufficient detail to explain why they were rejected. In each case, the analysis of the alternatives must be sufficiently detailed to allow the comparative evaluation of the environmental benefits, costs, and risks of the Proposed Action and each ***reasonable alternative***. Particular attention should be given to alternatives that might enhance the environmental quality or avoid, reduce, or minimize some or all of the adverse environmental effects, costs, and risks. In addition, an analysis of the "no action" alternative should be included. To this end, to facilitate the purposes of HRS Chapter 343 and in response to DEIS comments, a comparative table of the environmental benefits, costs, and risks of the Proposed Action at full implementation of the Mahi Pono farm plan, the "No Action" alternative, and the reasonable alternatives to the Proposed Action, is provided at the end of this Chapter as Table 3-2.

The objectives of the Proposed Action are:

- Preserve and maintain the EMI Aqueduct System, including its access roads and trails
- Continue to meet domestic and agricultural water demands in Upcountry Maui
- Continue to provide water for agricultural purposes in Central Maui (specifically, to allow for the full transition of fields previously used for sugarcane ~~sugar cane~~ cultivation into new, diversified agricultural uses)
- Continue to serve community water demands in Nāhiku

With these objectives in mind, the alternatives considered are: (1) the Proposed Action, meaning a long-term Water Lease being issued permitting water diversions up to the maximum amount authorized after compliance with the ~~under the~~ CWRM D&O (an assessment of the impacts of the Proposed Action is provided in Chapter 4); (2) a long-term Water Lease issued permitting water diversions in an amount less than what is allowed after compliance with the ~~under the~~ CWRM D&O (this is the Reduced Water Volume alternative); and (3) a Water Lease issued with different terms, i.e., (a) the Alternative Lease Duration alternative and (b) ~~or~~ the Modified Lease Area alternative. The "No Action" alternative, meaning no Water Lease being issued, is also assessed, although the No Action alternative clearly does not meet the objectives listed above.

3.1 Alternatives Considered But Dismissed

This chapter also reviews alternative means of achieving some of the objectives of the Proposed Action through alternative sources of water or alternative ownership of the EMI Aqueduct System. However, a preliminary analysis determined that these options are not considered viable for various reasons including the expected intensification of environmental effects and lack of feasibility. Therefore, these options are considered but dismissed from further study.

Some comments submitted in response to the DEIS requested that the EIS further evaluate the feasibility of pursuing, as a means to supplement or augment the Water Lease water (rather than replace the Water Lease water entirely), the alternative water sources that had been

presented in the DEIS. Such variations on the information presented in the DEIS are incorporated into the discussions below

3.1.1 Water Sources Alternatives

New and additional water sources could be used to supplement periodic and/or long-term deficits under the No Action alternative or Water Lease Volume alternative to achieve the objectives of the Proposed Action. Any alternative requiring significant development, including facilities such as wells, pumps, distribution pipes and reservoirs, however, would incur more cost, which would increase water delivery costs and potentially discourage, or at least limit, the diversity of agriculture that could otherwise be provided. Since the quantity of groundwater in Central Maui is dependent on surface water for recharge, increased pumping from existing wells in Central Maui cannot be depended on for long-term development of agriculture in Central Maui. Additionally, the salinity levels of the groundwater in Central Maui~~,~~ prohibit use of groundwater as a sole source of water for diversified agricultural development in Central Maui. The ~~Diversified~~ diversified agricultural crops proposed by the Mahi Pono farm plan are generally less salt-tolerant than sugar, the previous agricultural crop grown in Central Maui.

As discussed in Section 2.1.4 of the EIS, historically, the Central Maui agricultural fields have been irrigated by a mix of East Maui surface water and Central Maui pumped brackish groundwater. The East Maui surface water, which is primarily derived from State land,[1] is diverted through the EMI Aqueduct System, which is a gravity-fed water delivery system that has been in operation for over a century, and delivered to the Central Maui Field Irrigation System to irrigate the Central Maui agricultural fields. Brackish groundwater wells that draw from aquifers underlying the Central Maui agricultural fields supplement the surface water delivered by the EMI Aqueduct System. Mahi Pono, the owner of the Central Maui agricultural fields, currently uses both of these irrigation water sources to support its current farming operations and to a far lesser extent, support limited historical uses and water used for reservoirs, fire protection, dust control, and hydroelectric. As noted in Section 2.1.2 of the EIS, East Maui surface water delivered through the EMI Aqueduct System is also provided to the MDWS. The maximum amount of surface water estimated to be diverted from the License Area is approximately 87.95 mgd (this figure takes into account the IIFS established by the 2018 CWRM D&O for the East Maui streams in the License Area).

Alternative water sources also have more potential for adverse environmental impacts than the Proposed Action, which would utilize the existing gravity-fed EMI Aqueduct System that has been in place for over a century, and utilize the existing Central Maui Field Irrigation System ~~irrigation system~~ that is planned for upgrades by Mahi Pono. Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e., the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As part of this upgrade, Mahi Pono's irrigation engineering team is implementing ~~designing a~~ high-efficiency irrigation systems that will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) ~~recycle~~ recycling and ~~re-use~~ re-using all water used in Mahi Pono's processing

[1] The EMI Aqueduct System diverts surface water from the approximately 50,000-acre "Collection Area." Of those 50,000 acres, approximately 33,000 acres are owned by the State of Hawai'i (the License Area), and the remaining approximately 17,000 acres are privately owned.

plants; and (3) ~~integrate~~ integrating various live technology feeds to constantly monitor plant, soil, and tree health.

3.1.1.1 Groundwater Alternative

This alternative is intended to reduce the amount of surface water required for irrigation to support diversified agriculture in Central Maui. If sufficient groundwater sources can be developed, then the groundwater together with the amount of surface water that may be available through the No Action or Reduced Water Volume alternative ~~Alternative~~ could, conceivably, meet objectives of the Proposed Action.

The Central Maui agricultural fields are within the MDWS~~'s~~ Central Maui Aquifer Sector which includes four aquifer systems: Pā'ia, Kahului, Kamaole, and Makawao aquifers. Currently, ~~the~~ Mahi Pono's Central Maui agricultural fields have 10 ~~15~~ wells (see Figure 2-7 ~~2-5~~) in the Pā'ia, ~~and~~ Kahului, and Ha'ikū aquifers.[2] The average amount of ~~pumping rate from 1987 to 2006 was about 26,663 mg per year. This volume equates to a pumping average of 73 mgd. Brackish~~ brackish groundwater used on the Central Maui agricultural fields from 2008 to 2013 was approximately ~~42.5~~ 70 mgd. (Plasch, Updated 2020 ~~2019~~). This average daily pumping rate is well above the Sustainable Yield (SY) of ~~8~~ 32 mgd (7 mgd for the Pā'ia aquifer, ~~and~~ 1 mgd for the Kahului aquifer, and 24 mgd for the Ha'ikū aquifer (within the Ko'olau Aquifer Sector Area)), as determined by the CWRM (see detailed discussion in Section 4.2.2). This high pumping rate may have been achievable in the past due to the large amount of recharge that was occurring when sugar was being cultivated and irrigated by imported surface water from East Maui. During this same period, the total amount of surface water being applied to the Central Maui agricultural fields was approximately 106.61 mgd. ~~irrigation from surface water in Central Maui was approximately 112 mgd, and an additional approximately 44 mgd of surface water was applied to the fields through system losses (evaporation and leakage) within the Central Maui field system~~. The recharge from the application of this volume of East Maui surface water on the Central Maui agricultural fields served to replenish ~~these system losses were replenishing~~ the Kahului and Pā'ia aquifers and is likely the reason that pumping groundwater at rates greater than the SY was achievable.

Under the Proposed Action, less surface water will be used for irrigation in the Central Maui agricultural fields than was the case in the past, leading to less recharge of the underlying aquifers (85.22 ~~92.32~~ mgd is the maximum amount of surface water estimated to be available under the Proposed Action at Māliko Gulch as compared to the recent (2008-2013) average during sugarcane operations of approximately 106.61 mgd). All of Mahi Pono's ~~the~~ existing wells are located within the Pā'ia, ~~and~~ Kahului, and Ha'ikū aquifers and, with little recharge from former sugar irrigation levels, maximum pumping exceeding the SY of ~~8~~ 32 mgd would eventually increase salinity of the water drawn from the wells. At that point, pumping rates would need to be reduced to protect the aquifers. ~~Given that there are other wells in these aquifers, the safe maximum pumping rate is probably about half, or 4 mgd (Akinaka, 2019~~).

[2] Note that CWRM D&O, FOF 738 refers to 15 brackish water wells, which was the number of brackish wells that A&B utilized during it sugar cane operations. However, one of the 15 wells referred to, State Well No. 5128-002, does not serve the Central Maui agricultural fields and four of the other brackish wells are on lands not sold to Mahi Pono and thus are not available for Mahi Pono's use. See discussion at Section 2.1.4.

To increase groundwater supplies for irrigation of the Central Maui agricultural fields ~~yields~~, additional wells could be drilled in other aquifers in Central and East Maui. The groundwater in East Maui's Koʻolau Aquifer Sector could be an alternative water source to supplement or replace some of the East Maui stream surface water for use in Central Maui. The Koʻolau Aquifer Sector generally underlies the License Area and is made up of four aquifer regions, identified as the Haʻikū, Honopou, Waikaimoi, and Keʻanae Aquifers. (See Figure 4-17). Specifically, it is anticipated that the potential development of new wells sited on Mahi Pono / EMI owned lands within the privately owned portions of the Collection Area as well as areas between Honopou Stream and Māliko Gulch that transect the Koʻolau Aquifer Sector could potentially be pursued and transported to the MDWS and the Central Maui agricultural fields via the existing EMI Aqueduct System. These wells could be dedicated to supply water to the EMI Aqueduct System or into existing storage reservoirs that serve the same uses served by the EMI Aqueduct System. Due to the uncertainty of obtaining requisite approvals to drill new wells on State land, this alternative assumes well development on Mahi Pono /EMI land.

For the purposes of this analysis, using the SY as the maximum amount of groundwater theoretically available for use, the development of potential well sites within the proximity to the EMI Aqueduct System were considered, together with the following environmental and feasibility factors:

1. Avoiding the siting of well development locations near streams in order to minimize potential impacts to streamflow;

2. Locating the well development sites near a collection point or opening to the EMI Aqueduct System. As a large portion of the overall EMI Aqueduct System is made up of tunnels, many areas are not accessible for the purposes of discharging pumped groundwaters into the EMI Aqueduct System;

3. Spacing potential well development sites at least 1,000 feet apart from each other to minimize drawdown effects on the aquifer; and

4. Developing the potential well sites on lands which are legally accessible by EMI staff, i.e., on EMI / Mahi Pono owned lands.

Land use restrictions based on the environmental criteria noted above, as well as the practicalities of using lands owned by EMI and/or Mahi Pono, were the major constraining factors when considering the number of new wells that could be developed.

It can also be noted that the wells were capped at 1 mgd pumping rates because of the numerous wells required in the area and the potential effects larger pumping rates could have on the aquifer. It was previously determined that the East Maui Koʻolau Aquifer Sector has a hydraulic head of around 5 to 6 feet which in turn can sustainably support wells with a max pumping capacity of 1 to 1.5 mgd. (See Mink & Yuen, Inc., Final Supplemental Environmental Impact Statement for the East Maui Water Development Plan, prepared for the Maui County Department of Water Supply, at 31 (2002), *available at* http://oeqc2.doh.hawaii.gov/EA_EIS_Library/2002-11-08-MA-SFEIS-East-Maui-Water-Withdrawn.pdf.) Due to this prior determination, it is expected that the environmental impacts,

such as drawdown effects, of a pumping rate greater than 1 mgd would be more severe in the East Maui environment.

It is also noted that anything larger than 1 mgd involves much higher development and operational costs, both of which make the well less cost effective. Therefore, the 1 mgd standard is used as the most cost effective well to drill. Well pumps that exceed 1 mgd result in the water becoming exponentially more expensive to pump, which then minimizes the benefits of the well water. Additionally, water supply wells are typically installed at 1 mgd to make repairs easier. The uniformity between wells makes ordering and stocking parts easier and more efficient, allowing for parts to be ordered in bulk, thus reducing the cost of repairs and maintenance.

Using these criteria to locate potential new wells to source the EMI Aqueduct System, and taking into consideration the CWRM SY, discussed in more detail in Section 4.2.2, approximately 26 new well sites were identified for consideration (6 in the Ke'anae Aquifer, 7 in the Waikamoi Aquifer, 7 in Honopou Aquifer, and 6 in the Ha'ikū Aquifer) (See Figure 3-1). This would provide up to 26 mgd of replacement water, which is a fraction of what the Mahi Pono farm plan needs at full implementation.

Well development costs are estimated at $10 million per well ($260 million total). Although the DEIS outlines and evaluates an estimated cost of approximately $6 million per 1 mgd well, recent relevant construction cost comparisons reflect that well development in East Maui, which involve typically remote, undeveloped areas, could be much more costly. This rough estimate well development cost of $10 million per 1 mgd well assumes includes the following:

1. The potential well sites are mostly undeveloped and away from existing roadways. Providing access to these new sites will require extensive planning and permitting in addition to being very costly. ($2 million)

2. Due to the remoteness of the sites, power supply is not readily available. Power will need to be brought in from the nearest power sources. It is also likely that the power supply in the area may need to be upgraded to provide adequate power for the new wells. Deep wells such as these require large pumps that require lots of power to operate them. ($1 million)

3. Preparation and development of the well site including clearing, grading, paving and securing of the site. ($500,000)

4. Other development requirements such as material transportation and overall construction difficulties in remote areas. ($500,000)

5. Drilling and casing the well shaft. ($2M)

6. Mechanical work to install the pump within the well shaft and the mechanical pump controls. ($1 million)

7. Electrical work required to provide power and the electrical pump controls ($1.5 million)

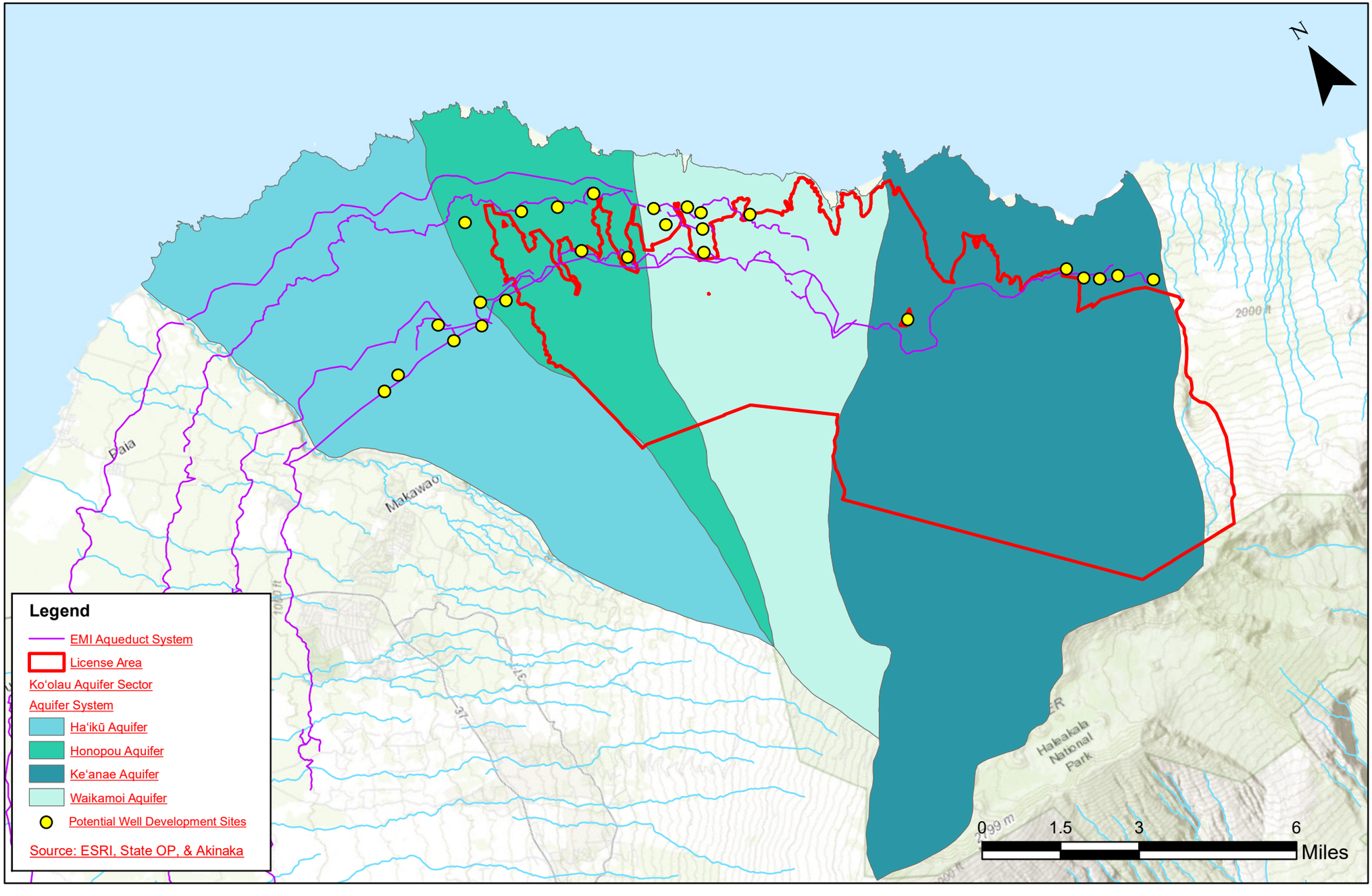


FIGURE 3-1

EAST MAUI AQUIFER SECTOR POTENTIAL WELL DEVELOPMENT SITE MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

8. Building structures to house the mechanical and electrical equipment and controls. ($500,000)

9. Installing piping to transport pumped water from the well to the ditch ($200,000)

10. Installing a receiving and diversion structure to transmit the pumped water into the ditch system. ($200,000)

11. Testing for well capacity, the pump and its controls. ($500,000)

These costs estimates are based on comparable wells developed in North Kona and Upcountry Maui (Akinaka, 2020). It should be noted however, that these costs estimates do not include the significant power generation costs incurred from having to continually pump the wells, or other operation and maintenance costs related to running a deep well system. These wells will be approximately 1400+ feet deep, requiring significant pumping costs. The Kuhiwa Well, located in Nāhiku, Maui, can be used for reference. It is at an elevation of 1,396 feet with a well depth of 1,411 feet.[3] That elevation and well depth is similar for all the proposed wells. (Akinaka, 2020).

It is also assumed that the amount of land needed for well development with access can be estimated to be around one acre. Although well sites are typically not very large, due to how remote most of the proposed well locations are, it can be assumed that lengthy access and utility developments might increase the amount of land needed. Additionally, the development of new wells and associated infrastructure would involve considerable land disturbance in areas that are relatively undisturbed now. This could increase environmental impacts, including potential impacts to undiscovered historic sites and cultural resources, and also require some slight topographic and soil changes.

Furthermore, impacts of well development will need to be assessed at each potential well site as the development of each site would carry a unique set of associated risks, impacts, and challenges. Accessibility and cost of power to supply and operate the wells reflect just a subset of such challenges. As emphasized previously, the extent and nature of these impacts will differ by location and setting. Notably, one impact that should be considered is the effect groundwater pumping will have on nearby surface water sources (streams). Often, groundwater pumping in an area may have a direct relation to lower stream flows and less surface water sources being available due to ground and surface water interaction. The resulting impacts of groundwater pumping, i.e., a reduction in available surface water, could negate any benefits that may arise from the reduction in the amount of surface water used.

Due to the lack of groundwater usage in East Maui, the relationship between surface water and groundwater in the area is largely unknown. This lack of information increases the risk involved with developing groundwater as a supplemental or replacement resource for surface water from East Maui. It should also be noted that obtaining the required land use entitlements, well construction permits, and other construction permits for associated infrastructure, would

[3] The probability of finding high level groundwater is unknown and is therefore not contemplated within this analysis. If high level groundwater was located, the well depths could be reduced.

take considerable time and could face opposition that may make well development and construction challenging. Nevertheless, depending on the terms and conditions of the Water Lease, it is conceivable that the lessee could incrementally pursue well development to supplement the East Maui surface water.

On a macro level, it is well established that a range of environmental impacts are generally associated with the development of wells within the East Maui region (Maui Pineapple Company, 1991). Based on past experience of developing new wells, these impacts range from the destruction of native plants and habitats to introduction of invasive species during the construction and operation of the wells. Also, changes in the topography from development could impact natural runoff directions. The extent of impacts of this nature could be considerable depending upon the location of the sites used. Impacts will vary by location due to remoteness of the area and how much development will be needed for both the pumping site as well as the utilities and access. There are numerous other site-specific impacts that would need to be considered that would require investigations at each potential site, such as: archaeological investigations, investigating the elevation of the water table (identifying if high level water bodies are present), construction impacts (noise, dust, overgrowth on site due to rainfall), and habitat and vegetation investigation (determining if rare/endangered species are present and how development will affect them). Moreover, the amount of land needed to undertake well development will vary from site to site due to requirements to distance well development from pollutants as well as from other wells to prevent drawdown effects.

Supplying well-sourced groundwater to the EMI Aqueduct System presents an additional challenge. Keeping water at the highest elevation ditch (the Wailoa Ditch) would be optimal to mitigate the additional energy costs incurred for the distribution of the water to the end users. One of the challenges that will be faced is the fact that Wailoa Ditch consists mostly of tunnels/covered ditch areas, which makes getting the water into the EMI Aqueduct System challenging. This could require additional piping from the well(s) to the nearest open point on the EMI Aqueduct System as well as additional power requirements and costs. These cost and power needs are not included in the rough estimates provided above.

Development of new groundwater wells in the Ko'olau Aquifer Sector, after taking into account basic environmental considerations such as seeking to limit impacts to streams, minimizing drawdown effects on the aquifer, and accessibly to the EMI Aqueduct System, would, at best, provide only a limited amount of water. Moreover, the Ko'olau Aquifer Sector is relatively in untouched in terms of well development. Groundwater impacts are expected to be more severe and noticeable as a result of drilling a well in an untouched aquifer as compared to drilling in an aquifer that is being pumped from existing wells, increasing environmental risks.

Due to the fact that potential well development would also involve the use of generally remote undisturbed lands in the State Land Use Conservation District, construction of wells and associated infrastructure would generate new and ongoing demands for electrical power. As such, even this limited well development analysis would not appear to enhance environmental quality when compared to the continued use of surface water through the existing, gravity-fed, EMI Aqueduct System, which requires no new construction or significant alterations to continue in operation.

~~Assuming that a single well is normally allowed to pump about 1 mgd within its area, 53 new well sites would need to be developed, each requiring site acquisition, drilling, testing and if adequate, brought into production. These wells would need to be spaced far enough to avoid salt water intrusion into the aquifer. Each well site would have an estimated development cost of $6 million. (Akinaka, 2019). To plan, obtain permits for, and construct 53 wells would probably be in the order of $318 million. Added to this cost would be transmission pipes, additional pumping and related energy consumption to reach higher elevations, and reservoirs. It is anticipated to be very unlikely that 53 new wells could be constructed within the Central and East Maui areas, as the environmental impacts would be considerable and permit approvals would be prohibitive.~~ Therefore, the groundwater alternative continues to be ~~is~~ viewed as an unreasonable alternative with greater risks of adverse environmental effects than the Proposed Action, and was dismissed from further review.

3.1.1.2 Reclaimed Water

The alternative of using reclaimed water from the Wailuku-Kahului Wastewater Reclamation Facility (WWRF) was considered as a potential supplemental or partial replacement source for East Maui surface waters. Kahului WWRF is surrounded by Kanahā ~~Kanahāē~~ Beach Park to the east, the Kanahā Pond Wildlife Sanctuary is mauka, and Kahului Harbor to the west. Presently, the Kahului WWRF has capacity of ~~for 7.9~~ 5.5 mgd and treats water to R-2 quality (Akinaka, 2020). Average flow in 2012 was 3.85 mgd. Average R-2 reuse in 2012 was 0.16 mgd. R-2 is secondary treated wastewater that has been disinfected. Presently, the R-2 recycled water from the Kahului WWRF is disposed through injection wells. Based on the State of Hawai'i Department of Health regulations and requirements regarding the re-use of R-2 recycled water, the application of such R-2 recycled waters may be limited from an agricultural viability standpoint. R-2 recycled water can be used for subsurface irrigation of crops such as fruit trees where the edible portion of crops has minimal contact with the recycled water. R-2 surface drip or subsurface drip irrigation is allowed for timber and trees not bearing food crops. R-2 water could also be used to irrigate pasture land. R-2 recycled water can be further treated to R-1 standard by filtration, which may entail adding a chemical flocculant to cause small particles in the water to clump together so they can be filtered out in the next step. The use of R-1 treated waters is not as restrictive as R-2 waters from an agricultural viability standpoint. R-1 recycled water is the highest quality and can be for agricultural irrigation via spray, surface drip or subsurface drip irrigation, as well as for watering livestock, with the exception of dairy animals that produce milk for human consumption. However, using R-1 waters on unprocessed agricultural food crops carries negative stigma from a commercial marketing perspective.

The County of Maui Department of Environmental Management (DEM) has expressed a desire to upgrade the Kahului WWRF plant to provide R-1 treatment capabilities in the future (as a project targeted for implementation as early as 2026-2028) but this upgrade currently has not been funded. It is noted that upgrading this facility to R-1 treatment standards is contingent upon the availability of County funding.

Hypothetically, the Kahului WWRF source could, at best, only provide 5.5 mgd of R-2 and/or R-1 treated waters and would also require the installation of a transmission / transportation system to convey these recycled waters from the Kahului WWRF to the Central Maui agricultural fields, a distance of some 10+ miles as there is no current transmission system that is capable of conveying recycled waters to the Central Maui agricultural fields. In addition,

construction near Kanahā Pond, which is designated as a State wildlife sanctuary, and any development along that corridor that surrounds the pond would raise the risks of new environmental impacts and risks in an acknowledged sensitive area. It would also be subject to additional regulatory processes and controls such as compliance with the Endangered Species Act, Chapter 6E, DOH approval process for construction and treatment, and recycled water use permits. Moreover, there are potential environmental impacts typically associated with wastewater treatment and reuse plants. These environmental impacts include the potential for groundwater, surface water, and coastal water pollution which depend on numerous factors including recycled water quality, depth of the unsaturated soil zone, physical and mineralogical characteristics of the soil layers heterogeneity, hydraulic load, and infiltration schedule (CWRM Water Reuse Survey and Report, 2013). Although there are many studies of the impacts on recycled water use on groundwater outside of the State, the unique properties of Hawaiian soils mean that not all lessons learned from those studies can be applied locally (Brown and Caldwell, n.d.). A study conduced at the Central O'ahu Regional Park showed promising results regarding the application of R-1 recycled water, however, the study also concluded that impacts of of recycled water use are highly dependent on recycled water quality and geological conditions at the application site.

Concerns have also been raised in the past about upgrading the Kahului WWRF, which is located in a hazardous and exposed location, at the front of a tsunami flood zone and a 3.2 feet sea level rise exposure area, rendering it a vulnerable public facility. Consequently, the upgrade of the WWRF to provide R-1 waters, as well as the construction of infrastructure required to convey those waters to potential users of the recycled water, is speculative and of questionable benefit from an environmental perspective. And, at best, assuming transmission could be installed, it would supply only a very limited amount (5.5 mgd maximum) of replacement water for the Mahi Pono farm plan.

The infeasibility is magnified under the context of both the anticipated adverse environmental impacts (hydrological, geological, biological) of developing this alternative source, along with the costs and uncertainty associated with the upgrade of the Kahului WWRF and construction of the supporting infrastructure. One prominent challenge associated with the production of recycled waters includes the wide variety of chemicals and compounds as well as microorganisms, organic chemicals, inorganic chemicals, disinfectants, disinfectant byproducts that need to be considered when treating reused water. Each of these products has the potential to be harmful to both humans and the environment. The extent of environmental impacts from these byproducts is dependent on the concentration as well as the type of specific compound/chemical in use. If not treated properly and used in the Central Maui agricultural fields, the chemicals and compounds being used could reduce crop yields for consumption, compromise the underlying soils, pollute underlying aquifers, and pollute nearshore environments.

In other words, this alternative / potential supplemental resource would supply a limited amount of water that generally would not enhance the environmental quality, or avoid, reduce, or minimize some or all of the adverse environmental effects, costs, or risks associated with the Proposed Action, which are discussed in Chapter 4. Consequently, the use of recycled waters from the Kahului WWRF continues to be dismissed from consideration as a reasonable alternative to the Proposed Action.

It should also be noted that while DEM is planning a new wastewater treatment facility west of its Kahului WWRF, it is planned to be located off of Kuihelani Highway near Waiko Road and within Mahi Pono's fields in West Maui. These fields are located outside the service area of the EMI Aqueduct System. The Central Maui agricultural fields that are considered in this EIS are all east of Maui Veterans Highway. Thus, it is assumed any reclaimed water from the planned WWTF within the West Maui fields will not be available for the Central Maui agricultural fields, and will remain in the area west of Maui Veterans Highway. Thus, not only is the development of this potential reclaimed water source uncertain, the proposed future WWTF would not be an available or reasonable replacement source of water for the Central Maui agricultural fields that are irrigated with East Maui stream water.

~~Costs for using recycled water include costs for upgrading the water from R-2 to R-1 standards, transmission by pump and pipelines, and reservoir(s). Kahului WWRF is at a low elevation, approximately five feet above mean sea level. The use of any reclaimed water for irrigation purposes in Central Maui would involve pumping and related energy consumption. The installation of pipelines, reservoirs, and other infrastructure to bring the reclaimed water to Central Maui would entail construction in the vicinity of the Kanahā Pond Wildlife Sanctuary, a 143 acre State of Hawai'i facility that comprises large brackish water wetland features and is home to three endangered bird species, the Hawaiian stilt, the Hawaiian duck, and the Hawaiian coot, as well as a variety of other bird wildlife, increasing the risks of detrimental environmental impacts. Considering the limited amount of reclaimed water that could be obtained due to the capacity at Kahului WWRF, infrastructure and operational costs, and the risk of environmental impacts, this alternative is viewed as an unreasonable alternative with greater risks of adverse environmental effects than the Proposed Action, and was dismissed from further review.~~

3.1.1.3 Added Storage Alternative

Given the variations in rainfall amounts in East Maui, if excess surface flows could be captured and stored to be used when flows through the EMI Aqueduct System are insufficient, the ~~overall~~ amount of diverted flow required to meet irrigation needs in Central Maui could be reduced during drier periods. Adequate storage allows for the opportunity to supplement water from the reservoirs into the ditches during these low flow / rainfall periods. However, storage is not a replacement water source. At best, it provides opportunity for more efficient use of the available water, especially during drier periods. Currently, the EMI Aqueduct System has six ~~eight~~ reservoirs that serve to supplement water delivery, mostly along the lower ditch systems.~~, and the~~ Mahi Pono's Central Maui ~~field irrigation system~~ Field Irrigation System is served by ~~has 48~~ 35 major reservoirs.[4] The combined storage capacity of these existing reservoirs in their current condition is approximately 1,064 ~~1,344~~ mg (approximately 796.9 mg from the Central Maui reservoirs and approximately 267.1 mg from the EMI Aqueduct System reservoirs) (Akinaka, ~~2019~~ 2020). Most of these reservoirs, however, have not been used since the closure of sugar in 2016 and others have not been used because they do not meet current dam safety requirements. Hence, they cannot be used to their full capacity. As a result, many will require extensive upgrades to put them back into service. These upgrades could cost

[4] GIS data provided by the State Office of Planning does not include all ~~48~~ 35 reservoirs within the Central Maui agricultural fields.

between $35 – 90 ~~50 – 100~~ million (Akinaka, 2020 ~~2019~~). These upgrades would include lining, covers, overall water retention improvements, etc.

Improving existing reservoirs in the Central Maui fields would lessen the amount of water that seeps into the ground at these reservoirs, as well as improve the efficiency of the overall system. However, it should be noted that the seepage water is not necessarily lost. The seepage occurring at the reservoirs helps to recharge the Central Maui Aquifer through infiltration. This seepage historically allowed HC&S to sustain pumping of the aquifers significantly greater than the SY for the aquifer set by CWRM. Due to the lessened amount of diverted water available to Mahi Pono compared to the previous amounts of water that HC&S was using, the recharge to the Central Maui Aquifer will be substantially lessened. It can be stated that seepage at the reservoirs is not deemed as a waste of water due to its contribution to recharging the aquifer.

Moreover, based on previous experiences and the cost of similar storage facilities in the State, the estimate to build new storage reservoirs is around $600,000 - $800,000 per million gallons of storage (Akinaka, 2020). Obtaining permits to upgrade and repair these reservoirs will also be challenging due to current dam safety requirements. Assuming that the existing reservoirs can be restored to their full capacity of 1,064.4 ~~1,344~~ mg, and the amount of surface water flow available for irrigation under the Proposed Action is approximately 92.32 mgd at Māliko Gulch, then the existing reservoirs could provide about 16 days of storage capacity.

The existing 41 reservoirs are fed by the EMI Aqueduct System surface water diversions so they can be filled when the amount of water delivered exceeds the amount used. The EMI Aqueduct System, however, is not designed to capture and convey high-volume freshet flows which overwhelm and bypass the diversions. ~~If such freshet flows (in excess of the IIFS standards under the CWRM D&O) could be captured, it could significantly increase storage capacity.~~ As discussed in Section 2.1.4, an estimated 85.22 mgd gross total of surface water (less Central Maui Field Irrigation System losses, a net estimated 65.88 mgd) will be needed to support Mahi Pono's farm plan at full implementation. Currently, the size and location of the existing reservoirs, as well as water availability do not lend themselves to providing significant back-up storage. Rather, the reservoirs are generally used for operational purposes, to move water to different fields.

Improving and adding storage could potentially serve to increase water availability for end users during drier periods since these are the times that the EMI Aqueduct System ditch water is low. Storage facilities could serve to supplement and add water into the ditches during these low flow times, provided water was available to fill these storage facilities on a regular basis. Restoration of the existing reservoirs for added storage within the EMI Aqueduct System could improve the reliability of delivering water to Central Maui.

As requested in some of the comment letters to the DEIS, a variation on the prior additional storage alternative discussion that was included in the DEIS is considered, whereby 100 mg of storage from new reservoirs would be built above the Wailoa Ditch (uppermost ditch of the EMI Aqueduct System) after Honopou Stream within EMI / Mahi Pono privately owned lands. At present, no storage exists at elevations above the Wailoa Ditch. However, it should be noted that supplemental storage only provides a net benefit if the ditch and/or alternative water sources can provide enough water to fill the reservoirs on a regular basis. As mentioned

above, the EMI Aqueduct System is not designed to capture and convey high-volume freshet flows which overwhelm and bypass the diversions. If such freshet flows (in excess of the IIFS under the CWRM D&O) could be captured, it could support a significant increase in storage capacity, but this would require significant changes to the EMI Aqueduct System. When rainfall in East Maui is low, all of the available water in the EMI Aqueduct System may be needed by the end water users. Under that scenario, there would be no excess water and any new reservoir capacity would be useless.

Moreover, similar to developing wells in the area, obtaining construction permits to build these reservoirs or to modify the EMI Aqueduct System and its diversions, like any other improvements in the area, could be a lengthy process and face opposition due to potential environmental impacts, and may raise issues that may make reservoir construction challenging in these remote, watershed areas. The anticipated environmental impacts of reservoir development and system modifications would need to be researched for each specific proposed area on a case by case basis, but, generally speaking, biological, geological and hydrological impacts are expected.

Furthermore, historically the reservoirs have been observed to be full only a small percentage of time throughout the year due to the lack of available, excess water, not needed by the County of Maui and the Central Maui agricultural fields. If additional storage were to be pursued, based on historical operation of the EMI Aqueduct System, there would not be enough source to benefit the system, particularly with the maximum diversions from the License Area now being significantly less than what historically occurred due to compliance with the CWRM D&O.

As analyzed in the DEIS, ~~If~~ if an additional storage volume of 1,200 mg is assumed to be built, an additional two weeks of ~~flow~~ water supply could be provided ~~at~~ assuming the daily need to irrigate the Central Maui agricultural fields with ~~the rate of~~ ~~82.36~~ 82.34 mgd. Combined with the storage capacity of the restored and existing reservoirs, a total of about a month's worth of storage capacity would be available, which would provide a substantial supply to weather periods of low rainfall during the dry season. However, it is unclear and doubtful whether sufficient water flows exist to fill all of this storage capacity ~~Moreover,~~ since currently, the captured freshet flows are not enough to regularly fill and would be used to replenish the restored and existing reservoirs and the frequency of these freshet flows and the ability of the EMI Aqueduct System to capture and convey such flows is unknown ~~between freshets, the period that stored water could be used could be extended even longer~~.

A single reservoir of this size (to hold 1,200 mg) could be located upstream of the Koolau Ditch within Hānawī Gulch. This area is preferable for the location of a reservoir to capture and store water because of its elevation and rainfall. The reservoir would be created by damming a ravine above the ditch so it can be fed by gravity flow and allow streamflow to continue in compliance with the CWRM D&O. Based on a rough estimate, a reservoir of this size would encompass about 30 acres with a 4,000 foot long dam structure standing approximately 150 tall at its highest point. (Akinaka, 2019). Construction of such a reservoir would be in the order of some $300 million. (Akinaka, 2019). Dams are uniquely engineered structures that require knowledge and experience in dam safety, particularly how to safely handle water flows in and out of the structure through appurtenant features, as well as mitigating the hazards of water passing through the dam embankment itself (seepage). Dams sustain high hydrostatic water

loads, which can result in failure of the embankment if they are not properly designed. (DLNR, The Hawai'i Dam and Reservoir Safety Program, FY 2017). It is very unlikely such a reservoir could be constructed as its environmental impacts would be considerable in terms of impacts to views and public safety concerns.

In summary, reservoir / storage improvements may improve the efficiency of the Central Maui Field Irrigation System but at the cost of providing less recharge to the underlying Central Maui Aquifers which in turn will decrease the amount of water the Mahi Pono can pump for brackish water needs. Moreover, the reservoir/storage improvements do not constitute a discrete alternative for providing an additional source of needed water, and instead represent a means by which the operational efficiency of the Central Maui Field Irrigation System may be improved. Additionally, the environmental impacts for developing new storage / reservoir facilities for the EMI Aqueduct System above Wailoa Ditch far outweigh the minimal benefits they will provide due to the fact that existing reservoirs / storage facilities are seldomly full due to a lack of available excess water. That, coupled with the fact that the EMI Aqueduct System will be diverting less water under the proposed Water Lease than had been diverted in the past, means that most reservoir water levels are assumed to decrease even more, rendering this scenario infeasible as a means of supplementing whatever surface water is allocated under the proposed Water Lease.

3.1.1.4 Desalination

Comments submitted in response to the DEIS called for further consideration of desalination. This option would include drilling additional wells within Mahi Pono's Central Maui agricultural fields and pumping salt water from below the aquifer for treatment at a desalinization plant that would be constructed by Mahi Pono. The new wells drilled within Mahi Pono's lands for desalinization would need to be dedicated to pump fully saline groundwater. Another option for desalinization involves improving the quality of the water from Mahi Pono's existing brackish wells in Central Maui. This option would not add to the amount of irrigation water available in Central Maui, it would merely change the quality of the water to make it less salty, and the volume of the desalinated water would be approximately half of the amount of brackish water.

Assumed land use for the deep saline wells would be similar to that for the groundwater wells, however, there will be a much greater cost and environmental impacts associated with saline groundwater wells. This is because saline groundwater wells need to be drilled much deeper than the freshwater wells in order for the well to penetrate the underlying salt water. Furthermore, there is a greater risk of tapping into geothermally heated groundwater with deep wells, which needs to be accounted for when planning well site locations. Additionally, maintenance costs can be assumed to be higher than the maintenance needed for freshwater wells due to the corrosive nature of salt water. Special well casings and pump motors will be needed in order to minimize the deterioration of the well. However, a beneficial aspect to pumping saline groundwater is that the water taken does not count against the SY of the aquifer. Therefore, larger pumps (meaning greater than the 1 mgd pumps proposed for groundwater wells) could be installed, resulting in fewer wells being needed. Of course, larger pumps also come with higher maintenance costs.

The impacts and costs associated with the development of deep saline wells and the construction of a desalinization plant are considerable, and therefore hard to justify under any

circumstances, and especially if the desalination produced only a limited amount of water. Therefore, to set the parameters of this analysis, it is assumed that such an undertaking would be pursued only if there were no Water Lease (i.e., the EMI Aqueduct System would deliver the estimated 26.39 mgd from the Collection Area and 4.37 mgd from the lands to the west of the Collection Area, for a total of approximately 30.76 mgd, as anticipated under the No Action alternative). A desalinization plant and associated wells could be constructed to supplement a portion of the amount of water that may be awarded under a Water Lease, rather than to replace the water that is being sought through a Water Lease. The costs for construction could be incrementally reduced due to fewer wells and operational costs could likewise be lower, but the overall environmental analysis would not change in any significant way (Akinaka, 2020).[5]

If, consistent with the No Action alternative, no Water Lease is issued, EMI would no longer provide surface water to the MDWS and therefore all of the limited amount of surface water would be made available to Mahi Pono. Under that scenario, the wells and desalinization plant would need to produce a minimum of approximately 55 mgd. This figure is based on the estimated 85.22 mgd (gross) that the Water Lease would provide to Mahi Pono prior to any reduction for DHHL reservations, less the amount of water EMI is entitled to under the No Action alternative (estimated at 30.76 mgd). However, it should be noted that the other source of irrigation water that Mahi Pono relies on - its 10 brackish wells in Central Maui - would likely be less productive in this scenario where there is such a dramatic decrease in the importation of East Maui stream water, and therefore an additional desalinization source could be needed.

It is estimated that five saline (i.e., deep salt water) wells each with a pumping capacity of 15,000 gallons per minute (gpm) or 21.6 mgd[6] could provide approximately 100 mgd of source water, which would result in 50 mgd of desalinated water. That is because during the desalinization process, as much as 50% of the water can be rejected as brine which means that only 50% of the water pumped into the plant will be usable. With such a high pumping capacity, the deep saline wells may need to be spaced about 3,000 feet apart from each other in order to prevent drawdown effects. Testing and studies would need to be done in order to confirm adequate spacing requirements to minimize effects of fresh/brackish water intruding into the saline layer of water. Due to the unpredictable effects that pumping saline water will have on the brackish water wells (i.e., unknown changes of aquifer geometry and the possible movement of the basal lens) it would be safe to assume that the saline wells will similarly need to be spaced from the existing brackish water wells.

Based on desalinization plants of similar capacity, the amount of land needed for Mahi Pono to build a desalination plant of this size would be on the order of 6 acres (Carlsbad Desal, 2020). This would be constructed within the Central Maui agricultural fields for irrigation

[5] The impacts associated with the desalination scenario could be somewhat lesser if a desalinization option were pursued in conjunction with the issuance of the Water Lease, as both the number of deep salt water wells needed could be reduced, and therefore the associated disposal of brine would be reduced. There would also be some reduction in energy demands associated with the desalinization option if more surface water through the gravity fed EMI Aqueduct System were available, lessening the need for the projected desalinized water.

[6] Using previous HC&S well data, it was determined that one of the largest production wells had a pumping capacity of 15,000 gpm or 21.6 mgd.

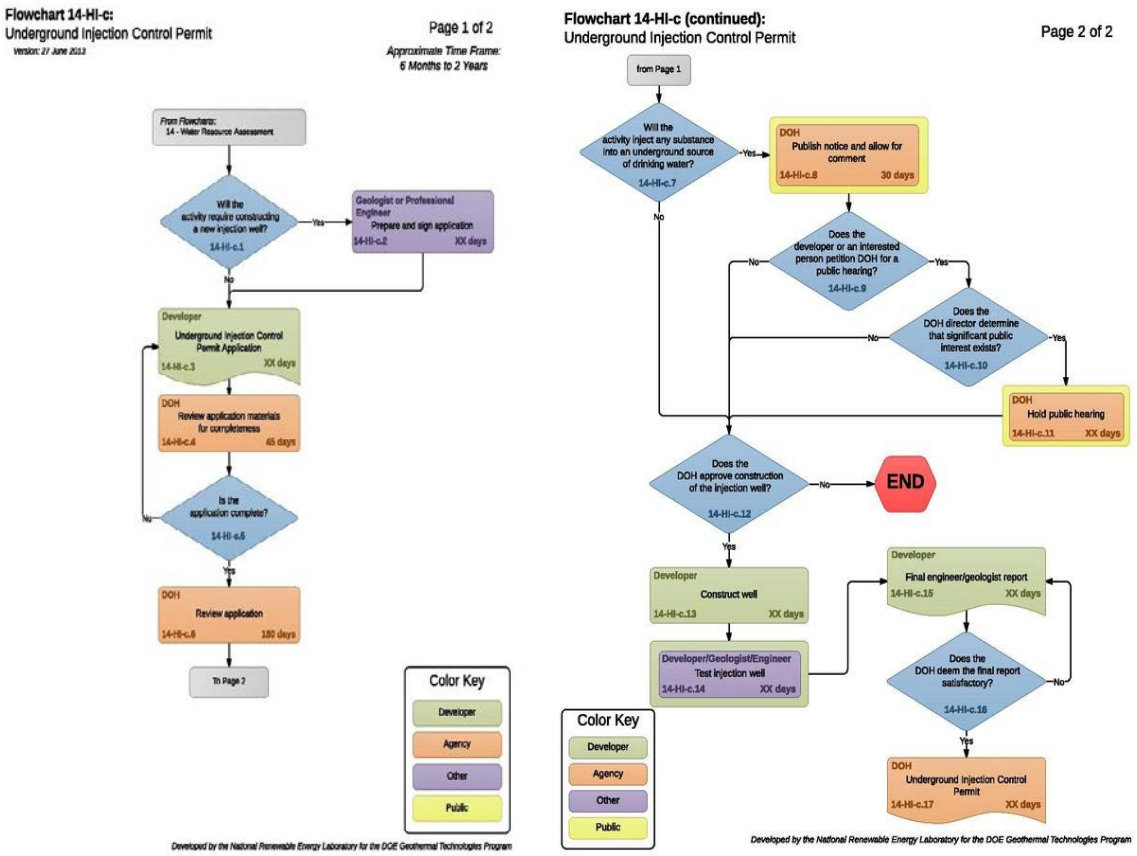
efficiency, but would also therefore eliminate those lands for agricultural purposes. Assuming similar land use to the groundwater alternative wells, an additional 5+ acres would be needed for the five well sites, further reducing the amount of land available for agricultural purposes, and an estimated 5+ acres would be needed for the injection wells, all further reducing the amount of land available for agricultural purposes in Central Maui and reducing open green space negatively impacting the visual resources of the area.

After treatment, around 50 mgd of brine will need to be discharged, leading to additional environmental hurdles. Typically, the brine, which has a very high salt content, is injected back into the ground, which could result in adverse impacts to the Central Maui aquifers and underlying soils. Moreover, disposal of the brine will need to be permitted and approved, which itself is a costly, difficult, and lengthy process. See Figure 3-2, which shows the process for obtaining an Underground Injection Control (UIC) Program permit which requires compliance with State rules and regulations.

The cost of the construction of this plant is reported to be in the order of approximately $1 billion, and this figure does not include development of the deep salt water wells or injection wells. An additional point of comparison is a 5 mgd desalination plant currently planned for construction on O'ahu with a cited building cost of around $40 million and operational costs estimated at $3.15 per thousand gallons. Additionally, the costs of constructing saline groundwater wells could be on the order of $15 million per well (with an estimated five wells needed, each with a pumping rates of 21.6 mgd to provide an estimated 100 mgd of source water).

Similar sized plants that generate potable water entail a cost factor of $6.15 per thousand gallons for consumers. While the energy needed for potable water are no doubt higher than what is needed for irrigation water, energy demands for operating this desalination plant would be considerable. In addition, based on previous experience and knowledge of brackish water desalination, associated energy costs would amount to somewhere in the region of $2 per thousand gallons.

Figure 3-2: Underground Injection Control Program Flow Chart



Anticipated environmental consequences span impacts to regional hydrologic, geologic, and biological resources. Hydrological resources would be assumed to experience the greatest impacts due to withdrawals and injections greatly influencing the regional water sources. Highly in-depth hydrogeological study will need to be done within the area of the proposed injection wells due to the fact that the injection wells must discharge the brine into a confined aquifer/space at least ¼ mile under any drinking water aquifers so as not to contaminate any other freshwater sources. Due to the increased restrictions and preventative measures that are required under Class I injection wells (Class I is the type of injection well associated with industrial waste), there would not be a need for a "no-farming zone" since, under construction regulations for a Class I well, extreme preventative measures are required in order to prevent harmful water from infiltrating drinking water sources in the event of a spill/leakage. Additionally, the harmful discharge from the desalination plant will be pumped extremely deep underground, minimizing any effect to surrounding soils. Nevertheless, a buffer area between the injection wells and the agricultural lands would be recommended.

Injection wells may also raise Clean Water Act concerns. Currently, the County of Maui only uses Class V injection wells, which inject treated, relatively good quality water underground. However, for this desalinization plant, Class I injection wells would be needed for the disposal of the brine. Class I wells are typically drilled deeper and have increased restrictions. Any proposed injection well would need to meet these same standards, which are challenging from

an engineering standpoint, and costly as consequence. It is also anticipated that drilling new Class I injection wells would create immense community and government opposition.

High construction and maintenance costs, low efficiency, high energy consumption cost and adverse environmental impacts are largely why desalinization is typically dismissed as a feasible source of water around the world. Moreover, the time needed for permitting is long and the process is anticipated to be challenging.

Overall, desalination is considered one of the last alternatives when water is not available from other sources. For these same reasons, desalinization is not a reasonable alternative to partially replace the water being sought under the Proposed Action and is therefore dismissed from further consideration.

The option of desalinating water from Mahi Pono's 10 brackish wells would do nothing to add replacement source for the farm plan. It would merely change the quality of the water to make it less salty. Therefore, it is not a replacement or supplement to the East Maui stream water proposed for diversion under the Water Lease. Mahi Pono's 10 brackish wells are located within the Pā'ia, Kahului and Ha'ikū aquifers. See Section 4.2.2, Table 4-5. In the past, actual pumping has exceeded the official SY for the Pā'ia, Kahului, and Ha'ikū aquifers because, as noted in the State Water Resource Protection Plan, 2019 Update ("WRPP"), the official SY of these aquifers "Represents sustainable yield under natural conditions, which ignores significant return irrigation recharge from East Maui." (WRRP, Appendix F, p. 87).

For the Kahului, Pā'ia and Ha'ikū aquifers, the upper limit of SY were 10, 33 mgd and 31 mgd respectively (WRPP, Appendix F, p. 76). Thus, pumping capacity can exceed the official SY of the aquifers. However, taking into account a lower rate of irrigation recharge that will occur as compared to under sugar cultivation, less pumping than historically took place will be needed to protect the aquifers. Based on the amount of surface water that could be available under the Water Lease, Mahi Pono will need approximately 21.31 mgd of brackish groundwater (before system losses) to supplement the supply of surface water used to irrigate crops based on what it believes will be available, of sufficient quality for its chosen crops, given the reduced amount of recharge that will occur due to the significant reduction in the amount of imported surface water from East Maui as a result of the IIFS established under the CWRM D&O.

The water from these wells has a high salinity level. The high salinity water could be used to irrigate sugarcane, but it cannot be used for many other crops. Desalinization would improve the quality of the water, thereby making it more usable for diversified agriculture. Surface water can be supplemented by brackish water in an amount equal to 20% percent of the total irrigation need. Taking into account the CWRM D&O, and the amount of surface water that will be available after compliance with the IIFS, it is estimated that there could be up 16.47 mgd of brackish groundwater used in the Central Maui agricultural fields. The 16.47 mgd figure is after losses in the Central Maui Field Irrigation System. However, the assumption underlying that already limited amount of brackish water is that approximately 87.95 mgd of surface water would continue to be diverted from the License Area (and some 4.37 mgd of surface water would continue to be diverted from the private lands), as anticipated under the Proposed Action. If desalinization was used to avoid the use of some East Maui stream water, i.e., if less East Maui stream water was imported for use for irrigation in Central Maui and therefore

less water was provided to recharge the underlying aquifers, the amount of brackish water that could realistically be pumped from Mahi Pono's 10 wells would be reduced proportionately.

The relationship between the recharge from surface water to the underlying aquifer was noted by CWRM in FOF 746 of the CWRM D&O:

> It is unclear what the direct relationship is of recharge from surface water importation to the underlying groundwater aquifer. HC&S historically supplemented surface water with pumped groundwater on a seasonal basis, and on an aggregate basis, constituted between 20 to 30 percent of total water use when HC&S was cultivating sugarcane. The amount of groundwater historically used was far in excess of the published sustainable yields of the underlying aquifers, which was made possible by the large volumes of surface water.

As noted above, during the desalinization process, as much as 50% of the water can be rejected as brine which means that only 50% of the water pumped into the plant will be usable. Based on the projected amount of brackish water noted above (which figure would likely be reduced if less surface water was imported from East Maui), desalinization of the water from the brackish wells would at most provide around 11 mgd of usable irrigation water. This water would not be in addition to the water Mahi Pono will be relying on. This process is merely a means improving the quality of the brackish water that Mahi Pono intends to pump from its existing 10 wells in support of its diversified agricultural plan. As such, this scenario raises all of the environmental concerns discussed above for the desalination option, but provides no replacement source of water, and is therefore dismissed from review.

3.1.2 Aqueduct Ownership

During public scoping for the DEIS in 2016 and 2017, it was suggested that the EMI Aqueduct System should be brought under new ownership, without the further involvement of A&B and EMI, and potentially under public ownership. Ownership of the EMI Aqueduct System changed in January 2019 to include Mahi Pono, which intends to continue to pursue diversified agriculture in Central Maui. Consideration of another change in ownership is too speculative at this point to warrant analysis. A change in the ownership of the EMI Aqueduct System will not enhance environmental quality or avoid, reduce, or minimize all or even some adverse environmental effects, costs, or risks of the Proposed Action. Should another entity manage the diversion of water from the License Area streams, the EMI Aqueduct System would still require repair and maintenance activities, and therefore, would still require access into the License Area and assumably still need to divert stream water for another entity's purpose and need. Hence effects from this alternative are anticipated to be identical to those described under the Proposed Action, assuming the ownership entity would have the requisite skills and staff to operate the EMI Aqueduct System as EMI has been doing for decades.

Comments received on the DEIS asked about the County of Maui Board of Water Supply's Temporary Investigative Group (TIG). In response, it is noted that on July 19, 2019, the County of Maui Board of Water Supply (BWS), which is an advisory board to the director of the MDWS, the mayor, and the Maui County Council, formed the TIG to explore options for ensuring public access to water, including the feasibility of purchasing and maintaining the EMI Aqueduct

System. The TIG prepared a TIG Report, that provides its own valuation of the EMI Aqueduct System, which was not based on an appraisal, however, and strategies for the County to acquire the EMI Aqueduct System. The TIG Report ultimately recommends that the County take immediate steps to secure ownership and control of the EMI Aqueduct System. The TIG Report was made public on October 16, 2019, after the publication of the DEIS, and has been included herein as Appendix Q. On December 19, 2019, the BWS approved the TIG Report, with amendments. However, based upon the information obtained to date, the County's acquisition of the EMI Aqueduct System remains speculative. The County Council has not yet deliberated on the findings of the TIG Report, nor issued any guidance in response to the TIG Report's finding. It is noted that the TIG Report's proposal for water rates for the Central Maui agricultural fields is nearly ten times that of what is being charged at KAP and to Upcountry agricultural users. Such a dramatic increase in water rates would have associated economic, fiscal, and social impacts, countywide.

This EIS was not prepared to assess the environmental impacts of government acquisition of the EMI Aqueduct System. However, assuming an alternative owner of the EMI Aqueduct System would be required to meet goals of the Proposed Action as described in this EIS, including meeting the Proposed Action's stated objective to support an economically feasible, sustainable diversified agricultural operation across the Central Maui agricultural fields, the physical environmental impacts of government acquisition of the EMI Aqueduct System would be similar to the impacts of the proposed Water Lease.

Moreover, as ~~As~~ discussed elsewhere in this FEIS ~~DEIS~~, EMI has been operating the EMI Aqueduct System since the start of construction in the 1870s. Few have the knowledge to operate and maintain this unique and complex system, consisting of approximately 388 separate intakes, 24 miles of ditches, and 50 miles of tunnels, as well as numerous small dams, intakes, pipes, 13 inverted siphons and flumes. ~~Furthermore,~~ While a partial investigation has been done of the feasibility of this alternative in the TIG Report, the EMI Aqueduct System is not for sale, and forced governmental acquisition of the system is projected to be prohibitively expensive, resulting in substantial costs to the public. For these reasons, this alternative continues to be ~~is~~ viewed as a highly speculative and unreasonable alternative for the Proposed Action.~~,~~ As referenced in the comment letters to the DEIS, this alternative was undefined and it is unclear whether such an acquisition of the EMI Aqueduct System would necessarily ~~and one that would not~~ meet the objectives of the Proposed Action; For example, the water service EMI provides by agreement to the MDWS, which in turn provides water for domestic and agricultural uses in Upcountry Maui (as well the Nāhiku community through water sourced from EMI-owned lands), the continuation of which is one of the objectives of the Proposed Action, would not clearly be satisfied under this alternative. Therefore, it was dismissed from further review.

3.2 Alternative Analysis

3.2.1 Reduced Water Volume Alternative

The BLNR cannot authorize a lease that allows the use of more water than can be diverted under the CWRM D&O. However, the BLNR could elect to issue a water lease that authorizes the use of a lesser amount of water. Projections of the amount of government water available from the License Area at Honopou Stream ~~stream~~ after taking into account the CWRM D&O,

is approximately 87.95 mgd. This amount would be subject to further reduction in accordance with the DHHL reservation once called upon for use by the DHHL.[7] The CWRM estimated that the amount of water potentially available after implementation of the CWRM D&O might be enough for about 90% of the irrigation needs for the approximately ~~23,000~~ 22,000 acres of IAL lands in Central Maui (although it is not clear if the CWRM D&O took into account the future DHHL reservation). However, there are approximately 30,000 agricultural acres in Central Maui (largely, but not exclusively, IAL lands), and Mahi Pono has expressed an intention to farm as much of that land as possible.

The existing water delivery agreements with the MDWS are contingent upon the Water Lease being issued, therefore if no Water Lease is issued, it is assumed that the delivery of water to the MDWS would terminate. Under the Reduced Water Volume alternative, depending on the amount of water authorized under the Water Lease, the MDWS may receive no water from the Wailoa Ditch or some amount up to 7.1 mgd. The greater the reduction in the amount authorized under the Water Lease, proportionally less water will be available to the MDWS.

3.2.2 Water Lease With Different Terms

3.2.2.1 Alternative Lease Duration

As discussed in Chapter 1, on May 14, 2001, A&B requested that the BLNR offer a long-term (30 year) lease at public auction for the right, privilege and authority to enter and go upon the State-owned License Area for the purposes of developing, diverting, transporting and using government-owned waters. However, the BLNR has the authority to offer such a lease with a term that is either shorter or longer than 30 years, provided, however, that under HRS § 171-36, the BLNR cannot authorize a lease for a term longer than sixty-five years. Some have viewed a shorter term for the Water Lease as an opportunity to evaluate the lessee's performance during its term as a basis for further extension. In this context, a lease term shorter than 30 years could limit the ability of Mahi Pono or a lessee to obtain financing for the needed investment in establishing successful diversified agricultural operations and crops that may take years to reach economic viability. Additionally, the infrastructure and land management necessary to support a diversified agriculture farm plan is different from what was necessary for sugar cane, and thus requires significant infrastructure improvements and land preparation. Given the considerable time and expense it takes to develop a diversified farm plan such as the one Mahi Pono is proposing, a shorter term water lease would likely result in a reduced range of crops, and the reduced cultivation of designated IAL in Central Maui. This would be inconsistent with the Proposed Action objective of developing diversified agriculture in Central Maui.

3.2.2.2 Modified Lease Area

Some comments on the DEIS asked for consideration of a smaller License Area. Although A&B's May 14, 2001 submittal referred to a License Area comprised of approximately

[7] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture.

33,012.91 acres of State-land (subject to review and confirmation by the Department of Accounting and General Services, Survey Division), the BLNR has the discretion to set the geographic parameters of the ~~Lease~~ License Area to an area that is smaller, but still maintains the safety and integrity of the EMI Aqueduct System in terms of water collection capabilities and the structure of the system itself, as well as the safety of the employees who maintain / operate the EMI Aqueduct System. Limiting the geographic extent of the ~~Lease~~ License Area to that which is reasonably necessary to operate the EMI Aqueduct System with appropriate buffers to ensure public safety and the security of the system, could be consistent with the objectives of the Proposed Action. The buffer areas would need to run along the length of the ditch system on both sides (mauka and makai), as well as on both sides of the access roads. If public access across the ditch system (makai to mauka) is desired by the State, it may be possible in certain areas where the ditch system is underground (tunneled) and thus not exposed to public access.

This smaller modified License Area could enable greater public access into the watershed area for recreational and cultural purposes, depending upon the access protocols that the State, as landowner, establishes. Public access into the License Area would presumably allow for hiking, hunting, gathering, and other recreational and or cultural activities. However, where additional public access may be authorized, and the extent of any additional public access, is not currently known. Because this access would presumably be outside the License Area (i.e., the License Area under the Water Lease would be reduced in size), it is assumed that EMI would not manage this public access ~~into the License Area~~, and that obligation will fall upon a State agency as the landowner (presumably the DLNR). As previously noted, the 2020 revocable permit, as well as the 2021 revocable permit, removed the Hanawī NAR (being approximately 7,500 acres) from the License Area. See Section 1.3.1 of this FEIS. Hence, it is assumed that the Hanawī NAR would be not be part of the License Area under the Proposed Action. No portion of the EMI Aqueduct System is within the Hanawī NAR. However, it is unlikely that the removal of the Hanawī NAR from the License Area would result in additional public access to that area as the NAR rules restrict public access. This may not be true for other areas that the BLNR may ultimately decide to withdraw from the License Area for the purposes of the proposed Water Lease. Under any circumstances, balancing public access with operational and security concerns regarding the EMI Aqueduct System will need to be considered under this alternative.

It should be noted that in the past people have used the EMI Aqueduct System as a recreational resource and have unfortunately died as a result. The EMI Aqueduct System is not a recreational resource. EMI has taken many steps to promote ditch safety on Maui, including conducting a safety audit of the EMI Aqueduct System using local and national experts which resulted in a program of ditch improvements (e.g., fencing, physical barriers, signage) in an effort to help prevent future incidents. Safety grates have been installed on all siphons. EMI also intensified its existing school presentation programs, giving in-person slide presentations about the dangers of playing in the EMI Aqueduct System. EMI initiated a program of print and radio safety ads, focused around school vacation periods. EMI also created the EMI Safety Program, partnering with eight youth clubs across Maui to conduct an annual "Play Hard, Play Safe" campaign, that includes an EMI Safety Selfie contest, that serves to increase Maui youth's awareness of the dangers of playing in the ditches. Notwithstanding these efforts, trespassing cannot be completely controlled. However, more

entrants into the License Area could also lead to more illegal use of the EMI Aqueduct System as a recreational resource.

While some have advocated for greater or unfettered public access into the License Area, potentially adverse impacts of such access could include the introduction and spreading of invasive species and damage to historic resources. An increase in public access to the License Area as part of this alternative (or any other alternative) would have a potential impact to the flora and fauna species that are currently present in the License Area. As discussed in the Terrestrial Flora and Fauna Technical Report (Appendix C), an increase in the activities mentioned above would result in vegetation trampling, which, depending on the degree of access and use of the area, may have a significant impact on existing flora. In addition, the potential for weed, rapid 'ōhi'a death, and little fire ant introduction and invasion would increase. Weeds, by definition, can outcompete most flora for space and nutrient resources. Weed invasions, if they were to occur, would decrease the quality and quantity of habitat available for native plant species, which in turn may decrease the quality of critical habitat for the Maui parrotbill and crested honeycreeper. The additional presence of vehicles and humans for various activities in previously unused or rarely used areas in the License Area, meaning for example, areas outside of the existing EMI access roads and trails, could disrupt the normal behavior of wildlife and temporarily displace individuals from existing habitat. Human noise and activity would increase due to an increase in access, which would have a negative impact on wildlife.

Modifying the License Area for public use would increase the potential for these impacts to flora and fauna, and potentially increase the intensity of the impacts throughout the License Area. Although EMI personnel have access to the License Area, practically speaking their access is limited to those long-standing roads and trails that provide access to the EMI Aqueduct System, and therefore such access does not entail access to previously un-accessed lands within the License Area. Should the License Area be modified for greater public access, the intensity of these impacts would be greater if the public is allowed in the eastern portion of the License Area, as the analysis presented here, as well as Appendix C (Terrestrial Flora and Fauna Technical Report) of the FEIS, demonstrates that native and unique flora and fauna species are more likely to occur in the eastern portions of the License Area. Allowing public access to the western portion of the License Area may have a lesser negative impact on biological resources. Hence, under this alternative, it is recommended that the Water Lease lessee work with the respective State agency to design an appropriate boundary that protects the integrity and safety the EMI Aqueduct System and staff ensuring public safety, as well as minimizes public access to the eastern portions of the License Area.

As it relates to historic resources, increased public access has the potential to pose a greater impact to historic properties and the environment, especially if public access is not effectively managed. For example, recently, concerns of this nature have prompted visitor limitations to the culturally significant Hā'ena State Park on the north shore of Kauai (Wu 2018). Potential impacts from poorly managed access could include looting and "rock-robbing" of surface and subsurface historic properties, littering, harvesting of archaeologically associated flora such as *ti* (*Cordyline fruticose*), trampling or erosion fromedestrian / vehicular access, and unpermitted ground disturbance. Significant impacts to historic properties as a result of poorly managed access have been documented elsewhere in the State (Azambuja 2013; Wu 2019). As such, if increased public access within the License Area resulted in access more intensive than the

access currently undertaken by EMI (which is assumed to be the case, as public access would not be increased to provide greater access to the system itself), there is a risk of impacts to historic properties (any building, structure, object, district, area, or site over 50 years old) depending upon the activities of the public within those lands previously within the License Area.

3.3 No Action

Under a 1938 Agreement ~~agreement~~, attached to this FEIS as Appendix R in response to public comment, between the Territory (now the State) of Hawai'i and EMI ~~A&B~~, EMI ~~A&B~~ was given a "perpetual" right and easement to convey water through those portions of the EMI Aqueduct System located within State lands, and to divert the water so conveyed through the EMI Aqueduct System, and ~~A&B~~ EMI granted the Territory (now the State) a similar perpetual right and easement. The duration of these "perpetual" easements was stipulated to last until the termination of the 1938 Agreement. The 1938 Agreement is still in place and valid. The State may, but is not obligated to, terminate the 1938 Agreement only if the licenses (or Water Lease) are offered at public auction but EMI fails to bid. EMI may, but is not obligated to, terminate the 1938 Agreement if the State fails to offer the licenses at public auction. Thus, if no water lease/water license is offered at auction, the 1938 Agreement provides that EMI may still collect water derived from the EMI-owned portions of the Collection Area and, utilizing the easement granted to it in the 1938 Agreement, transport it across the entirety of the EMI Aqueduct System that traverses the Collection Area. Hence, ~~This~~ this agreement is in place irrespective of the issuance of any Water Lease. The No Action alternative would result in no Water Lease being issued from the State. However, under the 1938 Agreement ~~agreement~~ and a related calculation involving isohyet analysis of rainfall patterns, it is understood that approximately 30% of the water in the License Area streams is derived from the privately owned lands. The following more detailed discussion regarding the 30% calculation is provided in response to public comments on the DEIS. Appendix R-1 (which was provided as HC&S Exhibit C-12 in the CWRM IIFS proceedings), is a copy of EMI's October 24, 1985 letter to the USGS reporting for the 1984/1985 fiscal year, followed by USGS' November 6, 1985 report for the same period to the State. The USGS report includes a table, the last column of which lists the yield of water from government-owned lands for each of the four portions of the License Area. This number was derived by applying separately, to the total yields for each portion of the License Area, a percentage factor derived from historical data, to estimate the amount of water yielded from government versus EMI-owned lands in the Collection Area. Beginning with fiscal year 1985-1986, the State no longer contracted with USGS for this service and EMI took over the operation of the ditch gauges previously operated by USGS and reported the water license yields directly to the State.

Appendix R-2 and R-3 (which HC&S provided as Exhibits C-13 and C-14 in the CWRM IIFS proceedings) are copies of EMI's reports to the State for fiscal year 1985-1986 and 1986-1987, respectively. These followed the format of the previous USGS reports.

Appendix R-4 (which HC&S provided as Exhibit C-15 in the CWRM IIFS proceedings) is a copy of EMI's August 22, 1988 report to the State for fiscal year 1987-1988. The format of Appendix R-4 differs from that of the prior reports in that a single annual yield from government owned lands is reported which is derived by aggregating the readings from the four license areas and applying a single factor of 70%. This change came about as the result of discussions

between EMI and the State once the Honomanū Water License, the last of the long-term water licenses, had expired, and all four license areas were the subject of one-year permits. The 70% factor and was based on comparisons of the average yields reported by USGS in prior years and a series of isohyetal studies from 1949 to 1985. This reporting format and formula was then used for all subsequent years.

Appendix R-5 is a copy of an agreement reflected on a typewritten document entitled, "Comparison of Private and State Water Ownership as Calculated By the Methods Described," with handwritten notations indicating that it was agreed to on December 2, 1987. Appendix R-5 lists a "1949 Isohyetal Study," a "1985 DLNR Study", a "1985 EMI study," a "1985 EMI Re-Study," "Actual Yield - 1949 Data," "Actual Yield - 1985 Data," and "1985 DLNR - RESTUDY." Although the underlying studies referenced in Appendix R-5 have not been located, the 70% - 30% split agreed to in 1987, in reliance upon studies going back to 1949, is a reasonable basis to estimate that the average percentage of water collected annually from the License Area, on a long term basis, originating on privately owned lands is 30%.

Therefore, the EMI Aqueduct System could continue to divert approximately 30% of the water available from the ~~Collection~~ License Area, plus the 4.37 mgd from the ~~that portion of the Collection Area that is derived from~~ privately owned lands ~~outside of the License Area~~ between Honopou Stream ~~stream~~ and Māliko Gulch. Under the No Action alternative, it is assumed that an estimated total of 26.39 mgd is available to be diverted from that portion of the Collection Area east of Honopou stream, and approximately 4.37 mgd of surface water would be available from privately owned lands (i.e. not within the License Area) between Honopou Stream ~~stream~~ and Māliko Gulch. Thus, it is estimated that the maximum amount of surface water available to the EMI Aqueduct System under the No Action alternative would be approximately 30.76 mgd (Akinaka, 2019). This reduction in water would significantly limit Mahi Pono's ability to develop robust diversified agriculture in Central Maui, and would have associated detrimental impacts on food production and economic benefits that would be achieved under the Proposed Action.

The existing water delivery agreements with the MDWS are contingent upon the Water Lease being issued, therefore if no Water Lease is issued, it is assumed that the delivery of water to the MDWS would terminate for Upcountry Maui and Nāhiku. As a consequence, domestic and agricultural water needs in Upcountry Maui would need to be met by alternative water sources that would need to be developed by the MDWS. At this point in time, it is unknown whether sufficient groundwater resources exist in Upcountry Maui to meet these water demands. It is anticipated that the development of alternative water-source infrastructure would be prohibitively expensive, and depending upon the specific sources, or combination of sources, could result in significant direct adverse impacts to the environment. Moreover, the costs of any new well development would also be passed on to all Maui water consumers as the MDWS has a unified water rate for all of its customers on the island of Maui.

3.4 Comparative Evaluation of Reasonable Alternatives

Alternatives are to be evaluated based upon the extent to which they are able to satisfy the objectives of the Proposed Action. An EIS must include a comparative evaluation of the environmental benefits, costs, and risks of the Proposed Action and each reasonable alternative. The objectives of the action are to:

- Preserve and maintain the EMI Aqueduct System, including its access roads and trails
- Continue to meet domestic and agricultural water demands in Upcountry Maui
- Continue to provide water for agricultural purposes in Central Maui (specifically, to allow for the full transition of fields previously used for sugar cane cultivation into new, diversified agricultural uses)
- Continue to serve community water demands in Nāhiku

A comparative evaluation of impacts to relevant environmental characteristics and the various reasonable alternatives is provided in the following section (the impacts analysis for the Proposed Action is provided in Chapter 4).

3.4.1 Topography

Neither the Proposed Action nor any of the alternatives are expected to have any significant effect on topography within the License Area because no topographic changes to the License Area are proposed under the Proposed Action or the alternatives.

Some construction related to the preparation of the Central Maui agricultural fields for the Mahi Pono farm plan and related agricultural facilities is anticipated under the Proposed Action, and would likely take place under the Modified Lease Area alternative as well. The extent of Mahi Pono's implementation of its farm plan and related facilities under either the Reduced Water Volume alternative or the Alternative Lease Duration alternative would depend upon the degree of certainty required to warrant such investment.

3.4.2 Soils

East Maui

Neither the Proposed Action nor any of the alternatives are expected to have any significant effect on soils within East Maui because no changes are proposed under the Proposed Action or the alternatives. However, under the Modified Lease Area alternative, there may be some adverse impact to soils within the License Area through greater public access to and use of the License Area.

Upcountry Maui

Under the Proposed Action, there may be some beneficial alteration to soils in Upcountry Maui as more currently fallow former sugarcane fields will be put into productive agricultural uses at the County's planned 262-acre expansion to KAP, and the continued supply of irrigation water to the County's existing KAP would maintain status quo or potentially allow for greater improvements to the soils at KAP. Under the Reduced Water Volume alternative, the beneficial impacts to the Upcountry Maui soils may not take place, depending upon how much water from the EMI Aqueduct System is available for use in Central Maui. Under the No Action alternative, it is assumed that no water would be transported through the EMI Aqueduct System to the MDWS, therefore no beneficial impacts to Upcountry Maui soils are expected. The Alternative Lease Duration alternative would not have a direct impact on Upcountry Maui, but indirectly it is assumed that a Water Lease of a longer term will provide greater stability and predictability,

thereby enhancing the chances ~~changes~~ of beneficial impacts to Upcountry Maui soils, and a shorter Water Lease term could have an opposite effect. The Modified Lease Area alternative is not expected to have any impact on Upcountry Maui.

Central Maui

Under the Proposed Action, there will be a beneficial impact on soils in Central Maui as they are improved through the removal of volunteer (i.e., rogue) sugarcane and weeds, and related soil preparations for diversified agriculture. These preparations include the application of effective micronutrients, plastic removal, pH adjustments, and the application of organic matter. Under the Reduced Water Volume alternative, the beneficial impacts to the Central Maui soils would be more limited, depending upon the amount of water actually available through the Water Lease. The No Action/No Lease alternative would require less soil preparations due to the reduction of acreage devoted to diversified agriculture. Instead of diversified agriculture, a significant amount of acreage would be allocated for use as cattle pasture. The Alternative Lease Duration alternative could have similar impacts to the No Action alternative should the Water Lease be issued for a period of time that is insufficient for Mahi Pono to make the desired improvements to the Central Maui fields as proposed under the Proposed Action. The Modified Lease Area alternative is not expected to have any impact on Central Maui.

3.4.3 Surface Water and Aquatic Environment

~~License Area~~ East Maui

The HSHEP model requires specific diversion conditions at each diversion. Applying the model to the Reduced Water Volume alternative would require information regarding where stream flows are proposed to be increased over the Proposed Action and the amounts. Generally speaking, the more water returned to natural streamflow conditions, the more of an increase in habitat units there would be for native amphidromous species, including native damselfly species. This would likely also improve habitat conditions for a number of introduced predator and competitor species, which could prevent any increases to native species populations. Given such information, the HSHEP model is able to readily calculate the number of remaining Habitat Units (HU) in any given scenario. Under the No Action alternative, 30% of remaining low flow discharge is diverted at each individual diversion after complying with the CWRM D&O. The HSHEP model estimates that under the No Action scenario, approximately 1,394,508 potential habitat units would exist (i.e., approximately 79.8 percent of potential HU) would be available for native species population. Put another way, the No Action alternative decreases the amount of available habitat units by approximately 20.2 percent. ~~Therefore, approximately 70% of the total HU would remain, or put conversely, the No Action alternative reduces HU by approximately 30% from natural flow conditions~~. Neither the Alternative Lease Duration alternative nor the Modified Lease Area alternative are expected to have any significant effect on surface water hydrology and aquatic environment because the stream diversions would not change under either alternative.

No effects to surface waters are expected to Upcountry Maui or Central Maui under the Proposed Action or the alternatives because no alterations to streams in those areas, to the extent any streams exist, would take place.

3.4.4 Groundwater

East Maui

Neither the Proposed Action nor any of the alternatives include activities that would draw upon groundwater in East Maui (i.e., no well development is proposed) or have the potential to cause significant adverse effects to groundwater in East Maui, because no development in East Maui is proposed under any of the alternatives. There may be a connection between decreased stream diversions and increased groundwater as would be the case under the Reduced Water Volume alternative and the No Action alternative. However, the current pumpage of wells in the four aquifers in East Maui (Ha'ikū, Honopou, Waikamoi, and Ke'anae of the Ko'olau Aquifer Sector) is well below the SY, as discussed in Section 4.2.2.

Upcountry Maui

No significant, direct impacts to groundwater resources in Upcountry Maui are expected under the Proposed Action or any of the alternatives. However, any alternative that reduces the amount of surface water delivered by the EMI Aqueduct System to the MDWS (such as the No Action alternative and potentially the Reduced Water Volume alternative) could have a secondary effect of causing the MDWS to seek replacement water through the development of wells that draw upon groundwater.

Central Maui

The Proposed Action and other alternatives have the potential to cause beneficial impacts to groundwater resources in Central Maui, with the understanding that the more surface water that is used to irrigate the Central Maui agricultural fields, the greater the replenishment of the underlying aquifers. The irrigation recharge that has occurred over the years of sugarcane farming in Central Maui (recharge of the Kahului and Pā'ia aquifers) is believed to be the reason why wells in those aquifers have been able to pump at rates that exceed the SY (the CWRM's establishment of SY for aquifers does not take into account water transfers). Furthermore, a simulated scenario in a USGS study prepared in 2008 suggests that the complete removal of irrigation return recharge would decrease water levels and increase salinity in the Central Maui Aquifer Sector.

3.4.5 Coastal Waters

East Maui

Neither the Proposed Action or any of the alternatives include activities that would impact the coastal waters in East Maui or have the potential to cause significant adverse effects to coastal waters or the marine environment in East Maui, because the vastly larger ocean environment is not be impacted by the intensity of the flow in stream water that diverts into the ocean.

A reduction in the volume of water diverted from East Maui streams under the No Action/No Lease alternative and the Reduced Water Volume alternative may lessen the suspended-sediment concentrations in streams during large storms which discolor coastal waters during and following storms. The sediment deposited into the marine environment may also be stressful for marine life and coral reef. However, because of the continuous and intense wave energy in shore areas in East Maui, nearshore areas in East Maui do not constitute important habitats for coral reef communities and associated marine species (Sea Engineering, Inc (SE) & Marine Research Consultants, Inc. (MRC), 2019).

Upcountry Maui
Neither the Proposed Action nor any of the alternatives include activities that would significantly impact the coastal waters or the marine environment based upon activities in Upcountry Maui because there are no coastal waters in Upcountry Maui.

Central Maui
Assuming cultivation similar as projected under the Proposed Action, neither the ~~The~~ Proposed Action or ~~and~~ other alternatives ~~may~~ will have no significant impacts ~~beneficial impact~~ on coastal waters in Central Maui near to the agricultural fields (Māliko Bay, Ho'okipa Beach Park, Pā'ia Bay, and Ma'alaea Bay) because the amount of wind-blown erosion which may damage nearshore environments is minimized by cultivation of the agricultural fields. Theoretically, a reduction in the volume of water diverted from East Maui streams under the No Action/No Lease alternative and the Reduced Water Volume alternative may decrease the amount of runoff from the agricultural fields that may impact the nearby coastal waters. However, in actuality, under all alternatives, including the No Action/No Lease alternative, Mahi Pono will apply BMP that control the volume and flow rate of runoff water, keep the soil in place, and reduce soil transport. Neither the Alternative Lease Duration alternative or the Modified Lease Area alternative are projected to have any specific impact on coastal waters.

3.4.6 Drainage

East Maui
Under the Reduced Water Volume alternative and the No Action alternative, the streams within the License Area would have an increase in stream flow. However, drainage facilities throughout the communities in East Maui, which can include, but are not limited to, drains, gutters, storm sewers, etc., are only impacted when storm runoff reaches extremely high levels. The Proposed Action and the other alternatives will have no discernible impacts on such storm flows and their impact on drainage facilities or surrounding uses as these are designed to handle the 10-, 50-, and 100-year floods which is are much higher flows than IIFS volumes or natural flow conditions.

Upcountry Maui
Neither the Proposed Action nor any of the alternatives would significantly impact the drainage facilities in Upcountry Maui.

Central Maui
The Central Maui agricultural fields are designed and operated to efficiently utilize irrigation water from the EMI Aqueduct System so there is no surface runoff. Neither the Proposed Action nor any of the alternatives would significantly impact the drainage facilities in Central Maui.

3.4.7 Natural Hazards

East Maui
Climate change indicators suggest that East Maui will face increased periods of intense, episodic rainfall where several inches of rain fall in a few hours (SOEST, 2014). With several streams being within East Maui, greater, episodic rainfall could increase stream flows and possible exceed the capacity of the EMI Aqueduct System as discussed in Section 4.3.1. The continued use and maintenance of the EMI Aqueduct under the Proposed Action and all

alternatives will not exacerbate those impacts, and may help to lessen the severity of such impacts to the extent that the EMI Aqueduct System ~~system~~ helps to manage, redirect and disburse flows. The Modified Lease Area alternative could present risks to public safety if unfettered public access within the License Area meant more people could be put at risk due to stream flooding. If the No Action alternative involved the abandonment of the EMI Aqueduct System, these risks may be greater. However, Mahi Pono has developed a preliminary farm plan to be implemented in the event the Water Lease is not issued as presented in Section 3.4.13 ~~3.4.14~~, and that plan continues to rely on the EMI Aqueduct System. The Alternative Lease Duration alternative could conceivable encourage the abandonment of the system, but this scenario is too speculative to evaluate.

As discussed in the SE & MRC report (See Appendix B, Assessment of Streams and the Ocean Water Chemistry), global rates of mean sea-level change (SLC) is +3.4± 0.42 mm/yr. The sea level trend in Kahului Harbor from 1947 to 2017 is +2.21 ± 0.42 mm/yr. Hawai'i has thus far experienced a rate of sea level rise that is less than the global rate, but that is expected to change over the next few decades as the impacts from melting ice originating far from Hawai'i will begin to be felt in Hawai'i. Relatedly, coastal erosion in Hawai'i is expected to increase as discussed in Section 4.3.2. Without any changes to the existing surface of land and sea floor (as is the case under the Proposed Action and all alternatives), there will be an increase of passive flooding along the shoreline in East Maui, resulting in an expected landward regression of landforms combined with an increase in elevation. Neither the Proposed Action nor the alternatives involve any construction along or near the shoreline that would be at risk from sea-level rise.

According to the FEMA Flood Insurance Rate Maps (FIRM), the License Area is predominantly designated as Zone "X", "Areas determined to be outside the 0.2% annual chance floodplain." A number of adjacent parcels along the makai edge of the License Area lie in areas designated as Zone "A", "Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies." (See Figure 4-28 in Section 4.3.3) However, flooding in East Maui is generally caused by freshets. Depending upon the parameters of the Modified Lease Area alternative, there could be an increase risk to safety arising from increased public access and stream flooding.

According the Tsunami Evacuation Zone maps for Maui, the entire License Area is outside of the tsunami evacuation zones. There are areas below the Ke'anae and Honomanū portions of the License Area that are within the tsunami evacuation and extreme tsunami evacuation zone (See Figure 4-29 in Section 4.3.3).

Neither the Proposed Action nor any other alternatives involve any construction or any ground disturbance that would alter the topography that may potentially impact flooding or tsunami hazards.

Upcountry Maui

Climate change may cause a decline in rainfall in Upcountry Maui. Any alternative that may result in less water being delivered through the EMI Aqueduct System to the MDWS for use in the Upcountry Maui Water System could increase periods of intense water shortages in Upcountry Maui. Regarding sea level rise, Upcountry Maui is between the 1000-4000 feet elevation. There are no coastal waters adjacent to Upcountry Maui. Neither the Proposed

Action nor any of the alternatives are anticipated to cause or suffer from any impacts related to sea level rise.

According to the FEMA FIRM, Upcountry Maui is predominantly designated as Zone "X", "Areas determined to be outside the 0.2% annual chance floodplain." (See Figure 4-30 in Section 4.3.3) Moreover, according the Tsunami Evacuation Zone maps for Maui, Upcountry Maui is entirely outside of the tsunami evacuation zones. A small portion of Māliko ~~Maliko~~ Bay within the MDWS Upcountry Maui Water System service area lies within the Tsunami Evacuation Zone (See Figure 4-31 in Section 4.3.3).

Neither the Proposed Action nor any other alternatives would impact flooding or tsunami hazards in Upcountry Maui.

Central Maui

Central Maui is already relatively dry. If climate change increases the periods of drought in Central Maui, as is predicated, continued diversified agriculture under the Proposed Action and all alternatives is vulnerable. Any alternative that may result in less water being delivered through the EMI Aqueduct System to Central Maui increases the likelihood of wildfires. To the extent that the use of renewable energy, such as Mahi Pono's proposed utility scale solar farm(s), offers any climate change avoidance benefits, all of the alternatives, including the Proposed Action, will provide a beneficial impact.

According to the FEMA FIRM, Central Maui is predominantly designated as Zone "X", "Areas determined to be outside the 0.2% annual chance floodplain." A number of adjacent parcels along the makai edge of Central Maui lie in areas designated as Zone "AE", "Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies," and Zone "VE", "Areas subject to inundation (See Figure 4-32 in Section 4.3.3).

According to the Tsunami Evacuation Zone maps for Maui, the majority of the Central Maui agricultural fields are outside of the tsunami evacuation zone. However, there are portions of the Central Maui agricultural fields in the vicinity of Kihei, Pā'ia, and Kahului that are within the tsunami evacuation zone (See Figure 4-33 in Section 4.3.3).

Neither the Proposed Action nor any other alternatives involve any construction or any ground disturbance that would alter the topography that may potentially impact flooding or tsunami hazards.

3.4.8 Flora, Fauna, and Invertebrates

East Maui

The Modified Lease Area alternative may have a significant effect on flora, fauna, and invertebrate species in East Maui because the License Area could see an increase in public access. More hiking, hunting, gathering, and other recreational and/or cultural activities within the License Area would result in vegetation trampling, which, depending on degree of access and use of the area, may have a significant impact on existing flora. In addition, the potential for weed introduction and invasion would increase. Weeds, by definition, can outcompete most flora for space and nutrient resources. Weed invasions, if they were to occur, would decrease

the quality and quantity of habitat available for native plant species, which in turn may decrease the quality of critical habitat for the Maui parrotbill and crested honeycreeper. The presence of vehicles and humans for various activities in the License Area could disrupt the normal behavior of wildlife and temporarily displace individuals from roadside habitat. Human noise and activity would increase due to an increase in access, which would have a negative impact on wildlife. None of the other alternatives, including the Proposed Action, are expected to generate significant effect on flora, fauna, or invertebrate species (SWCA Environmental Consultants (SWCA), Updated 2020 ~~2019~~). As noted above in Section 3.2.2.2, should the License Area be modified for greater public access, the intensity of these impacts would be greater if the public is allowed in the eastern portions of the License Area, as the analysis presented here, as well as Appendix C (Terrestrial Flora and Fauna Technical Report) of the FEIS, demonstrates that native and unique flora and fauna species are more likely to occur in the eastern portion of the License Area. Allowing public access to the western portion of the License Area may have a lesser negative impact on biological resources.

Under the No Action alternative, should it be sufficient for EMI to continue operation and maintenance of the EMI Aqueduct System, then the activities would have impacts comparable to the Proposed Action.

Under the Reduced Water Volume alternative, increased streamflow would likely have very little impact on the current composition of terrestrial flora and fauna. An increase in streamflow would lead to composition changes in riparian vegetation. Impacts on aquatic flora and fauna (i.e., damselflies and mosquitoes) would vary depending on the eventual condition of each stream (Trutta, Updated 2020). In general, increased stream flow benefits the native damselflies' habitat while decreasing mosquito habitat. However, increase stream flow may also benefit introduced predator and competitor species, which may limit the increase in Hawaiian damselfly populations or other native flora, fauna, and invertebrate species. Although SWCA's Terrestrial Flora and Fauna Report stated that EMI Aqueduct System would require more routine maintenance of the open ditches due to vegetation growth within the ditches due to less flowing water in the EMI Aqueduct System under the Reduced Water Volume alternative, based upon information from EMI, maintenance activities and impacts under the Reduced Water Volume alternative are comparable to the Proposed Action.

Upcountry Maui

Neither the Proposed Action nor any of the alternatives are expected to have any significant impacts on flora, fauna, or invertebrate species in Upcountry Maui because no alternative directly involves the development of any new lands in Upcountry Maui. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant.

Central Maui

Under the No Action alternative and the Reduced Water Volume alternative, if the reduction of irrigation water is significant, and depending upon the viability of Mahi Pono's No Action/No Lease farm plan (see Table 3-2 ~~3-1~~ in subsequent Section 3.4.12), it is possible that some proportion of the Central Maui agricultural fields would be abandoned and become fallow. This could result in a pattern of succession of weedy plants, beginning with herbaceous species and grasses such as wild sugarcane (*Saccharum spontaneum*), Guinea grass, and swollen fingergrass. Tree tobacco, castor bean, and woody species such as African tulip, albizia, Java plum, and Christmas berry would ultimately follow. Few to no native species would colonize

the fields in the foreseeable future. Holding ponds would dry up and fill in, which would eliminate nest and foraging habitat for endangered Hawaiian waterbirds and foraging habitat for migrant shorebirds and migrant waterfowl. If Central Maui agricultural fields were to remain fallow, over time, biodiversity could gradually rise as the establishment of woody species would increase the complexity of the habitat structure, which would provide more nesting opportunities for MBTA-listed birds such as cattle egret, northern cardinal, mourning dove, and house finch. The potential for tree tobacco to colonize abandoned fields would be beneficial for the Blackburn's sphinx moth because it would increase available breeding habitat. Impacts could be similar under the Alternative Lease Duration alternative, if the term of the Water Lease is too short to allow for the implementation of the Mahi Pono farm plan. The Modified Lease Area alternative would not affect these resources in Central Maui.

3.4.9 Historic Resources

East Maui

A reduction in the volume of water diverted from East Maui streams under the Reduced Water Volume alternative will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. As such, the Reduced Water Volume alternative will have no impact to archaeological historic properties. Similarly, the Alternative Lease Duration alternative will have no significant effect on historic resources because the duration of the Water Lease will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction (CSH LRFI, Updated 2020 ~~2019~~).

The Modified Lease Area alternative, if resulting in an increase in unmanaged public access to the License Area, has the potential to impact historic properties. Potential impacts from unmanaged access could include looting and "rock-robbing" of surface and subsurface historic properties, littering, harvesting of archaeologically-associated flora such as ti (Cordyline fruticose), trampling or erosion from pedestrian/vehicular access, and unpermitted ground disturbance. As noted above in Section 3.2.2.2, significant impacts to historic properties as a result of poorly managed access have been documented elsewhere in the State (Azambuja 2013; Wu 2019). Consultation with the SHPD is recommended in order to determine the appropriate historic preservation requirements if there is to be an increase in vehicular/pedestrian traffic or uncontrolled public access within the License Area.

The No Action alternative involves the continued use of the EMI Aqueduct System to supply irrigation water to Central Maui in support of Mahi Pono's No Lease/No Action farm plan and should not have a significant effect on historic properties. However, if the No Action alternative does not include continued maintenance and repair of the existing EMI Aqueduct System, then the No Action alternative has the potential to pose an impact to historic properties. Components of the EMI Aqueduct System ~~aqueduct system~~ that deteriorate and begin to fail, such as broken ditch walls or collapsed tunnels, have the potential to alter natural drainage patterns and increase erosion in downstream areas that are outside of established stream channels. These areas have the potential to contain surface and subsurface historic properties that could be affected by flooding and erosion. As an architectural resource, the EMI Aqueduct System

would also be affected by "neglect resulting in deterioration or destruction" if maintenance and repair of the EMI Aqueduct System are discontinued (Mason Architects, 2019).

No impacts to historic resources in Upcountry Maui ~~or Central Maui~~ are anticipated under the Proposed Action or any of the alternatives.

With respect to Central Maui, should any of the alternatives described herein result in Mahi Pono conducting agricultural activities beyond the established agricultural fields' footprint (i.e., into the gulches that extend through the Central Maui agricultural fields) or below the established agricultural plow zone, then there would be a potential to impact historic or cultural resources.

3.4.10 Cultural Resources and Practices

East Maui

The Reduced Water Volume alternative has the potential for cultural impacts related to the diversion of water but potentially to a lesser extent than the Proposed Action. These impacts include: interest in getting clarification on stream flow, water diversion, and climate statistics; concern regarding indigenous freshwater species that may be impacted by the act of diverting water; concern of water not exiting stream beds and flowing into the ocean: and concern of the lack of water needed to maintain a healthy and productive lo'i kalo or taro patch in areas where water may continue to be diverted. Recommended mitigation for the Reduced Water Volume alternative is equal to that of the Proposed Action (see Section 4.6). The application of the IIFS under the CWRM D&O has the potential to reduce or eliminate this cultural impact as many of the streams that are currently in use by community participants where these impacts are identified have been fully restored in accordance with the CWRM D&O (CSH CIA, Updated 2020 ~~2019~~).

The Alternative Lease Duration alternative has the potential for cultural impacts related to the diversion of water to an equal extent as the Proposed Action (see Chapter 4) and similar mitigation measures would be proposed. The IIFS requires under the CWRM D&O has the potential to reduce or eliminate ~~this~~ cultural impacts as many of the streams that are currently in use by community participants where these impacts are identified have been fully restored in accordance with the CWRM D&O.

The Modified Lease Area alternative is assumed to increase public access to the License Area, but not to alter stream diversions. Unfettered public access could make traditional cultural resources more available for consumptive use, but risk unsustainable overuse of those resources. However, if access is properly managed, this alternative has the potential for cultural impacts to an equal extent as the Proposed Action and similar mitigation measures would be proposed.

Under the No Action alternative, no Water Lease would be issued, but the EMI Aqueduct System would continue to be authorized to divert to 30 percent of the water from the larger 50,000-acre Collection Area based on previous agreements, in addition to surface water collection arising from the areas between Honopou (the western end of the License Area) and Māliko. As such, the No Action alternative may have impacts similar to the Proposed Action, but to a lesser extent due to the reduction in water volume and the locations of the diversions.

There is the potential for increase in habitat and resources associated with traditional and customary practices due to increased stream flow. Also, as with the Proposed Action, the application of the CWRM D&O has the potential to reduce or eliminate cultural impacts of the No Action alternative as many of the streams that are currently in use by community participants where impacts were identified have been fully restored in accordance with the CWRM D&O. Mitigations measures would be similar as those under the Proposed Action.

Upcountry Maui

No impacts to cultural resources are anticipated in Upcountry Maui under any of the alternatives because no new development or activities (with the exception of the County's planned 262-acre expansion of the KAP, which expansion is within lands that were formerly used for sugarcane production) are planned for Upcountry Maui related to the Water Lease. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant.

Central Maui

No impacts to cultural resources in Central Maui are anticipated under any of the alternatives. The agricultural fields have been cultivated for over a century to grow sugarcane and there are no known cultural practices that occur or cultural resources within the agricultural fields in Central Maui. However, should any of the alternatives described herein result in Mahi Pono conducting agricultural activities beyond the established agricultural fields' footprint (i.e., into the gulches that extend through the Central Maui agricultural fields) or below the established agricultural plow zone, then there would be a potential to impact historic or cultural resources.

3.4.11 Social Characteristics

East Maui

East Maui residents expressed concerns about the physical condition of the EMI Aqueduct System and a hope that Mahi Pono's ownership of EMI would lead to improved stewardship of the EMI Aqueduct System. In light of Mahi Pono's intention to pursue diversified agriculture under all alternatives, even the No Lease/No Action alternative, and to irrigate the Central Maui fields with diverted surface water from East Maui, ongoing maintenance and operation of the EMI Aqueduct System is expected to take place under all alternatives, to the extent operations and maintenance of the system is financially feasible. Some also questioned the need for a 30-year water lease, and emphasized shorter lease terms. ~~In addition, Mahi Pono is designing a high-efficiency irrigation system for use in the Central Maui fields, which is intended to reduce water usage overall and to integrate various live technology feeds to constantly monitor plant, soil, and tree health. As such, under the Proposed Action and all alternatives, beneficial impacts to the Central Maui irrigation system are anticipated.~~[8] The East Maui residents' concerns about social and emotional impacts from generations of having East Maui streams diverted to Central Maui is a significant impact present under all alternatives (Earthplan, Updated 2020 ~~2019~~). The Modified Lease Area alternative would provide beneficial impacts as many East Maui residents expressed the need for an increase in public access within the License Area. Some residents expressed a desire for no water lease to be issued as focus group participants vowed to continue to oppose the proposed water lease, and advocate the

[8] This statement has been omitted from this section as it is not relevant to East Maui but rather, the statement pertains to Mahi Pono's plans for Central Maui.

removal of all diversion structures from the kalo and community streams designated for full restoration. However, participants also hoped that the potential large scale agricultural operations and production with the new ownership of Central Maui lands would provide food supply for Maui and Hawai'i that can lead to food self-sufficiency. Interviewees liked the community agricultural component proposed by Mahi Pono under the Proposed Action. They felt that, while it would provide land for small farmers, the consolidation of support, such as processing, equipment and marketing, would help lower costs for local farmers. The No Action alternative would significantly decrease the opportunities for food self-sufficiency and a major reduction in the Mahi Pono Community Farm area (from 800 acres to only 300 acres) would provide for fewer opportunities to small local farmers.

Upcountry Maui

The effect of the Proposed Action and the alternatives on Upcountry Maui social characteristics depends on the amount of water that will be delivered by the EMI Aqueduct System for the MDWS use. The more water that is released to Upcountry Maui, the more it will benefit the social community of the region. Upcountry Maui residents are concerned about the continuation of reliable water service, and recognize that the MDWS would be challenged to adapt should water delivery from the EMI Aqueduct System cease. They also recognize that replacing the water would require developing new sources with related costs that would get passed to the MDWS customers. These concerns and potential impacts should only be present under the No Lease/No Action alternative or potentially under the Reduced Water Volume alternative. However, other impacts are less physical, such as concerns about water being a public trust. These impacts would be present under all alternatives.

Central Maui

Under the Proposed Action and all alternatives, Central Maui will be put into agricultural production, which is seen as a beneficial impact to the Central Maui community that values agriculture as a major land use in Central Maui and values green fields in Central Maui and seeks to avoid urban development in this area.

Under all alternatives, crops will be grown, but the extent to which the crops will supply local vendors and restaurants, as desired by Central Maui residents, and increase food self-sufficiency will depend upon the amount of water that can be diverted from the License Area. Similarly, the extent to which the Mahi Pono farm plan will encourage the younger generations to consider farming as a way of life, may depend upon the extent of the farm plan. Under the Proposed Action, Central Maui will ultimately produce some 338 million pounds of crops per year, including 8 million pounds from the community farms that Mahi Pono will incorporate into Central Maui (Plasch, Updated 2020 ~~2019~~). Productive community farms may contribute to making farming attractive to future generations. In contrast, under the No Lease/No Action farm plan, Central Maui would produce about 110.5 million pounds per year in crops, which is only about a third of the production under the Proposed Action, with only around 3 million pounds per year from community farms. Central Maui residents also care about Mahi Pono's commitment to planting non-GMO crops, which commitment is present under all alternatives.

3.4.12 Economic and Fiscal Resources

East Maui

No significant differences to the economic and fiscal impacts are expected within East Maui under any of the alternatives. Due to the heavy rainfall on the windward slopes of Haleakalā and the many streams in the area, many of the makai communities in East Maui are well suited for growing taro and truck crops. (Munekiyo, Updated 2020 ~~2019~~). Also, a number of farmers in East Maui have appurtenant and riparian rights to use water from these streams. Collectively, there are about 55 ~~45~~ acres in East Maui that are suitable for growing taro, and about 45 ~~35~~ acres for truck crops (Plasch, Updated 2020 ~~2019~~). As such, the factor that had the most influence in potentially altering the economic and fiscal impacts in East Maui was the issuance of the CWRM D&O that established IIFS and required full restoration of stream flows of all taro streams in East Maui. Neither the Water Lease (under any alternative) nor the No Action/No Lease alternative has the potential to change that.

The impacts of East Maui farming activity would be the same for the Proposed Action, Reduced Water Volume alternative, Alternative Lease Duration alternative, Modified Lease Area alternative, and the No Action alternative. At full development, East Maui farms would produce about ~~1.0~~ 1.2 million pounds per year of taro and about ~~400,000~~ 500,000 pounds per year of other crops, resulting in $3.6 ~~2.9~~ million in direct and indirect sales per year. Farms would support a total of ~~21~~ 26 direct and indirect jobs. However, State revenues, Maui County property taxes, and City and County of Honolulu excise tax surcharge revenues associated with East Maui farming activities would be nominal. (Munekiyo, Updated 2020 ~~2019~~).

There is a potential for impacts to the Nāhiku community ~~Community~~, located in East Maui. The Nāhiku community ~~Community~~ receives domestic water service from the MDWS which is directly sourced from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located directly adjacent to the Koolau Ditch ~~Aqueduct System~~, and the MDWS services approximately 43 water meters~~,~~ located along Nāhiku Road. The Proposed Action would allow for the continued water service for the approximately 43 water meters in the Nāhiku community. Under the No Action/No Lease alternative, water service to the Nāhiku community is assumed to terminate. ~~Water delivery amounts under the Reduced Water Volume alternative depend upon the amount of permitted diversions~~ (Munekiyo, 2020 ~~2019~~).

Moreover, under the No Action alternative, the rent payments for the Water Lease, of which a percentage goes to the State Special Development Fund, would no longer occur as under the Proposed Action which is discussed further in Section 4.7.3.

Upcountry Maui

There are potentially significant economic and fiscal impacts related to Upcountry Maui under the various alternatives. Under the Proposed Action, it is anticipated that the rate the MDWS pays for water delivery through the EMI Aqueduct System will increase from the current $0.06 per kgal because EMI's per unit operating cost will increase as a result of fixed costs being spread out over a lower volume of water diverted and possible higher payments to the State for Water Lease rent as compared to historic payments. (Munekiyo, Updated 2020 ~~2019~~).

Furthermore, even under the Proposed Action, which contemplates continued delivery of water to the MDWS, the County is nevertheless expected to need an additional 7.95 mgd to meet

future demands arising from growth. The life-cycle unit cost of developing and operating incremental basal wells is projected to be $34 per thousand gallons (kgal), which far exceeds the current average water service rate of $4 per kgal. The total life-cycle cost for 7.95 mgd of new wells is $1.2 billion. It is assumed that the MDWS would seek a variety of funding sources to cover the cost to develop the new wells, but due to the significant cost of new water source development, it would also be reasonable to expect that the water service rate charged by the MDWS would increase. The Reduced Water Volume alternative would have impacts ranging between those under the Proposed Action and those under the No Action/No Lease alternative, depending upon how much new water sources the MDWS would have to develop to make up for the shortfall. If the MDWS has to replace the 7.1 mgd supplied by the EMI Aqueduct System, and in addition develop ~~to~~ the 7.95 mgd projected to be needed to meet future water demands, the MDWS would need to develop 15.05 mgd of new water source. It is estimated that the life-cycle unit cost to develop those necessary wells and reservoirs for Upcountry Maui is $38 per kgal. This would translate to $2.6 billion, compared to $1.2 billion under the Proposed Action. The significantly higher costs associated with the No Action alternative would impact the County's Water Supply Fund and would be expected to have a corresponding impact to the MDWS finances and on the ratepayers Countywide. (Munekiyo, Updated 2020 ~~2019~~).

Furthermore, the approximately 37,100 residents and 14,200 households within the Upcountry Maui Water System Service Area ~~service area~~ in 2017 had a collective income of $1.1 billion and residential property values within the Upcountry Maui Water System Service Area ~~service area~~ was about $2.3 billion, and the approximately 880 businesses in Upcountry Maui in 2017, employed 5,400 individuals with a payroll estimated at $245.7 million. The lack of reliable and sufficient water has the potential to constrain the otherwise anticipated growth in population, business, and jobs (Munekiyo, Updated 2020 ~~2019~~).

Water availability under the various alternatives may have economic and fiscal impacts related to Upcountry Maui agriculture. Under the Proposed Action, with continued and expanded farming, it is projected that about 1,510 acres would be farmed in 2030, and this farming would generate about $31.8 million per year in direct and indirect sales, about 150 direct and indirect jobs, and about $5.8 million in payroll for these jobs. Under the No Action/No Lease alternative, this farming is anticipated to terminate (Munekiyo, Updated 2020 ~~2019~~).

Central Maui

There are potentially significant economic and fiscal impacts related to Central Maui under the various alternatives. Impacts are assessed in two phases, a development period, where the Central Maui fields get prepared and used for diversified agriculture, and that period is followed by the full operations period, when the fields are in full operation under the Mahi Pono farm plan. Under the Proposed Action, the there is an estimated 10-year development period to establish the Mahi Pono farm plan. Under the No Action alternative, preparation of the Central Maui fields for the No Lease farm plan will be less and is estimated to take 6 years.

Full development of the Mahi Pono farm plan under the Proposed Action would result in substantial beneficial impacts. Direct crop sales are projected at $155.9 million per year, and total combined farm sales, including crops, cattle, and energy revenues, would reach $168.9 million per year in direct sales (far exceeding the $101 million of revenue in 2006 derived from sugar production). Farm employment is expected to reach 790 direct jobs. Diversified agricultural operations would generate an estimated $4.5 million in State tax

revenues by 2030. Property taxes paid to the County of Maui would be about $800,000 per year. The City and County of Honolulu would derive about $140,000 per year from the excise tax surcharge (Munekiyo, Updated 2020 ~~2019~~).

In contrast, under the No Action/No Lease alternative, at full operations, the scaled-down Farm Plan would result in a significant reduction in acreage dedicated to crop cultivation and an increase in unirrigated pasture, and related reduction in sales, employment, and State and County tax revenues. Annual sales are expected to reach $51.3 million based upon about only a third as much crop production as under the Proposed Action. The pastures would support a cattle herd of about 9,700 cow-and-calf animal units, produce nearly 9,700 calves per year, and generate revenues of about $6.3 million per year. The solar farm(s) would generate about 32.5 ~~82,125~~ MW ~~mW~~ of electricity per year, with revenues of about $8.2 million per year. Combined farm and energy revenues would reach about $65.9 million per year in direct sales and $57.7 million per year in indirect sales for a total of $123.5 million per year, of which about $103.4 million would be on Maui and $20.2 million on O'ahu. Profits from farm operations, energy operations, and indirect sales would be about $12.4 million.

At full operations, there would be one-third as much employment as the Proposed Action: about 270 direct jobs, 120 indirect jobs, and 390 total jobs. Payroll for direct and indirect jobs is estimated at $15.6 million. The direct and indirect jobs would support an estimated 880 residents. State tax revenues would be less than half that of the Proposed Action: about $1.7 million per year. Property taxes paid by to the County of Maui would be about $650,000 per year (Munekiyo, Updated 2020 ~~2019~~).

During the farm development period, State taxes to be generated from the No Lease/No Action farm plan arising from the conversion of Central Maui farmlands from sugar cane to diversified agriculture and green energy would generate an average of about $1.9 million per year in State taxes, for a 6-year cumulative total of about $11.4 million. The planned solar farm(s) with the State subsidy would average about $3.1 million per year, for a 6-year cumulative total of about $18.8 million. Thus, State tax revenues minus the energy subsidy would average a negative $1.2 million per year, for a 6-year cumulative total of a negative $7.3 million. The County would derive negligible tax revenues from the anticipated development activity and the City and County of Honolulu would derive cumulative excise tax surcharges of about $60,000 (Munekiyo, Updated 2020 ~~2019~~).

The Reduced Water Volume alternative would have proportionally lesser beneficial economic and fiscal impacts than the Proposed Action. The Alternative Lease Duration alternative could have significantly less beneficial impacts than the Proposed Action depending upon whether the Water Lease term reasonably allowed for development of the Mahi Pono farm plan. It is not anticipated that the Modified Lease Area alternative would have any significant fiscal or economic effects.

3.4.13 Agricultural and Related Economic Resources

East Maui

No significant differences to the agricultural activities and related economic benefits are expected within East Maui under any of the alternatives. Collectively, there are about 55 ~~45~~

acres in East Maui that are suitable for growing taro and 45 ~~35~~ acres suitable for truck crops and those estimates would not change under any of the alternatives. Related gross and net water requirements would be approximately 140,000 gpd ~~6.28 mgd~~ and 30,000 gad ~~1.52 mgd~~ respectively (the high gross water requirement is due to the fact that nearly 80% of the water used for growing taro is diverted from streams, passed through lo'i, and is then returned to the streams). Other crops use an assumed 5,000 gpd, which is a high estimate. At full production, farmers in East Maui who rely depend on stream flows are estimated to be able to produce some 1.2 million pounds/year of taro and about ~~400,000~~ 500,00 pounds/year of other crops at full development. Under all alternatives, East Maui farms are expected to generate about $83,000 ~~67,000~~ per year in State taxes and about $200 ~~100~~ per year in County property taxes. (Plasch, 2019). The farms that depend on stream water generate approximately $1.7 ~~1.4~~ million/year in direct sales and about $3.6 ~~2.9~~ million/year in direct and indirect sales.

Upcountry Maui

At full operations of the farm plan, under the Reduced Water Volume alternative, significant but smaller changes would occur for Upcountry Maui as are anticipated for Central Maui, e.g. for each 1 mgd less of surface water there would be a related reduction of 24.51 acres of lands in crops, a reduction in direct sales on Maui of about $245,000 per year, a reduction in direct sales on Maui of about $245,000 per year, about 2.4 fewer direct and indirect jobs, and a reduction in State tax revenues of about $9,000. Moreover, from an agricultural perspective, should water costs significantly rise for Upcountry Maui water users, farming in Upcountry Maui would significantly decrease and it is anticipated that many farms would relocate to Central Maui given the overall better agronomic conditions, cheaper rents, and cheaper water. (Plasch, Updated 2020 ~~2019~~).

The farms that depend on water from the EMI Aqueduct System would generate annual State taxes of about $54,000 and County revenues of $85,000 under the Proposed Action. The County revenues include both property taxes and rents from the KAP. The taxes generated from Upcountry Maui under the Proposed Action would drop to zero, or close thereto, under the No Action alternative because the County would no longer receive rents for lots at the KAP, and property tax rates are assumed to drop because the agricultural land would be assessed as pasture values. (Plasch, Updated 2020 ~~2019~~).

Under the Proposed Action, development activity related to the conversion of the fallow sugarcane land at the expected KAP expansion is estimated to cost about $1.3 million (about $260,000/year assuming a 5 year development period). This would not take place under the No Action alternative. The 7.5 direct and indirect jobs associated with the KAP expansion during the development period, and the 150 direct and indirect jobs associated with the KAP expansion and other Upcountry Maui water users by 2030 would not materialize under the No Action alternative.

No additional State and County tax revenues generated from Upcountry Maui are anticipated under the No Action alternative, in contrast to the $200,000 State tax revenues related to the expansion of the KAP under the Proposed Action during the development period, and the additional $54,000/year in State taxes anticipated from the KAP expansion and other farmers in Upcountry Maui by 2030.

Central Maui

There are potentially significant impacts to agriculture in Central Maui under the various alternatives. Impacts are assessed in two phases, a development period, where the Central Maui fields get prepared and used for diversified agriculture, and that period is followed by the full operations period, when the fields are in full operation under the Mahi Pono farm plan. Under the Proposed Action, the there is an estimated 10-year development period to establish the Mahi Pono farm plan. Under the No Action alternative, preparation of the Central Maui fields for the No Lease farm plan will be less and is estimated to take 6 years.

The Reduced Water Volume alternative has the potential for a significantly adverse effect on agriculture production in Central Maui and the related economic impacts. For each 1 mgd less of surface water made available to the Central Maui fields, there is a related reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture, a reduction in direct sales on Maui of about $1.7 million per year, a reduction in direct-and indirect sales on Maui and O'ahu of about $3.3 million per year, about 8.5 fewer direct jobs on Maui and about 12 fewer direct-and-indirect jobs on Maui and O'ahu, and a reduction in State revenues of about $50,000 per year.

For illustration, if the Water Lease permitted diversions in the amount of 70 mgd (an estimated 22.32 mgd reduction from the Proposed Action), there would be 189 fewer jobs than expected under the Proposed Action (604 jobs under the Reduced Water Volume if diversions of 70 mgd were permitted v. 793 jobs under the Proposed Action). The detrimental effects of the Reduced Water Volume continue the greater the reduction in permitted diversions.

Under the No Action alternative there would be an estimated drop in total water supply, including both surface and groundwater sources, after system losses from 82.34 mgd under the Proposed Action to 29.72 mgd. Mahi Pono prepared a conceptual No Action, i.e. no Water Lease farm plan. This scaled-down farm plan would provide significantly less irrigated farm land, and therefore significantly fewer crops. At full operations, the No Action alternative farm plan includes:

- 9,080 acres of irrigated farm land, including 200 acres of tropical fruit, 4,180 of orchard, 400 acres of row and annual crops, in addition to 300 acres for a community farms and space for limited non-GMO energy crops. In contrast, under the Proposed Action there is expected to be 20,650 acres of irrigated farm land, including 12,850 of orchard crops, 600 acres of tropical fruit, 1,200 acres of row and annual crops, in addition to 800 acres for community farm, and space for limited non-GMO energy crops.

- 24,470 acres of cattle pasture, comprised of 3,800 acres of irrigated pasture, and 20,670 acres of unirrigated pasture (in contrast to approximately 13,800 acres of cattle pasture, comprised of 4,700 acres of irrigated pasture, and 9,100 acres of unirrigated pasture under the Proposed Action).

- 11,570 unirrigated acres will have limited agricultural utility. Mahi Pono will likely have to find alternative uses for this property, including utilizing the property for unirrigated pasture.

The Mahi Pono farm plan envisioned under the No Action alternative Proposed Action would consist of the following:

Table 3-1 Mahi Pono No Action/No Lease Farm Plan

Proposed Use	Acres	GPD ~~GPAD~~	Surface mgd ~~MGD~~	Groundwater mgd ~~MGD~~	Total mgd ~~MGD~~	Annual mgd ~~MGD~~	% of Total
Community Farm	300	3,392	0.70	0.32~~0.26~~	1.02~~0.97~~	372~~353~~	3.3~~3.25%~~
Orchards (citrus, mac nuts, beverage crops)	4,180	5,089	17.36	3.91~~3.39~~	21.27~~20.75~~	7,663~~7,574~~	71.52~~69.77 %~~
Tropical Fruits	200	4,999	0.69	0.31~~0.26~~	1.00~~0.95~~	365~~349~~	3.36~~3.21%~~
Row and Annual Crops	400	3,392	1.15	0.21~~0.82~~	1.31~~.98~~	496~~722~~	4.57~~6.65%~~
Energy Crops	200	3,392	0.47	0.20	0.68	248	2.28%
Pasture, irrigated	3,800	1,161	3.40	1.01	4.41	1,610	14.83%
Pasture, unirrigated	20,670	0	0	0	0.00	0	0.00%
Green Energy	250	0	0	0	0.00	0	0.00%
TOTAL	30,000	991	23.77~~23.79~~	5.96~~5.95~~	~~29.74~~(29.72 with 0.02 adjustment)	~~10,855.16~~10,854.00	100.00%

At full operations, once the No Action/No Lease farm plan was fully implemented, Central Maui would produce about 110.5 million pounds per year in crops, which is only about a third of the production under the Proposed Action, which is estimated to produce $338 million pounds per year in crops (Plasch, Updated 2020 ~~2019~~). Of the 110.5 million pounds produced, about 3 million pounds per year from the Community Farm, 104.5 million pounds per year from orchards, and 3 million pounds per year of tropical fruits, plus production from row crops, annual crops, and energy crops.

Under the No Action/No Lease alternative, annual crop sales would reach about $51.3 million (compared to $155.9 million under the Proposed Action). Cattle pasturage would increase from

7,300 cow-and-calf units generating $4.8 million/year under the Proposed Action to 9,700 cow-and-calf units and revenues of $6.3 million/year under the No Action alternative.

Total farm sales under the No Action/No Lease alternative could reach $57.7 million/year, with $46.1 million being Hawai'i sales and $11.5 million being export sales. This is a sharp reduction from the $160.7 million/year under the Proposed Action (with $104.4 million of that being Hawai'i sales and $56.2 million being export sales). To help put these numbers in context, under the Proposed Action, combined farm and energy revenues would reach $168.9 million/year in direct sales, which far exceeds the $116 million average revenues from sugar production between 2008 to 2013 and the $101 million in revenues during the 2006 sugar period. Under the No Action alternative, combined farm and energy revenues would reach only $65.9 million/year.

At full operations, the Mahi Pono No Action/No Lease farm plan would generate about one-third as many jobs (390 direct and indirect jobs with a payroll of $15.6 million) as under the Proposed Action, which is anticipated to support some 1,140 jobs, with a payroll of $45.3 million, and with about 1,000 of those jobs being on Maui. (Plasch, 2019).

State and County tax revenues would be about half as much under the No Action alternative as under the Proposed Action (approximately $1.7 million). At full operations anticipated in 2030, the Proposed Action farm plan would generate some $4.5 ~~$7.5~~ million in State tax revenues, $800,000 in County property taxes, and about $140,000 to the City and County of Honolulu from the excise-tax surcharge. The No Action farm plan is estimated to generate about $3.8 million per year, $650,000 in County property taxes, and about $50,000/year to the City and County of Honolulu for the excise-tax surcharge.

The No Action alternative would also result in far less in capital investments and less revenue to the State during the 6-year development period. Under the No Action/No Lease farm plan, capital investment for land preparation and related agricultural improvements would drop to $144.8 million invested over about 6 years, with expenditures and indirect sales averaging approximately $42.9 million per year (in contrast to the $214.7 million capital investment under the Proposed Action, and $39.9 million/year for 10 years in expenditures and indirect sales under the Proposed Action). During the farm development period, costs for converting the fallow sugarcane fields to support the No Lease farm plan are estimated at $40.5 million (compared to $89 million under the Proposed Action). Jobs during the relatively shorter development period (6 years compared to 10 years under the Proposed Action) are estimated at 290 direct and indirect jobs (compared to 330 direct and indirect jobs for the 10 year development period under the Proposed Action). Taxes paid to the State during the 6 year development period are estimated at $11.4 million over the 6-year development period, but with the State solar subsidy the State tax revenues would be negative $7.3 million for the 6 year cumulative total. In contrast, State tax revenues the 10 year cumulative total under the Proposed Action is $18.6 million under the Proposed Action, minus the State solar subsidy, resulting in a cumulative loss of State tax revenues of about $100,000.

Development costs for the solar farm(s) ($93.8 million) are expected to be the same across all alternatives. Similarly, energy sales from the solar farm(s) are expected to be the same under all alternatives; approximately $8.2 million/year.

3.4.14 Recreational Resources

East Maui

The Modified Lease Area alternative would have different impacts on recreational resources in the License Area from the other alternatives, including the Proposed Action. Hunting and hiking are permitted in the License Area now and that is expected to be the case under all alternatives. However, the access is limited and regulated. If the License Area were reduced to make more of the State land open to the public that could potentially have a beneficial impact on the availability of recreational resources in East Maui subject to whatever limitations on access were imposed by the State. It should be noted that in the past people have used the EMI Aqueduct System as a recreational resource and unfortunately have died as a result. The EMI Aqueduct System is not a recreational resource. EMI has taken many steps to promote ditch safety on Maui, including conducting a safety audit of the EMI Aqueduct System using local and national experts which resulted in a program of ditch improvements (e.g., fencing, physical barriers, signage) in an effort to help prevent future incidents. Safety grates have been installed on all siphons. EMI also intensified its existing school presentation programs, giving in person slide presentations about the EMI Aqueduct System and the dangers of playing in it. EMI initiated a program of print and radio safety ads, focused around school vacation periods. EMI also created the EMI Safety Program, partnering with eight youth clubs across Maui to conduct an annual "Play Hard, Play Safe" campaign, that includes an EMI Safety Selfie contest, that serves to increase Maui youth's awareness of the dangers of playing in the ditches. Notwithstanding these efforts, trespassing cannot be completely controlled. However, more entrants into the License Area could also lead to more illegal use of the EMI Aqueduct System as a recreational resource.

Upcountry Maui

All of the alternatives that allow for water to continue to be supplied to the MDWS from the EMI Aqueduct System have the potential to have some beneficial impact on the Upcountry Maui recreational resources because many of the recreational facilities in Upcountry Maui have irrigated landscaping restrooms, showers, water fountains, and pools that are supplied with water delivered through the EMI Aqueduct System.

Central Maui

Neither the Proposed Action nor any of the alternatives are expected to have significant impact on the recreational resources in Central Maui because water derived from the EMI Aqueduct System is not used for any recreational facilities in Central Maui.

3.4.15 Visual Resources

East Maui

Neither the Proposed Action nor any of the alternatives are expected to have significant impact on the visual resources in the License Area because no new construction or land alteration is planned for the License Area. However, in the short-term, where diversions are lower due to the minimal amount of agricultural activity currently taking place in Central Maui, and once Mahi Pono's farm plan is significantly developed, there may be a decrease in stream flows and waterfalls that can be viewed along Hāna Highway. However, views from Hāna Highway were formally recognized a significant as early as the year 2000 (when President Clinton designated the Hāna Millennium Legacy Trail), when stream diversions were significantly greater than will be the case under the Proposed Action.

Upcountry Maui
Neither the Proposed Action nor any of the alternatives are expected to have significant impact on the visual resources in Upcountry Maui because no new construction or land alteration is planned for Upcountry Maui. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant.

Central Maui
Under the No Action alternative, the Mahi Pono farm plan would include some 9,080 acres in green open space in the form of farms and irrigated pasture, which is a significant reduction from the 20,650 green open space acres under the Proposed Action. Therefore, the No Action alternative and potentially the Reduced Water Volume alternative have the potential to decrease the amount of green open space planned under the Proposed Action because the water availability is directly connected to the acreage of land used for crops. The Alternative Lease Duration alternative may also negatively impact the visual resources should the Water Lease be issued for a period of time that is insufficient for Mahi Pono to fully implement its farm plan and make its desired improvements to the Central Maui agricultural fields.

3.4.16 Air Quality

East Maui / Upcountry Maui
Neither the Proposed Action nor any of the alternatives are expected to have significant impact on the air quality in the License Area or Upcountry Maui because no new construction, water service facilities, or land alteration is planned for these regions. Thus, there would be no associated dust generation or emissions from construction-related vehicles or stationary equipment. Additionally, the EMI Aqueduct System is gravity-fed and does not require fuel for operation.

Central Maui
Under the Proposed Action and all the alternatives, there will be beneficial impacts on regional air quality because of the termination of sugarcane burning practices. Nevertheless, the transition to diversified agriculture may adversely affect air quality because of an increase in equipment emissions and dust from uncultivated land. Mitigation measures are described in Chapter 4. Similar measures would be employed for Central Maui to the extent those lands are farmed under the alternatives to the Proposed Action. Under the No Action alternative there is a potential increase in dry fallow lands in Central Maui due to less irrigation water.

3.4.17 Noise

East Maui
Neither the Proposed Action nor any of the alternatives are expected to have significant impact on the noise levels in the License Area or East Maui overall because no significant noise generating activities are proposed. It is possible that under the Modified Lease Area alternative that with increased public access there would be some increase in noise levels, but not to any degrees that could be considered significant.

Upcountry Maui
Neither the Proposed Action nor any of the alternatives are expected to have significant impact on the noise levels in Upcountry Maui. Under the No Action alternative and potentially under

the Reduced Water Volume alternative, water deliveries to the Upcountry Maui water system will be terminated or reduced, which could discourage new activities that might otherwise have a slight and short-term increase in noise, such as the KAP expansion. However, no significant noise related impacts are anticipated in Upcountry Maui under any of the alternatives or under the Proposed Action. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant.

Central Maui

Under the Proposed Action and the alternatives, there may be impacts on noise in Central Maui because of the transportation vehicles and equipment used for the diversified agriculture. However, due to the expansive agricultural fields and the internal cane haul roads in Central Maui, the noise levels will not affect public areas. None of the ~~other~~ alternatives will have a significant impact on noise quality in Central Maui.

3.4.18 Hazardous Materials

East Maui

Under the Proposed Action and alternatives, no significant impacts are anticipated as EMI personnel will likely continue to use federally regulated herbicides in accordance with their labels to maintain the trails and access roads used to maintain the EMI Aqueduct System. In January of 2020 EMI committed to foregoing using Round-Up to maintain the EMI Aqueduct System and any trails and access roads. The amount of water diverted will have little bearing on these maintenance requirements.

Upcountry Maui

Under the Proposed Action, and potentially all other alternatives except for the No Action alternative, expansion of the KAP may include a corresponding increase in the use of herbicides and pesticides for crop maintenance. Such use would be subject to federal regulations so no significant environmental impacts are anticipated. In the Reduced Water Volume and No Action alternatives agricultural use and the associated use of herbicides and pesticides may decline or end due to the potential contraction or elimination of the KAP.

Central Maui

Any use of agricultural chemicals for diversified agriculture in the Central Maui fields would be in strict compliance with federal regulations and Mahi Pono will exercise due care to prevent the release of fuels, lubricants and other hazardous materials. Mahi Pono intends to use a limited amount of fertilizers and pesticides in accordance with all laws and regulations and only on an as-needed basis. In addition, since January 2020, Mahi Pono has also committed to foregoing the use of Round-Up and other glyphosate-based products within the Central Maui agricultural fields. Mahi Pono's use of fertilizers and pesticides will follow BMPs approved by the DOH, the U.S. NRCS, the U.S. EPA, the DOA and other governmental agencies in regards to the use of chemicals, and controlling dust and erosion and, thus, runoff. The DOA's Pesticide Branch also provides regulatory oversight over Mahi Pono's pesticide use. In accordance with this oversight, records of pesticide use must be kept and made available to the Pesticide Branch upon request at any time. In addition, Act 45 which was passed by the 2018 Hawai'i Legislature and effective on January 1, 2019 required that all Certified Applicators of Restricted Use Pesticides (RUP) submit a report of the RUP that were applied each year. Hence, no significant impacts are anticipated. The Reduced Water Volume and No Action

alternatives will result in fewer crops and a corresponding decrease in the use of agricultural chemicals.

3.4.19 Traffic

East Maui

No significant impacts to traffic in East Maui are expected under any of alternatives, including the Proposed Action. Under the Modified Lease Area alternative with increased public access to the License Area, there may be a moderate increase in traffic as compared to the other alternatives.

Upcountry Maui

No significant impacts to traffic in Upcountry Maui are expected under any of alternatives, including the Proposed Action. Long term, should Upcountry Maui experience a lack of growth or even a loss of population or other activities, as anticipated under the No Action alternative, Upcountry Maui may have less traffic in the future or as compared to the other alternatives. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant.

Central Maui

Even under the Proposed Action with the full implementation of the Mahi Pono farm plan, no significant impacts to Central Maui traffic are anticipated. The other alternatives would have even lesser impacts due to fewer Mahi Pono farm employees (estimated 790 employees at full operations under the Proposed Action compared to an estimated 270 jobs under the No Action alternative).

3.4.20 Public Water Systems

East Maui

A portion of the Nāhiku community is served by the MDWS directly through the EMI West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located directly adjacent to the Koolau Ditch. By contract, EMI continues to deliver water to the MDWS for the Nāhiku community. However, that water delivery is premised upon EMI's continued receipt of permits or a lease from the State BLNR. Even though the agreement provides the MDWS a right to up to 20,000 gpd per twenty-four hour day, EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). ~~Aqueduct System via a development tunnel in the Koolau Ditch near Makapipi Stream. The tunnel draws up 20,000 to 45,000 gpd gdp, dependent on weather,, directly from the EMI Aqueduct System.~~ The area is at a lower elevation where the water system has sufficient pressure for residential service. Potential impacts to the Nāhiku community will depend upon the amount of water allowed to be diverted under the Water Lease. Under the Proposed Action, water delivery to the Nāhiku community is expected to continue to be provided. ~~With increasingly deeper reductions in the amount of water available through the Water Lease, however, the reliability of water supplied to the Nāhiku community would become increasingly tenuous. Water delivery amounts under the Reduced Water Volume alternative depend upon the amount of permitted diversions.~~ The alternative of a Water Lease with a shorter lease term would reduce the time horizon for certainty that water would be available to the Nāhiku community. Therefore, for the Nāhiku

community, this would reduce the time to pursue alternative sources of water, which are limited. Under the No Action alternative, where no Water Lease is awarded ~~and the only available water would be derived from privately owned land~~, water service to Nāhiku community is assumed to terminate.

Upcountry Maui

Potential impacts to the Upcountry Maui Water System will depend upon the amount of water allowed to be diverted under the Water Lease. Under the Proposed Action water delivery to Upcountry Maui is expected to continue as usual. Under the No Action/No Lease alternative, water service to Upcountry Maui is assumed to terminate. Water delivery amounts under the Reduced Water Volume alternative depend upon the amount of permitted diversions.

Central Maui

Neither the Proposed Action nor the alternatives are expected to have a significant adverse effect on public water systems because water service to Central Maui is through the privately owned EMI Aqueduct System. Regarding impacts to the private Central Maui Field Irrigation System ~~irrigation system~~, Mahi Pono expects to invest over $20 million to increase the efficiency of its Central Maui Field Irrigation System (i.e., the infrastructure that distributes water from Kamole-Weir). As a part of this upgrade Mahi Pono's irrigation engineering team is also designing ~~a~~ high-efficiency irrigation systems. The new irrigation system will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. As such, under the Proposed Action and all alternatives, beneficial impacts to the Central Maui Field Irrigation System ~~irrigation system~~ are anticipated.

3.4.21. Public Services and Facilities

East Maui

No significant impacts are anticipated on public services and facilities as a result of the Proposed Action, Reduced Water Volume and No Action alternatives. Increased public access in the Modified Lease Area alternative could require greater involvement by the DLNR personnel and possibly by County police.

Upcountry Maui

~~No significant impacts are anticipated.~~ Under the Reduced Water Volume alternative and the No Action alternative, there are anticipated to be adverse impacts relating to public services and facilities as it is anticipated that water service to the MDWS provided by EMI would terminate, and the Upcountry Maui region would be without sufficient water sources to meet water demands. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant.

Central Maui

Under the Proposed Action, ~~upon restoration of the Central Maui field irrigation system reservoirs,~~ it is anticipated that the ~~previous~~ relationship with the Maui County Fire Department would continue ~~resume~~ whereby firefighters would use water from the reservoirs to fight fires. In the Reduced Water Volume and No Action alternatives, the amount of water in reservoirs, particularly during drier weather conditions, would likely be less or unavailable, reducing their

usefulness in fighting fires. Wildfires in fallow fields in Central Maui would be of greatest concern, particularly during drier weather conditions.

3.5 Comparative Evaluation Summary

An EIS must include a section discussing alternatives which could attain the objectives of the action regardless of cost, in sufficient detail to explain why they were rejected. In each case, the analysis of the alternatives must be sufficiently detailed to allow the comparative evaluation of the environmental benefits, costs, and risks of the Proposed Action and each ***reasonable alternative***. Particular attention should be given to alternatives that might enhance the environmental quality or avoid, reduce, or minimize some or all of the adverse environmental effects, costs, and risks. As discussed above, the three reasonable alternatives to the Proposed Action are: (i) a Water Lease issued permitting water diversions in an amount less than what is allowed under the CWRM D&O (this is the Reduced Water Volume alternative); (ii) a Water Lease issued for a term different from the 30-year term sought under the Proposed Action (this is the Alternative Lease Duration alternative); (iii) a Water Lease issued with a smaller geographical scope than requested for the Proposed Action, but with no reduction is water collection capabilities (this is the Modified Lease Area alternative) The environmental benefits, costs, and risks of those alternatives are analyzed in the sections above. However, in response to a comment on the DEIS, the following comparative table of the environmental benefits, costs, and risks of the Proposed Action at full implementation of the Mahi Pono farm plan, the "No Action" alternative, and the reasonable alternatives to the Proposed Action, is provided in Table 3-2 below. The more detailed discussion and analysis of the impacts of the Proposed Action are set forth in Chapter 4.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
TOPOGRAPHY[10]					
All	NSI	NSI	NSI	NSI	NSI
SOILS[11]					
EM	NSI	NSI	NSI	NSI Some adverse impact due to greater public access to and use of License Area	NSI
UM	NSI Possible County improvements to soils in KAP expansion area	NSI Potential beneficial impact to KAP expansion area soils may not take place if reduced volume causes lower deliveries to the MDWS	NSI Potentially similar as under Proposed Action if Water Lease term is sufficient duration to justify farming of KAP expansion area	NSI	NSI No projected County improvements to soils at KAP expansion area

[9] See Chapter 4 for analysis of the impacts of the Proposed Action. Projected impacts presented in this Table are as of full implementation of Mahi Pono farm plan.

[10] See generally, Section 4.1.1 addressing the Proposed Action and Section 3.4.1 addressing the alternatives and No Action.

[11] See generally, Section 4.1.2 addressing the Proposed Action and Section 3.4.2 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
CM	Beneficial soil management (application of effective micronutrients, plastic removal, pH adjustments, and the application of organic matter Soils will be gathered and replaced or moved into other field locations, as needed, and activities such as soil amendment will follow in preparation for planting Windbreaks planted in fields Use of weedmat Mowing rather than plowing inter-rows NRCS Conservation Plan Rotational livestock grazing Permanent canopy tree crops (increase soil moisture retention and reduce evapotranspiration	Beneficial soil management similar as under Proposed Action, but over fewer acres due to less land in cultivation due to less water availability	Similar as under the No Action alternative if duration of Water Lease is too short to implement the full farm plan	Similar as under the Proposed Action	Least beneficial soil management (due to reduction in amount of acreage cultivated in diversified ag)

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
SURFACE WATER AND AQUATIC ENVIRONMENT[12]					
EM	63.9% potential Habitat Units	Potential for more Habitat Units than under Proposed Action (and less than under No Action) depending upon streams and diversions affected	Similar as under the Proposed Action	Similar as under the Proposed Action	79.8% potential Habitat Units
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI	NSI	NSI	NSI	NSI
GROUNDWATER[13]					
EM	NSI	NSI	NSI	NSI	NSI

[12] See generally, Section 4.2.1 addressing the Proposed Action and Section 3.4.3 addressing the alternatives and No Action. See also App. A, *Assessment of Impacts of Stream Diversions On Instream Habitat in East Maui Streams Using the Hawaiian Stream Habitat Evaluation Procedure (HSHEP Model).*

[13] See generally, Section 4.2.2 addressing the Proposed Action and Section 3.4.4 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	No groundwater wells planned in License Area as part of Proposed Action Current pumpage in Ko'olau Aquifer System is well below SY	Similar as under the Proposed Action Potential for increased groundwater in Ko'olau Aquifer System due to increased stream flow	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action Potential for increased groundwater in Ko'olau Aquifer System due to increased stream flow
UM	NSI Assumes continued supply of surface waters to MDWS by EMI for Upcountry Maui needs	NSI, unless MDWS forced to develop new groundwater source to replace reduced surface water deliveries to MDWS (if so, see No Action)	Similar as under the Proposed Action	Similar as under the Proposed Action	Potential for significant impacts if MDWS forced to develop new groundwater source to replace previously available diverted EM stream water
CM	Diverted surface waters from License Area provides beneficial groundwater recharge to Central Maui aquifers	Less groundwater recharge than under the Proposed Action	Similar as under the Proposed Action, but for shorter duration	Similar as under the Proposed Action	Least amount of beneficial groundwater recharge
COASTAL WATERS[14]					
EM	NSI	NSI	Similar as under the Proposed Action	Similar as under the Proposed Action	NSI

[14] See generally, Section 4.2.3 addressing the Proposed Action and Section 3.4.5 addressing the alternatives and No Action. See also App. B, *East Maui Irrigation Assessment of Streams and the Ocean Water Chemistry*.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Stream flow from License Area into the marine environment, beyond the narrow transition zone, has a minimal influence due to naturally occurring rapid and intense mixing	May lessen suspended sediment concentrations during large storms			May lessen suspended sediment concentrations during large storms
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI Proposed Action, due to field cultivation, will reduce potential for wind-blown erosion in fields near to coastal waters Farm plan will comply with BMPs approved by DOH, NRCS, EPA, and other agencies	NSI anticipated, less than under the Proposed Action due to less cultivation, but Mahi Pono will still apply BMPs that control the volume and flow rate of runoff water, keep the soil in place, and reduce soil transport	Similar as under the Proposed Action	Similar as under the Proposed Action	Potential beneficial impact but significantly less than under the Proposed Action due to less cultivation, but Mahi Pono will still apply BMP that control the volume and flow rate of runoff water, keep the soil in place, and reduce soil transport
DRAINAGE[15]					
EM	NSI	NSI	NSI	NSI	NSI
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI	NSI	NSI	NSI	NSI

[15] See generally, Section 4.2.4 addressing the Proposed Action and Section 3.4.6 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Irrigation water to be applied at rates that will not cause surface runoff				
NATURAL HAZARDS[16]					
EM	NSI EMI Aqueduct System is gravity fed and requires no fuel to operate - no GHG emissions from operation License Area not anticipated to face impacts from sea level change due to climate change License Area predominantly flood zone "X" - outside the 0.2% annual chance floodplain License Area flooding is from freshets License Area not within the tsunami evacuation zone	NSI	NSI	Potential increase in risks due to stream flooding if unfettered public access within the License Area is allowed	NSI
UM	NSI	NSI	NSI	NSI	NSI

[16] See generally, Section 4.3 (including 4.3.1- 4.3.5) addressing the Proposed Action and Section 3.4.7 addressing the alternatives and No Action; see also Central Maui discussion in Section 3.4.11. and Section 3.4.13 .

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
		Any decrease in surface water delivered by EMI to MDWS increases periods of intense water shortages			Any decrease in surface water delivered by EMI to MDWS increases periods of intense water shortages
CM	NSI / Beneficial impacts Climate change trends may suggest increased potential for CM agricultural fields to experience longer, more intense, periods of drought Cultivation of food crops for the Hawai'i market contributing to reduction in imported food and associated fossil fuel emissions Some GHG emissions from livestock (methane and nitrous oxide) Continuation of the relationship with the Maui County Fire Department which allows its use of water from the various reservoirs within the agricultural fields to fight fires (See Central Maui discussion in Section 4.14.1)	Similar as under the Proposed Action but with increased likelihood of wildfires due to less water being delivered to Central Maui fields	Similar as under the Proposed Action, but for shorter duration	Similar as under the Proposed Action	Fewer benefits than under the Proposed Action Significant reduction in local food crops from 338 million llbs/yr under PA to 110.5 million lbs/yr (see Central Maui discussion in Section 3.4.11) Increase in livestock pasturage and related decrease in land in crops (see Central Maui discussion in Section 3.4.13) Increased likelihood of wildfires due to less water being delivered to Central Maui fields

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
FLORA[17]					
EM	NSI EMI activity will take place within the same footprint Mitigation/avoidance measures identified if maintenance activity takes place in new/pristine areas (see East Maui discussion under Impacts and Mitigation Measures in Section 4.4.1)	NSI Similar as under the Proposed Action	NSI Similar as under the Proposed Action	Potential for significant impact Greater public access within License Area could increase spread of invasive species Allowing public access to the western portion of the License Area may have a lesser negative impact on biological resources than within the eastern portion	NSI Similar as under the Proposed Action
UM	NSI	NSI	NSI	NSI	NSI
CM	Beneficial impacts	Potentially less beneficial than Proposed Action if water reduction is	Potentially same as No Action if term of Water Lease is too short to allow for	Similar as under the Proposed Action	Reduction in beneficial impacts as compared to Proposed Action due to reduced land in crops due to lack of water

[17] See generally, Section 4.4.1 addressing the Proposed Action and Section 3.4.8 addressing the alternatives and No Action. See also App. C, *Terrestrial Flora and Fauna Technical Report for the Proposed East Maui Water Lease*.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Increased diversity in croplands could lead to an increase in diversity of flora	significant and results in fewer acres in diversified agriculture	implementation of the Mahi Pono farm plan		Potential for eventual increase in biodiversity over time if land were to be left fallow
FAUNA AND INVERTEBRATES[18]					
EM	NSI EMI access will be within established areas Mitigation/avoidance measures identified (see East Maui discussion under Impacts and Mitigation Measures in Section 4.4.2)	Similar as under the Proposed Action Potential that increased stream flow benefits damselfly habitat, but may also benefit introduced predator and competitor species, thereby limiting any increase in Hawaiian damselfly populations or other native species	Similar as under the Proposed Action but for shorter duration	Potential for significant impact Increase in vehicles and humans for various activities in License Area could disrupt the normal behavior of wildlife	NSI Similar as under the Proposed Action should it be sufficient for EMI to continue operation and maintenance of the EMI Aqueduct System
UM	NSI	NSI	NSI	NSI	NSI
CM	Potential beneficial impacts Planned orchards (12,850 acres; Table 2-2 MP Farm Plan) may create breeding habitat for	If insufficient surface water availability results in fallow fields,	Similar as under the Proposed Action If Water Lease term too short to allow for	Similar as under the Proposed Action	Similar as under the Proposed Action Potential reduction in beneficial impacts from

[18] See generally, Section 4.4.2 addressing the Proposed Action and Section 3.4.8 addressing the alternatives and No Action. See also App. C, *Terrestrial Flora and Fauna Technical Report for the Proposed East Maui Water Lease*.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	the endangered Hawaiian hoary bat Mitigation/avoidance measures identified (see Central Maui discussion under Impacts and Mitigation Measures in Section 4.4.2)	see No Action alternative	implementation of farm plan, see No Action alternative		orchards (only 4,180 acres in orchards as compared to Proposed Action planned 12,850 acres in orchards) (See FEIS Table 3-1 MP No Action Farm Plan, and see Table 2-2 MP Farm Plan) Holding ponds would dry up and fill in, eliminating nest and foraging habitat for endangered Hawaiian waterbirds and foraging habitat for migrant shorebirds and migrant waterfowl Eventual repopulation MBTA birds and tree tobacco if fields left fallow
HISTORIC RESOURCES[19]					
EM	NSI No significant ground disturbance proposed within	Similar as under Proposed Action	Similar as under Proposed Action	If this results in increased, unmanaged, public	Similar as under Proposed Action unless No Action does not include continued

[19] See generally, Section 4.5 addressing the Proposed Action and Section 3.4.9 addressing the alternatives and No Action. See also App. D, *Historical Structure Assessment East Maui Aqueduct System*, and App. E, *Archaeological Literature Review and Field Inspection for the Proposed Lease (Water Lease) for the Nāhiku, Keʻanae, Honomanū, and Huelo License Areas (East Maui Aqueduct System), Multiple Ahupuaʻa, Makawao and Hāna District, Maui Island.*

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	previously undisturbed areas under the Proposed Action Mitigation measures identified (see East Maui discussion under Impacts and Mitigation Measures in Section 4.5)			access, this has the potential to increase negative impacts to historic properties	maintenance of EMI Aqueduct System, in which case negative impacts to EMI Aqueduct System
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI Plowing expected to stay w/in established agricultural fields and plow zone	Similar as under Proposed Action assuming similar plowing patterns	Similar as under Proposed Action assuming similar plowing patterns	Similar as under Proposed Action assuming similar plowing patterns	Similar as under Proposed Action assuming similar plowing patterns
CULTURAL RESOURCES AND PRACTICES[20]					
EM	Impacts Traditional & customary practices take place within License Area Mitigation measures identified (see East Maui discussion of Impacts and Mitigation Measures and Summary of	Potentially reduced impacts as compared to the Proposed Action	Similar as under Proposed Action	Potential for greater negative impacts than under the Proposed Action depending upon the management of increased public access If access is properly managed, impacts to	Less impacts than under Proposed Action Potential for increase in habitat and resources associated with traditional & customary practices due to increased stream flow

[20] See generally, Section 4.6 addressing the Proposed Action and Section 3.4.10 addressing the alternatives and No Action. See also App. F, *Cultural Impact Assessment for the for the Proposed Lease (Water Lease) for the Nāhiku, Ke'anae, Honomanū, and Huelo License Areas (East Maui Aqueduct System), Multiple Ahupua'a, Makawao and Hāna District, Maui Island.*

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Overall Cultural Mitigation Recommendations in Section 4.6)			be similar as under the Proposed Action	
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI No known cultural practices or cultural resources within the agricultural fields that have been cultivated for over a century (see Central Maui discussion of Impacts and Mitigation Measures in Section 4.6)	Similar as under Proposed Action assuming	Similar as under Proposed Action assuming Mahi Pono farming conducted within established agricultural fields footprint	Similar as under Proposed Action assuming Mahi Pono farming conducted within established agricultural fields footprint	Similar as under Proposed Action assuming Mahi Pono farming conducted within established agricultural fields footprint
SOCIAL CHARACTERISTICS[21]					
EM	Both beneficial and negative impacts identified by Social Impact Assessment participants (post-Mahi Pono acquisition of	Similar as under Proposed Action	Similar as under Proposed Action	Similar as under Proposed Action Increased public access within License	Both beneficial and negative impacts identified by Social Impact Assessment participants, including:

[21] See generally, Section 4.7.2 addressing the Proposed Action and Section 3.4.11 addressing the alternatives and No Action. See also App. G, A*&B Proposed Water Lease for the Nāhiku, Ke'anae, Huelo, and Honomanū License Area Social Impact Assessment.* Please note, the Social Impact Assessment provided as App. G recites feedback and impressions from numerous individuals regarding their thoughts on potential impacts (beneficial and negative). The summary in this Table 3-2 does not document the full range of comments presented in the Social Impact Assessment.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	CM agricultural fields), including: "Balance" was a frequent theme among interviewees Various groups need water originating from State EM watershed lands and should have access to water they truly need Regardless of one's own interest in the Water Lease, no one wanted water withheld from other groups Some report EM stream water being only source of water for domestic uses Some stated interest in observing and monitoring the EMI Aqueduct System's handling of water Proposed Action is viewed as a continuation of taking EM water to support a private for-profit company Success of Mahi Pono farm plan viewed as beneficial Mitigation measures identified		Some questioned need for 30-year Water Lease	Area lands viewed as beneficial	Some expressed a desire for no Water Lease to be issued Negative impacts due to termination of water delivery to MDWS for Nāhiku Significant decrease in opportunities for food self-sufficiency Negative impacts due to significant reduction in Mahi Pono Community Farm area (only 300 acres vs. 800 under Proposed Action)

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	(see East Maui discussion of Impacts and Mitigation Measures in Section 4.7.2)				
UM	Both beneficial and negative impacts identified by Social Impact Assessment participants, including: "Balance" was a frequent theme among interviewees Appreciation for water provided to MDWS; concern for the continuation of reliable water service to Upcountry residents and KAP Regardless of one's own interest in the Water Lease, no one wanted water withheld from other groups Mitigation measures identified (see Upcountry Maui discussion under Impacts and Mitigation Measures in Section 4.7.2)	Potential impacts (depends upon the amount of water supplied to MDWS for UM use) Negative impacts if reduction in water volume results in reduction in supply to MDWS (see No Action alternative) Reduction in water supply results in detrimental impacts to KAP (see No Action alternative)	Similar as under Proposed Action, but for shorter period of time	Similar as under Proposed Action	Both beneficial and negative impacts identified by Social Impact Assessment participants Termination of water delivery to MDWS & associated MDWS costs for replacement well development and pumping The costs of any new well development would also be passed on to the Upcountry Maui consumers The more water that is released to UM, the more it will benefit the social community of the region UM residents concerned about continuation of reliable water service; recognize MDWS would be challenged to adapt if deliveries from EMI ended Recognition that replacing the water would require developing new source with related costs that would get

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
					passed to the MDWS customers Some prefer no Water Lease be issued
CM	Both beneficial and negative impacts identified by Social Impact Assessment participants, including: Diversified agriculture consistent with recognized public policies, and will increase food self-sufficiency Green fields in CM seen as beneficial and desirable Concerns about GHG emissions from agriculture impacts on climate change Concerns about the availability of farm employees at economically feasible rates Desire for watershed management plan to outline improvements to the EMI Aqueduct System, including brush fire prevention and relate water needs to specific crops	Reduction in beneficial impacts as compared to Proposed Action, proportional to reduction in water diverted by the EMI Aqueduct System and available for Central Maui agricultural fields	Similar as under Proposed Action, but for shorter duration	Similar as under Proposed Action	Least beneficial due to significant reduction in scale and scope of farm plan and anticipated reduced food self-sufficiency Reduction in Community Farm acres largely viewed a negative (800 acres under Proposed Action, anticipated 300 acres under No Action)

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Mitigation measures identified (see Central Maui discussion of Impacts and Mitigation Measures in Section 4.7.2)				
ECONOMIC AND FISCAL RESOURCES[22], [23]					
EM	Beneficial impacts Continued provision of water to MDWS for Nāhiku community EMI Water Lease payments to State Special Land Development Fund (provides funds to OHA & DHHL) EMI direct & indirect jobs = 24 jobs and $1.1 million/yr payroll (see East Maui discussion in Section 4.7.3.2.b, Proposed Action - Economic and Fiscal Impacts)	Similar as under Proposed Action Provision of water to MDWS for Nāhiku community assumed to continue	Similar as under Proposed Action, but for shorter duration	Similar as under Proposed Action	Negative impacts Assumed termination of water delivery to MDWS for Nāhiku No EMI payment to State Special Land Development Fund

[22] See generally, Section 4.7.3, including Section 4.7.3.1.d, Section 4.7.3.2.b (as to East Maui), Section 4.7.3.3.c (as to Upcountry Maui), and Section 4.7.3.4.d (as to Central Maui), addressing the Proposed Action and Section 3.4.12 addressing the alternatives and No Action. See also App. H, *Economic and Fiscal Impact Study*.

[23] Not noted in this Table is the economic impact of EMI's direct spending of $1.8 million/yr (plus EMI's payments for the Water Lease).

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
UM[24]	Beneficial impacts Continued water service to Upcountry Maui allows continued operations of businesses (jobs, payroll, sales) Continued water service allows continued and additional crop production at KAP (farm sales, tax revenue) 1,100 UM businesses employ 6,700 individuals Total payroll - $304.9 million/yr Direct sales - $1.6 billion/yr for UM businesses and residential consumption Commercial & residential property values - $2.9 billion Total UM farm sales- $15.1 million/yr Indirect sales from UM farming activity - $13.4 million/yr	Potential reduction in water delivered to MDWS for UM and KAP resulting in fewer beneficial impacts, proportional to the reduction in water diverted by the EMI Aqueduct System (see No Action alternative) Less water permitted under Water Lease projected to increase per kgal costs to be paid by MDWS for Upcountry Maui Water System	Similar as under Proposed Action, but for shorter duration	Similar as under Proposed Action	Negative impacts as water deliveries to MDWS assumed to cease UM farmers, businesses, public facilities and residents will be negatively impacted Increased costs and water rates for MDWS users due to costs for replacement water source (see Upcountry Maui discussion in Section 3.4.12)

[24] This Table is limited to East Maui farm operations as full implementation of farming. For projections related to County's development activity at KAP expansion area, see FEIS Section 4.7.4

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Profits from UM farms and indirect sales - $3.2 million/yr Increased State tax revenue from UM farms - $54,000/yr in State taxes (see Upcountry Maui discussion in Section 4.7.3.3.c, Proposed Action - Economic and Fiscal Impacts) Negative impacts Potential increase in rate MDWS pays for water delivery from EMI Aqueduct System if costs of Water Lease and/or other conditions increase EMI's costs of delivery to MDWS				
CM[25]	Beneficial impacts from Mahi Pono farm plan revenues, employment, and taxes (all figures at full operation/build out of Mahi Pono farm plan) Crop sales - $155.9 million/yr	Reduction in beneficial impacts as compared to Proposed Action, proportional to the reduction in water diverted by the EMI Aqueduct System and	Shorter Water Lease term creates uncertainty for farm plan feasibility and full plan implementation and discourages investment in the farm	Similar as under Proposed Action	Significant reduction in beneficial impacts as compared to Proposed Action Crop sales $51.3 million/yr Cattle - $6.3 million/yr

[25] This Table is limited to operations at full implementation of the farm plan. For farm plan development activity see FEIS Section 4.7.3.4 and Section 4.7.4.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Cattle - $4.8 million/yr Solar - $8.2 million/yr Total Mahi Pono farm sales - $168.9 million/yr Indirect sales - $160.7 million/yr Direct employment - 790 jobs Indirect employment (due to purchase of goods and services by farmers & families) - 350 jobs Total payroll (direct & indirect) - $45.3 million/yr Total direct and indirect jobs support another 2,550 residents State tax revenues - $4.5 million/yr Property tax - $800,000.00/yr Honolulu excise tax - $140,000.00/yr (see Central Maui discussion in Section 4.7.3.4 Proposed Action - Economic and Fiscal Impacts - Full Operations)	available for Central Maui agricultural fields e.g., for each 1 mgd less of surface water there would be a related reduction of 173.31 acres of lands in crops, a reduction in direct sales on Maui of about $1.7million/yr, a reduction in direct sales on Maui of about $245,000 per year, about 2.4 fewer direct and indirect jobs, and a reduction in State tax revenues of about $9,000			Solar - $8.2 million/yr Total Mahi Pono farm sales - $65.9 million Indirect sales - $123.5 million/yr Direct employment - 270 jobs Indirect employment (due to purchase of goods and services by farmers & families) - 120 jobs Total payroll (direct & indirect) - $15.6 million/yr Total direct and indirect jobs support another 880 residents State tax revenues - $1.7 million/yr Property tax - $650,000.00/yr Honolulu excise tax - $50,000.00/yr (see Central Maui discussion in Section 3.4.12)

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
AGRICULTURAL AND RELATED ECONOMIC RESOURCES[26]					
EM	NSI EM farming is able to take place irrespective of the Proposed Action 55 net acres in taro 45 acres in other crops 1.2 million lbs/yr in taro 500,000 lbs/yr in other crops Direct sales - $1.7 million/yr Indirect Sales - $3.6 million/yr 26 farming jobs (direct + indirect) $80,000.00/yr State tax $200.00/yr property tax	Similar as under Proposed Action	Similar as under Proposed Action	Similar as under Proposed Action	Similar as under Proposed Action
UM	Beneficial impacts (crops, jobs, rents at KAP, taxes) due to	Potential reduction in water delivered to MDWS which would	Similar as under Proposed Action but for shorter duration	Similar as under Proposed Action	None of the beneficial impacts under the Proposed Action would occur

[26] See generally, Section 4.7.4 addressing the Proposed Action and Section 3.4.13 addressing the alternatives and No Action. See also App. I, *East Maui Water Lease: Agricultural and Related Economic Impacts*.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	farming enabled by EMI deliveries to MDWS 1,510 acres of farmland irrigated with water from EMI Aqueduct System 15.1 million lbs/year in crops $31.8 million/yr sales (direct + indirect) 150 jobs (direct + indirect) $3.5 million/yr payroll - direct jobs $2.3 million/yr payroll - indirect jobs $900,000.00/yr rents paid to County @ KAP 150 farming jobs (direct + indirect) $54,000.00/yr State tax @ KAP $70,000.00/yr real prop tax + rents @ KAP (see Upcountry Maui discussion in Section 4.7.4. b, Upcountry Maui: Agricultural Impacts of the Proposed Action)	negatively impact benefits under the Proposed Action, proportional to the reduction in water diverted by the EMI Aqueduct System e.g., for each 1 mgd less of surface water there would be a related reduction of 24.51 acres of lands in crops, a reduction in direct sales on Maui of about $245,000 per year, a reduction in direct & indirect sales of about $517,000 per year, about 2.4 fewer direct and indirect jobs, and a reduction in State tax revenues of about $9,000			

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
CM[27]	Beneficial impacts from Mahi Pono farm plan crop production and tax revenue at full buildout/operation 15,950 acres cropland, including 800 acres of Community Farm 4,700 acres irrigated pasture 9,100 acres unirrigated pasture 8 million lbs/yr from Community Farm 321 million lbs/yr from orchards 9 million lbs/yr of tropical fruits/row crops/ annual crops/energy crops $155.9 million/yr crop sales	Reduction in beneficial impacts as compared to Proposed Action, proportional to the reduction in the amount of water diverted through EMI Aqueduct System[28] For illustration, if the Water Lease permitted diversions in the amount of 70 mgd (an estimated 22.32 mgd reduction from the Proposed Action), there would be 189 fewer jobs than expected under the Proposed Action (604	Shorter Water Lease term creates uncertainty for farm plan feasibility and full plan implementation and discourages investment	Similar as under Proposed Action	Significant reduction in beneficial impacts due to significantly reduced water volumes thus less irrigated farm land and less crops Only 5,280 acres in crop: only 300 acres in Community Farm 3,800 acres irrigated pasture 20,670 acres unirrigated pasture 3 million lbs/yr from Community Farm 104.5 million lbs/yr from orchards

[27] This Table is limited to operations at full implementation of the farm plan. For farm plan development activity see FEIS Section 4.7.3.4 and Section 4.7.4.

[28] Each 1-mgd reduction of surface water from the Proposed Action would result in: a reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture, a reduction in direct sales on Maui of about $1.7 million/yr, a reduction in direct and indirect sales on Maui and O'ahu of about $3.3 million/yr, about 8.5 fewer direct jobs on Maui having a payroll of about $300,000.00/yr, about 12 fewer direct-and-indirect jobs on Maui and O'ahu having a payroll of about $500,000.00/yr,, and a reduction in State revenues of about $50,000.00/yr.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	$4.8 million/yr cattle sales $8.2 million/yr energy sales $329.5 million/yr total direct + indirect sales $4.5 million/yr State tax revenue $800,000.00/yr property tax to the County (see Central Maui discussion in Section 4.7.4. d, Proposed Action – Agricultural Impacts During Full Operations)	jobs under the Reduced Water Volume if diversions of 70 mgd were permitted v. 793 jobs under the Proposed Action)			3 million lbs/yr of tropical fruits/row crops/ annual crops/energy crops $51.3 million/yr crop sales $6.3 million/yr cattle sales $8.2 million/yr energy sales $123.5 million/yr total direct + indirect sales $3.8 million/yr State tax revenue $650,000.00/yr property tax to the County (see Central Maui discussion in Section 3.4.13)
RECREATIONAL RESOURCES[29]					
EM	Potential impact Some diverted streams have been identified for recreational use - 2018 CWRM D&O potentially mitigates impacts	Impacts could be less than under the Proposed Action if increased streamflow resulted in increased recreation	Similar as under the Proposed Action	Potential beneficial impact Increased public access could provide increased recreational opportunities if	Potential beneficial impact as compared to the Proposed Action

[29] See generally, Section 4.8 addressing the Proposed Action and Section 3.4.14 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	Hiking & hunting with permission expected to remain permitted under the Proposed Action			authorized by the State	
UM	NSI Water deliveries to MDWS for use in Upcountry Maui Water System will allow continued use of water for irrigated landscaping restrooms, showers, water fountains, and pools in parks and recreational facilities	Less water for MDWS Upcountry Maui Water System could negatively impact County's parks and recreational facilities that are served by water from EMI Aqueduct System, proportional to the reduction in water diverted by the EMI Aqueduct System	Similar as under the Proposed Action, but for shorter duration	Similar as under the Proposed Action	Termination of water supply to MDWS for use in Upcountry Maui Water System will negatively impact County's UM parks and recreational facilities, until water supply is replaced
CM	NSI	NSI	NSI	NSI	NSI
VISUAL RESOURCES[30]					
EM	Implementation of Mahi Pono farm plan over time could result in a decline in scenic quality of stream flows and waterfalls viewed from the Hana Highway	Potential for reduction in negative impacts	Similar as under the Proposed Action	Similar as under the Proposed Action	Increased natural steam flows as compared to the Proposed Action could enhance scenic resources, but views from Hāna Highway were formally recognized a significant as

[30] See generally, Section 4.9 addressing the Proposed Action and Section 3.4.15 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
	as compared to current interim condition of lower diversions Note that views from Hāna Highway were formally recognized a significant as early as the year 2000, when stream diversions were significantly greater they would be under the Proposed Action				early as the year 2000, when stream diversions were significantly greater they would be under the No Action
UM	NSI	NSI	NSI	NSI	NSI
CM	Beneficial impact Large expanse of green fields Greenery of CM is an integral part of what makes Maui special, and is appreciated when driving along the coast and on mauka – makai highways, and when flying overhead Farming structures will be in compliance with State and County zoning	Reduced beneficial impact, proportional to the reduction in water diverted by EMI Aqueduct System Less water means less cultivation and fewer green fields	Similar as under the Proposed Action unless Water Lease term too short to justify implementation of farm plan	Similar as under the Proposed Action	Least beneficial impact due to significant increase in unirrigated/uncultivated crop areas Reduction in cultivated green open space from 20,650 acres under Proposed Action to 9,080 acres under No Action

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
AIR QUALITY[31]					
EM	NSI EMI Aqueduct System is gravity fed - no fuel required for operations	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI Mitigation measures proposed for dust from agricultural operations (see Central Maui discussion under Impacts and Mitigation Measures in Section 4.10)	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action	Potential negative impact from dry fallow land under No Action farm plan
NOISE[32]					
EM	NSI	NSI	NSI	NSI Increased noise from increased public	NSI

[31] See generally, Section 4.10 addressing the Proposed Action and Section 3.4.16 addressing the alternatives and No Action.

[32] See generally, Section 4.11 addressing the Proposed Action and Section 3.4.17 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
				access assumed to be minimal	
UM	NSI	NSI	NSI	NSI	NSI
CM	NSI Mitigation measures proposed for noise from agricultural operations; limited noise sensitive areas due to expansive fields (see Central Maui discussion under Impacts and Mitigation Measures in Section 4.11)	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action
HAZARDOUS MATERIALS [33]					
EM	NSI Continued use of federally regulated herbicides in full compliance with all regulations for continued operations and maintenance of EMI Aqueduct System No use of Round-Up	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action

[33] See generally, Section 4.12 addressing the Proposed Action and Section 3.4.18 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
UM	NSI	NSI If reduced water results in reduction of KAP farming, expected reduction in use of herbicides and pesticides	NSI	NSI	NSI Reduced or eliminated use of herbicides and pesticides at County's KAP as a result of no farming due to lack of EM water
CM	NSI Use of agricultural chemicals in full compliance with all regulations No use of glyphosate products, including Round-Up	Similar as under the Proposed Action but if less cultivation due to less water, there could be a corresponding decrease in the use of agricultural chemicals	Similar as under the Proposed Action	Similar as under the Proposed Action	NSI Similar as under the Proposed Action but due to fewer crops, there could be a corresponding decrease in the use of agricultural chemicals
TRAFFIC[34]					
EM	NSI	NSI	NSI	Potential for traffic increase due to increased public access	NSI
UM	NSI	NSI	NSI	NSI	Potential traffic reduction due to loss of population

[34] See generally, Section 4.13 addressing the Proposed Action and Section 3.4.19 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
CM	NSI Traffic from agricultural operations largely within internal field roadways; will not affect public roadways Potential mitigation measures proposed if/when needed (see Central Maui discussion under Impacts and Mitigation Measures in Section 4.13)	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action	NSI Even less impacts as compared to the Proposed Action due to fewer farm employees (790 employees under Proposed Action vs. 270 under No Action)
PUBLIC WATER SYSTEMS[35]					
EM	Beneficial impact due to continued water to MDWS for the Nāhiku community	Similar as under Proposed Action	Similar as under Proposed Action, but for a shorter duration	Similar as under Proposed Action	Negative impact Assume termination of MDWS access to water source for the Nāhiku community
UM	Beneficial impact due to continued water delivery from EMI Aqueduct System for MDWS Upcountry Water System	Potentially reduced beneficial impact for MDWS Upcountry Maui Water System, proportional to reduced water deliveries/availability	Similar as under the Proposed Action	Similar as under the Proposed Action	Negative impact Assume termination of water supply to MDWS for use in Upcountry Maui Water System

[35] See generally, Section 4.15.1 addressing the Proposed Action and Section 3.4.20 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
		resulting from reduced water diverted by EMI Aqueduct System			
CM	NSI No impacts because no MDWS water used for irrigation under the farm plan Beneficial impacts arising from Mahi Pono's planned improvements to CM Field Irrigation System	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action	Similar as under the Proposed Action
PUBLIC SERVICES AND FACILITIES[36]					
EM	NSI	NSI	NSI	Potential increased need for State and County services if increased public access allowed	NSI
UM	Beneficial impact related to Water Lease - water provided to MDWS for Kula Hospital NSI	NSI	NSI	NSI	Negative impact due to potential termination of EMI water supply to MDWS

[36] See generally, Section 4.14 addressing the Proposed Action and Section 3.4.21 addressing the alternatives and No Action.

Table 3-2 Summary - Comparative Evaluation of Reasonable Alternatives NSI = No Significant Impacts EM = East Maui UM = Upcountry Maui CM = Central Maui					
Area	Proposed Action[9]	Reduced Water Volume	Alternative Lease Duration	Modified Lease Area	No Action/No Water Lease
CM	Beneficial impact - water provided for fire protection and energy generation EMI Aqueduct System water used to support fire suppression needs in and around the Pu'unēnē mill area and adjacent properties and general fire suppression needs in CM Two hydroelectric facilities utilize water derived from the EMI Aqueduct System to generate power for agricultural fields – planned solar farm may provide energy for Mahi Pono farm operations or to the MECO grid.	Reduced benefits than under the Proposed Action, proportional to the reduction in water diverted by the EMI Aqueduct System	Similar as under the Proposed Action but for shorter duration	Similar as under the Proposed Action	Negative impact Fire protection water supplies threatened with less water in reservoirs Increased risk of wildfires in CM due to less land under cultivation

Chapter 4:

Description of Existing Environment, Impacts, and Mitigation Measures

4. DESCRIPTION OF EXISTING ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES

This chapter describes the existing physical environment within the East Maui, Upcountry Maui, and at the Central Maui agricultural fields. This chapter also identifies the potential impacts to the environment from the Proposed Action within these different areas and, where appropriate, provides mitigation measures to address adverse environmental impacts from the Proposed Action.

For the purposes of this FEIS ~~DEIS~~, East Maui refers to the area potentially directly affected by the Proposed Action. Depending on the topic of discussion, it includes the following:

- The License Area comprised of 33,000 acres of State-owned land that is the subject of the Proposed Action (issuance of a long-term Water Lease) and which contains most of the EMI Aqueduct System as well the streams subject to the CWRM D&O (the petitioned streams) and those streams not subject to the CWRM D&O (the non-petitioned streams);
- The Collection Area, which includes the License Area, as well as approximately 17,000 acres of privately-owned land mauka and west of the License Area that contributes to water diverted by the EMI Aqueduct System; and,
- Areas generally makai of the EMI Aqueduct System, including a portion of the Hāna Highway, various undeveloped, agricultural and rural areas - including the Nāhiku community of which a portion is served by the MDWS with water via EMI's West Makapipi Tunnel 2 (Well No. 4806-07) (also known as the Nāhiku Tunnel), a development tunnel located on EMI land directly adjacent to the Koolau Ditch ~~from the EMI Aqueduct System~~, and the adjoining coastal waters.

Upcountry Maui is considered to be comprised of several communities, including Kula, Pukalani, Makawao Haʻikū, Hāliʻimaile, Waiakoa, Kēōkea, Waiohuli, ʻUlupalakua, Kanaio, Olinda, ʻŌmaʻopio, Kula Kai, and Pūlehu. For the purposes of this EIS, however, the area referred to as Upcountry Maui is generally the area served by the MDWS Upcountry Maui Water System, which is discussed in Section 2.1.3.1. (See Figure 4-3). While this service area generally lies within what is regarded as Upcountry Maui, it also extends to the coastline at the community of Haʻikū.Upcountry Maui also includes KAP and the 262-acre KAP expansion. The Upcountry Maui area considered in this FEIS ~~DEIS~~ is generally the area serviced by the portion of the Upcountry Maui Water System that gets water from the Kamole-Weir, Olinda, and Piʻiholo WTPs. The applicant has no involvement with any existing or proposed uses at KAP, the KAP expansion area, or in Upcountry Maui. Under the proposed Water Lease, the applicant's only involvement would be a continuation of a supply of water to the MDWS. Activities related to KAP or the KAP expansion are are assumed to be entirely under the County's jurisdiction, as that is County land, and the County of Maui is solely responsible for the use of that land as well as complying with any and all regulatory requirements. Any other activities or uses in Upcountry Maui would be the responsibility of the entities pursuing those activities, as they are entirely outside of the control of the applicant.

For the purposes of this FEIS ~~DEIS~~, under the Proposed Action, secondarily there would be full implementation of the Mahi Pono farm plan in the Central Maui agricultural fields. In this EIS, Central Maui is comprised of the approximately 30,000 acres of agricultural land that had previously been cultivated with sugarcane for over a century utilizing water from the EMI

Aqueduct System. Geographically, what is referred to as Central Maui encompasses approximately 36,000 acres, but approximately 6,000 acres is comprised of uncultivated areas, including roads, gulches, and patches of uncultivated land as shown in Figure 4-1.

4.1 Physiography

4.1.1 Geology and Topography

Geologically, the island of Maui is part of a large volcanic mass that also includes the islands of Moloka'i, Lāna'i, and Kaho'olawe. Historically, this mass was at one time a single island with an area of approximately 2,000 square miles. Maui itself consists of two separate shield volcanoes, West Maui (Mauna Kahalawai) and East Maui (Haleakalā).

East Maui

East Maui is located on the northern slopes of Haleakalā, which is now almost wholly covered by post-shield building stage alkali lavas. Formation of some of East Maui's more spectacular valleys, including the Ke'anae region, which is part of the License Area, began during the Honomanū Volcanic Series.

Three series of lava flows or volcanic series ~~Volcanic Series~~ are found in East Maui, the Honomanū, Kula, and Hāna Volcanic Series. The oldest series, the Honomanū Volcanic Series forms the bulk of the Haleakalā volcanic dome and are present in exposures of tholeiitic olivine basalt to oceanite along the northern sea wall and valleys. The Honomanū Volcanic Series is overlain by alkalic lavas of the Kula Volcanic Series. Locally, the contact is marked by the presence of a thin layer of red ashy soil up to 15 cm thick, but elsewhere tholeiitic Honomanū Series' lavas are interbedded with Kula alkalic olivine basalts over a transition zone 15 to 60 meters thick. Hawaiite is the predominant lithology of the Kula Volcanic Series, with lesser amounts of ankaramite and alkalic olivine basalt. Explosive eruptions were apparently fairly common at this time as large cinder cones are abundant in the Kula Volcanic Series. A prolonged period of erosion marks the end of Kula volcanism. The Hāna Volcanic Series ~~series~~ then partially filled these deeper valleys and canyons and veneered the remainder of the mountain. Hāna lavas are andesitic, picritic and olivine basalts that carry minimal water except where they have buried earlier perennial streams.

The elevation in East Maui extends from approximately 2,000 meters above sea level at the highest point of the Collection Area down to sea level at the coastline (See Figure 4-2). The overall slope is gentle, retaining much of the shield volcano form of Haleakalā, but many deep ravines cutting through the overall formation have steep slopes, evidencing the high amount of rainfall on the island's windward exposure.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System.

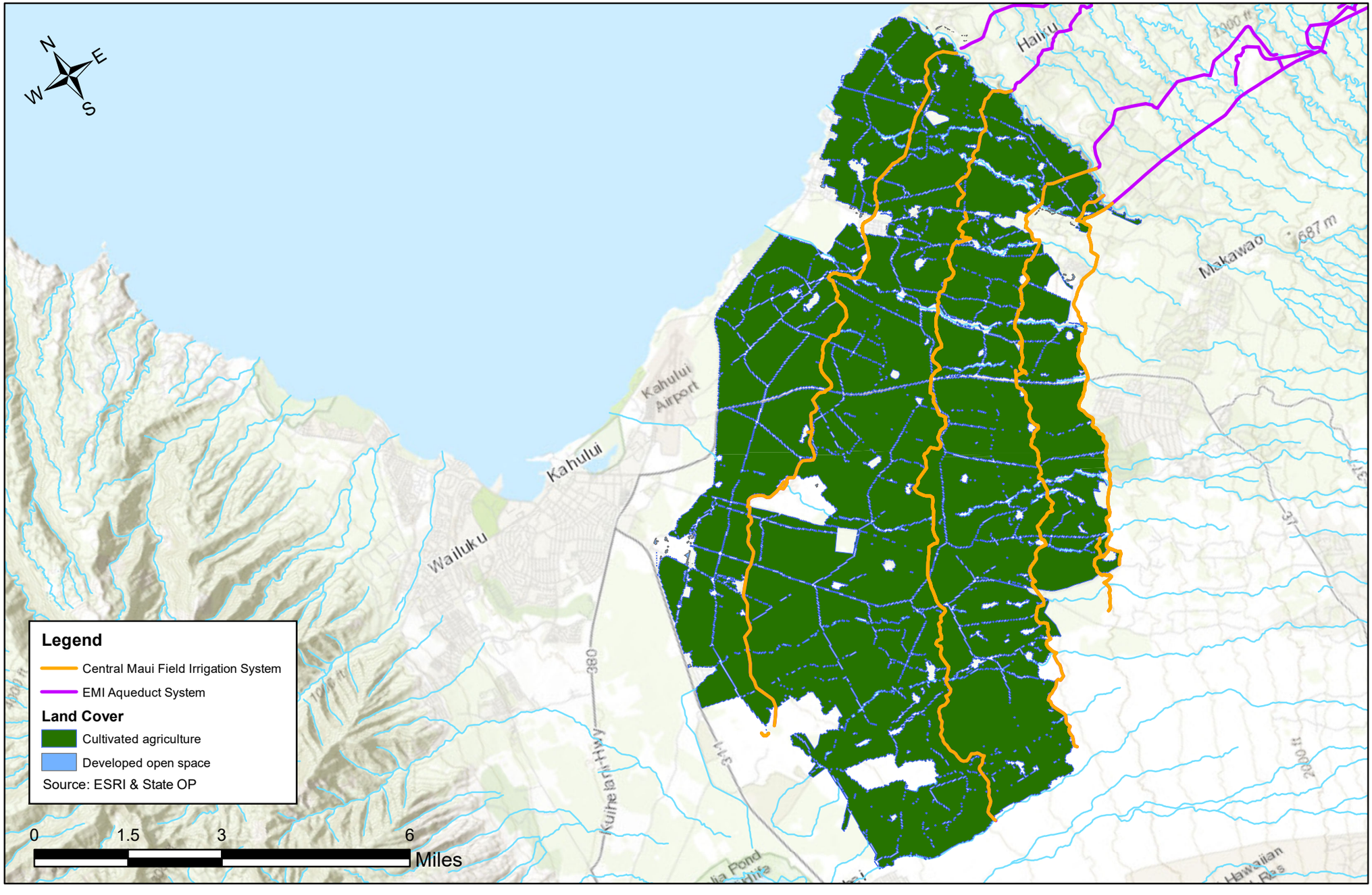


FIGURE 4-1

Central Maui Land Cover Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

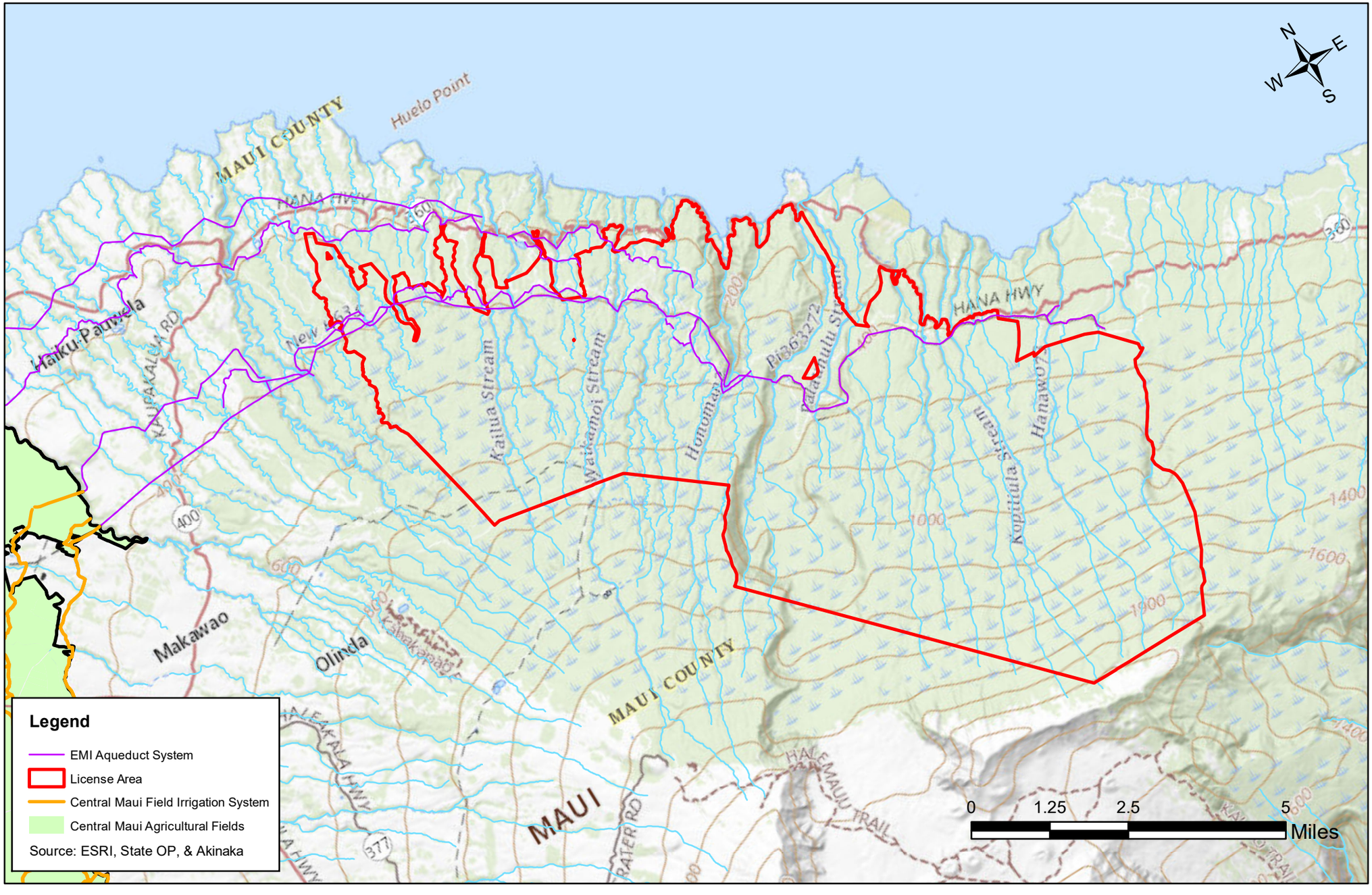


FIGURE 4-2

USGS East Maui Topography Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on geology or topography in the region are anticipated.

Upcountry Maui

Upcountry Maui is a region in Maui generally regarded as located on the western slope of Haleakalā, ranging in elevation from approximately 1,000 to 4,000 feet above sea level. For the purposes of this EIS, however, the area referred to as Upcountry Maui is generally the area served by the MDWS Upcountry Maui Water System, which is discussed in Section 2.1.3.1 ~~2.2.3.1~~. (See Figure 4-3). While this service area generally lies within what is regarded as Upcountry Maui, it also extends to the coastline at the community of Ha'ikū. The Kula Volcanic Series covers the entire northwest region of Haleakalā. Receiving far less rainfall than East Maui, Upcountry Maui retains much of the gently sloping volcanic shield formation and lacks the deep cut ravines characterizing East Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui, including agricultural users at KAP and the 262-acre KAP expansion. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on geology or topography in the region are anticipated.

Central Maui

The agricultural fields in Central Maui make up the majority of Maui's gently sloping isthmus. The isthmus is formed by nearly flat lying lava flows of Honomanū Basalt, interbedded with consolidated and unconsolidated sedimentary deposits. Beneath the isthmus, the Honomanū Basalt of Haleakalā overlies earthy sedimentary deposits and the older Wailuku Basalt of the West Maui Mountain. The area has been cultivated from decades of sugar cultivation. The elevation of the agricultural fields in Central Maui range from sea level to approximately 400 meters above sea level (See Figure 4-4).

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water to the Central Maui Field Irrigation System, which will allow for the continued transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on geology or topography in the region are anticipated.

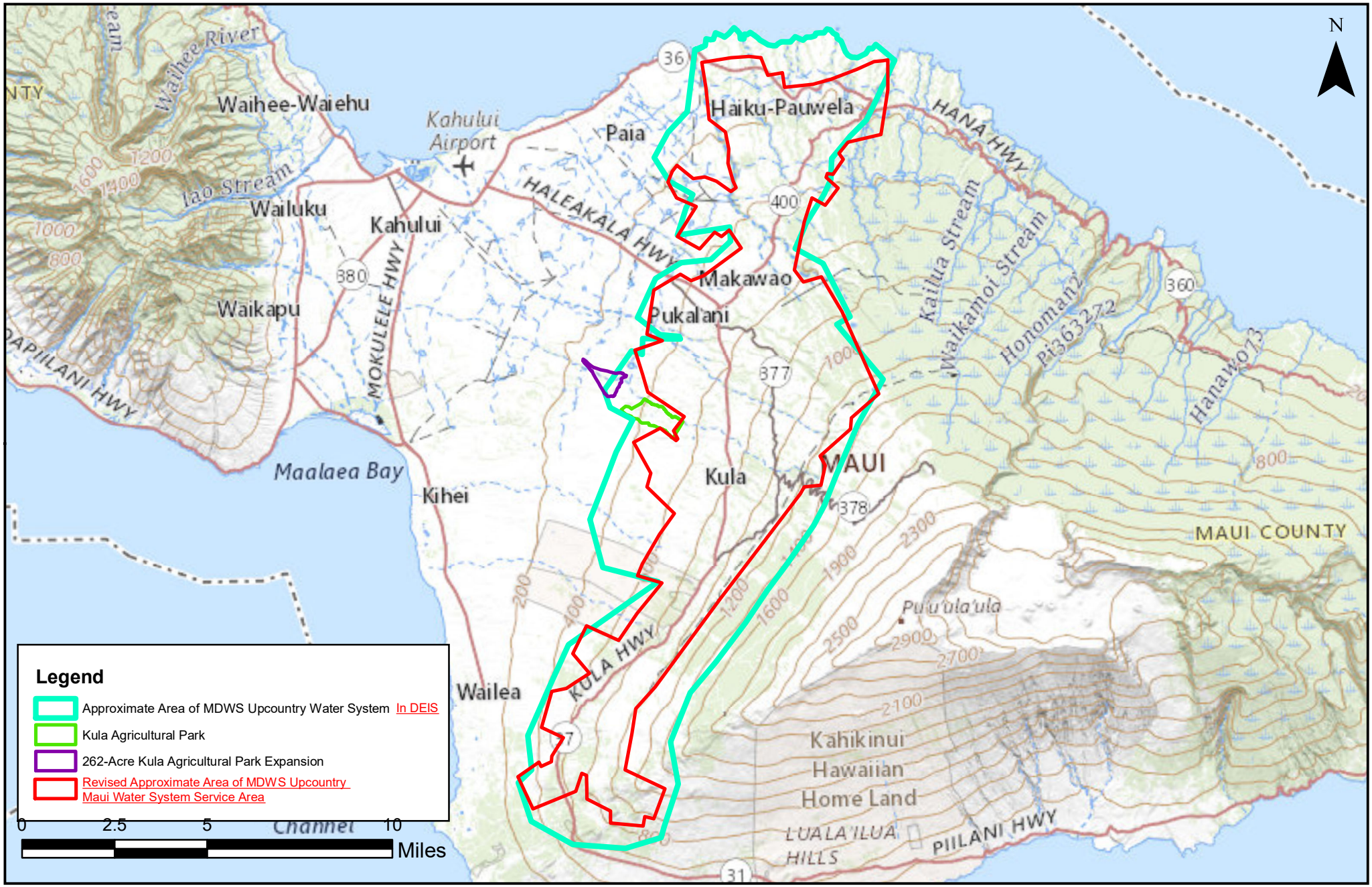


FIGURE 4-3

USGS Upcountry Maui Topography Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

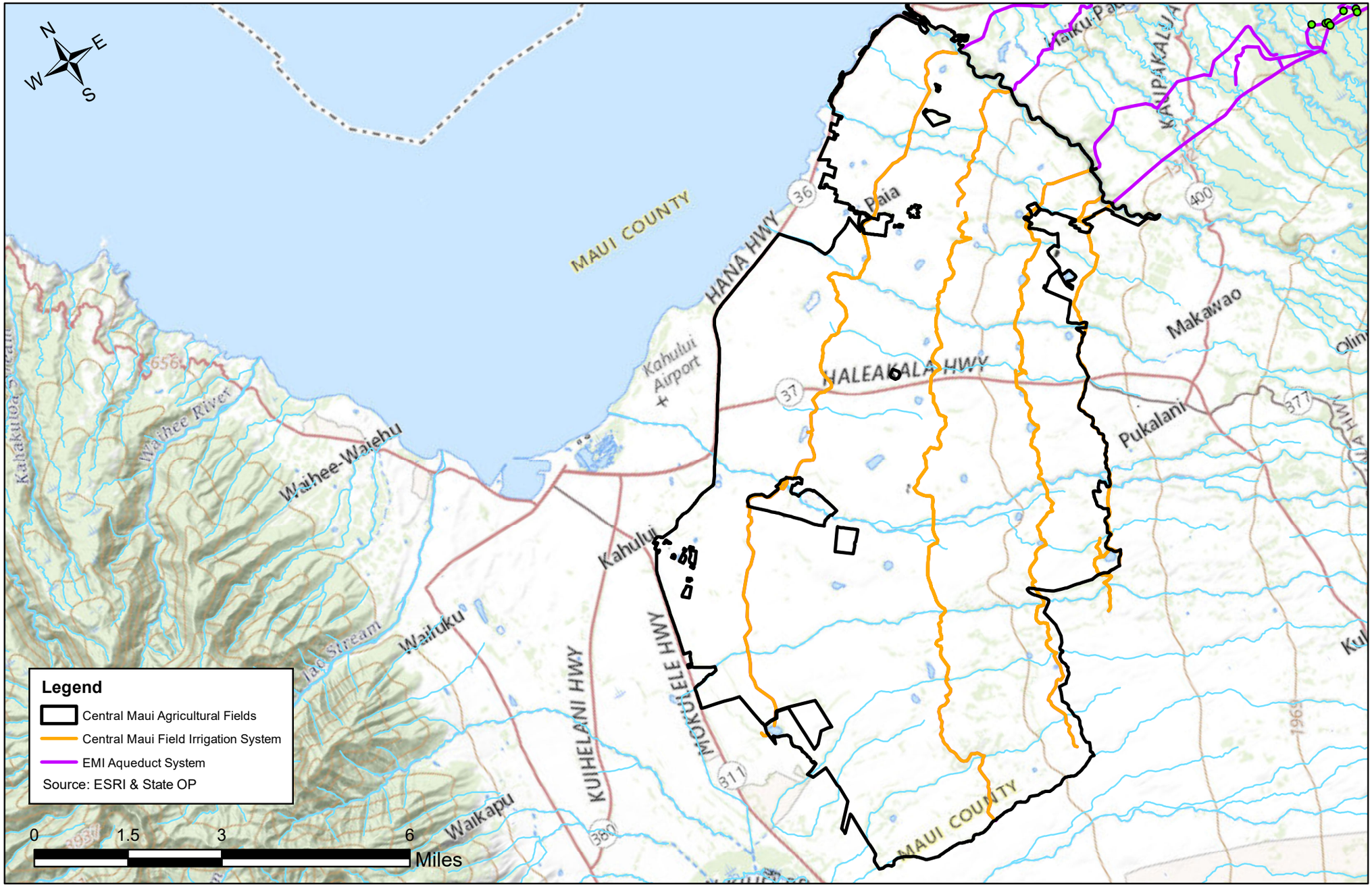


FIGURE 4-4

USGS Central Maui Topography Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

Mahi Pono, the owner of the Central Maui agricultural fields, proposes to construct approximately 319,000 square feet of building space related to its agricultural operations such as washing and packing areas, storage, etc. It is anticipated that the processing facilities will be located within a half-mile from the former HC&S Mill. All appropriate County grading and building permits will be sought for such construction.

Moreover, the former sugarcane fields would need to be cleared to allow for the transition to a diversified farm operation. Applicable best management practices (BMPs) and erosion control measures will be implemented to ensure no adverse impact to the existing geology and topography.

4.1.2 Soils

East Maui

Soil information regarding the License Area in East Maui was provided by Cultural Surveys Hawai'i, Inc. (CSH) (2019). Soils in the License Area can be broken down into four areas: Huelo, Honomanū, Ke'anae, and Nāhiku. Below is a discussion regarding the soils within the four portions of the License Area.

According to the U.S. Department of Agriculture (USDA) (2001) Soil Survey Geographic (SSURGO) database and soil survey data gathered by Foote et al. (1972), soils within the Huelo portion of the License Area include Kailua silty clay (3 to 25 percent slopes) (KBID), Pauwela clay (15 to 25 percent slopes) (PfD), Rough broken land (rRR), Honomanu-Amalu association (rHR), Rough mountainous land (rRT), Amalu peaty silty clay (3 to 20 percent slopes) (rAMD), and water > 40 acres (W) (See Figure 4-5).

Kailua silty clay (3 to 25 percent slopes) (KBID) soils are described as follows:

> This soil is on low uplands. Included in mapping were areas of Honomanu and Makawao soils. Also included were small, steep areas near cinder cones.
> In a representative profile the surface layer is dark brown silty clay about 9 inches thick. The upper part of the subsoil, about 18 inches thick, is dark-brown and dark reddish-brown silty clay that has subangular blocky structure. The lower part of the subsoil is very dark gray silty clay loam. The substratum is soft, weathered basic igneous rock. The soil is very strongly acid in the surface layer and strongly acid or medium acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. In places roots penetrate to a depth of 4 feet or more…
>
> This soil is used for pasture, woodland, and wildlife habitat. (Capability classification IVe, nonirrigated; pasture group 11; woodland group 8). (Foote et al. 1972:53)

Pauwela clay (15 to 25 percent slopes) (PfD) soils are described as follows:

> On this soil runoff is medium and the erosion hazard is moderate. Included in mapping were areas that are steep and moderately eroded.

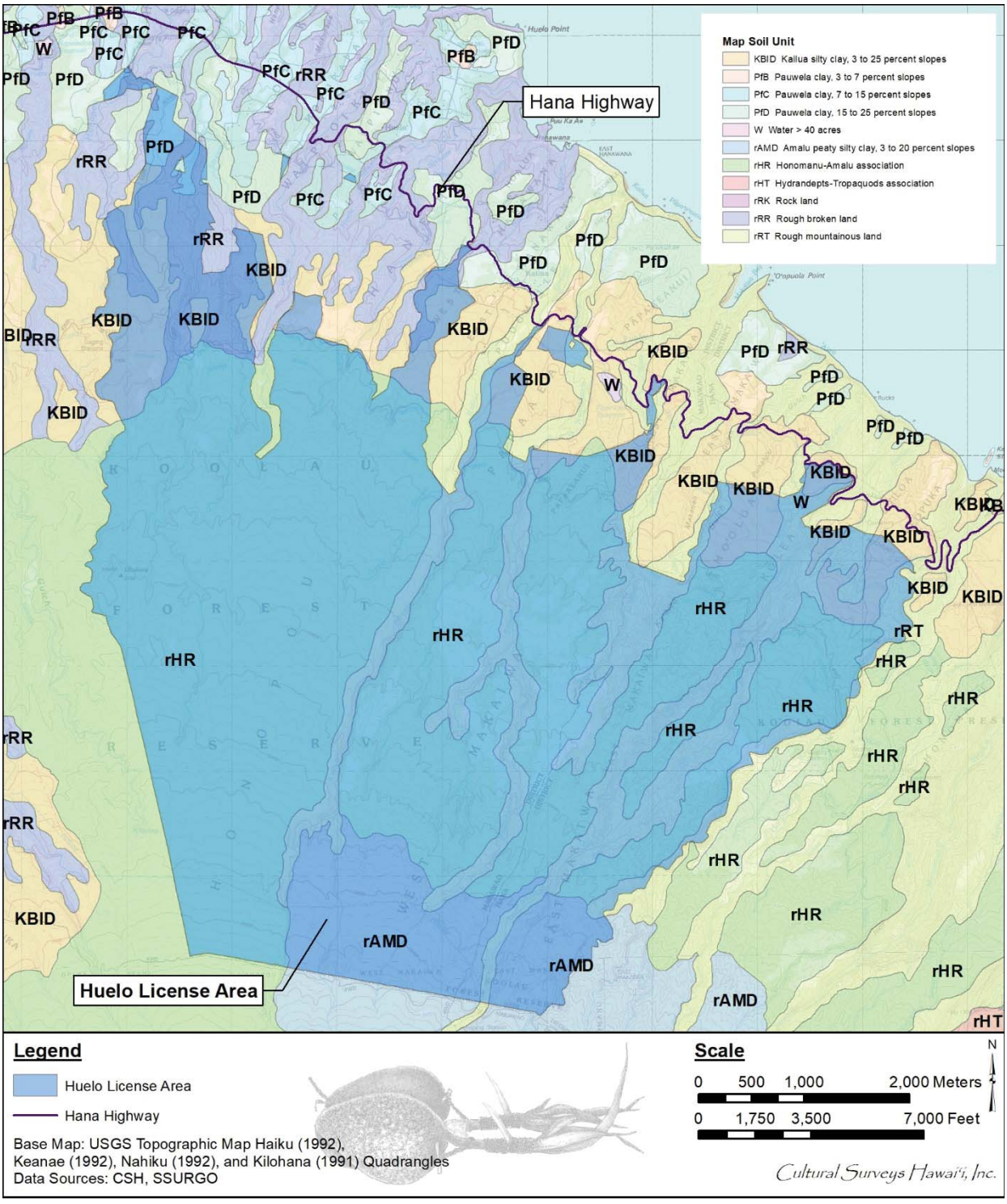


Figure 4-5. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Huelo License Area (U.S. Department of Agriculture 2001)

Cultural Surveys Hawai‘i, Inc provided map that depicts soil within portions of License Area

This soil is used for pasture and woodland. (Capability classification IVe, nonirrigated; pineapple group 8; pasture group 8; woodland group 7). (Foote et al. 1972:112)

Rough broken land (rRR) is described as follows:

Rough broken land (rRR) consists of very steep land broken by numerous intermittent drainage channels. In most places, it is not stony. It occurs in gulches and on mountainsides on all the islands except O'ahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches.

These soils are variable. They are 20 to more than 60 inches deep over soft, weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common. Included in mapping were areas of colluvium and alluvium along gulch bottoms.

This land type is used primarily for watershed and wildlife habitat. In places, it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, natal redtop, Bermuda grass, koa haole, and molasses grass. ~~Ohia~~ 'Ōhi'a, kukui, koa, and ferns are dominant in the wetter areas. Puakeawe, 'a'alii, and sweet vernal grass are common at the higher elevations. (Capability classification VIIe, nonirrigated). (Foote et al. 1972:119)

Honomanu-Amalu association (rHR) soils are described as follows:

The soils in this association have the profiles described as typical of their respective series. The areas are almost inaccessible by vehicle or on foot. They are on gently sloping to moderately steep, intermediate uplands on East Maui. The Honomanu soils occupy the more sloping, better drained side slopes. The Amalu soils occur on the less sloping tops of ridges and interfluves. The Honomanu soils are well drained; the Amalu soils are poorly drained. Runoff is slow to very slow, and the erosion hazard is slight.

Honomanu soils make up about 60 percent of the association, and Amalu soils about 40 percent. Included in mapping were small areas of Kailua soils and many small, very steep gulches. This association is used for water supply and wildlife habitat. It is covered with dense min forest vegetation. (Honomanu part is in capability classification IVe, nonirrigated; woodland group 8. ~~Ama1u~~ Amalu part is in capability classification VIIw, nonirrigated). (Foote et al. 1972:43)

Rough mountainous land (rRT) is described as follows:

Rough mountainous land (rRT) occurs in mountainous areas on all islands in the survey area. Is consists of very steep land broken by numerous intermittent drainage channels. In most places it is not stony. Elevations range from nearly

> sea level to more than 6,000 feet. The annual rainfall amounts to 70 to more than 400 inches. Over much of the area, the soil mantle is very thin. It ranges from 1 inch to 10 inches in thickness over saprolite. In most places the saprolite is relatively soft and permeable to roots and water.
>
> The land surface is dominated by deep, V-shaped valleys that have extremely steep side slopes and narrow ridges between the valleys. In most places, the local relief exceeds 500 feet. The soil material on the narrow ridgetops is similar to that of the Amalu and Olokui series. Rock land, rock outcrop, soil slips, and eroded spots make up 20 to 40 percent of the acreage.
>
> This land type is used for water supply, wildlife habitat, and recreation. The natural vegetation consists of ohia, false staghorn fern, tree fern, yellow foxtail, lantana, kukui, and puakeawe. (Capability classification VIIIe, nonirrigated) (Foote et al. 1972:119)

Amalu peaty silty clay (3 to 20 percent slopes) (rAMD) soils are described as follows:

> This soil is on high ridges and mountaintops. Included in mapping were small areas of Honomanu and Olokui soils and of steep gulches. In a representative profile an organic layer of black peat, about 8 inches thick, overlies a layer of gray massive clay about 8 inches thick. The substratum is soft, weathered basic igneous rock capped by a horizontal ironstone sheet 1/8 to 1 inch thick. The soil is extremely acid above the ironstone layer.
>
> Permeability is restricted by the ironstone sheet, which is impermeable except for cracks. Runoff is very slow, and the erosion hazard is no more than slight. Roots penetrate to a depth of 8 to 15 inches in places…
>
> This soil is used for water supply and wildlife habitat. (Capability classification VIIw, nonirrigated; woodland group 16). (Foote et al. 1972:28)

According to the USDA (2001) SSURGO database and soil survey data gathered by Foote et al. (1972), soils within the Honomanū portion of the License Area includes Kailua silty clay (3 to 25 percent slopes) (KBID), Stony alluvial land (rSM), Honomanu-Amalu association (rHR), Rough mountainous land (rRT), and Amalu peaty silty clay (3 to 20 percent slopes) (rAMD) (See Figure 4-6).

Stony alluvial land (rSM) soils are described as follows:

> Stony alluvial land (rSM) consists of stones, boulders, and soil deposited by streams along the bottoms of gulches and on alluvial fans. In most places, the slope is 3 to 15 percent. Elevations range from nearly sea level to 1,000 feet. The annual rainfall amounts to 15 to 200 inches.
>
> This land type is suited to pasture in the dry areas and to pasture and woodland in the wet areas.

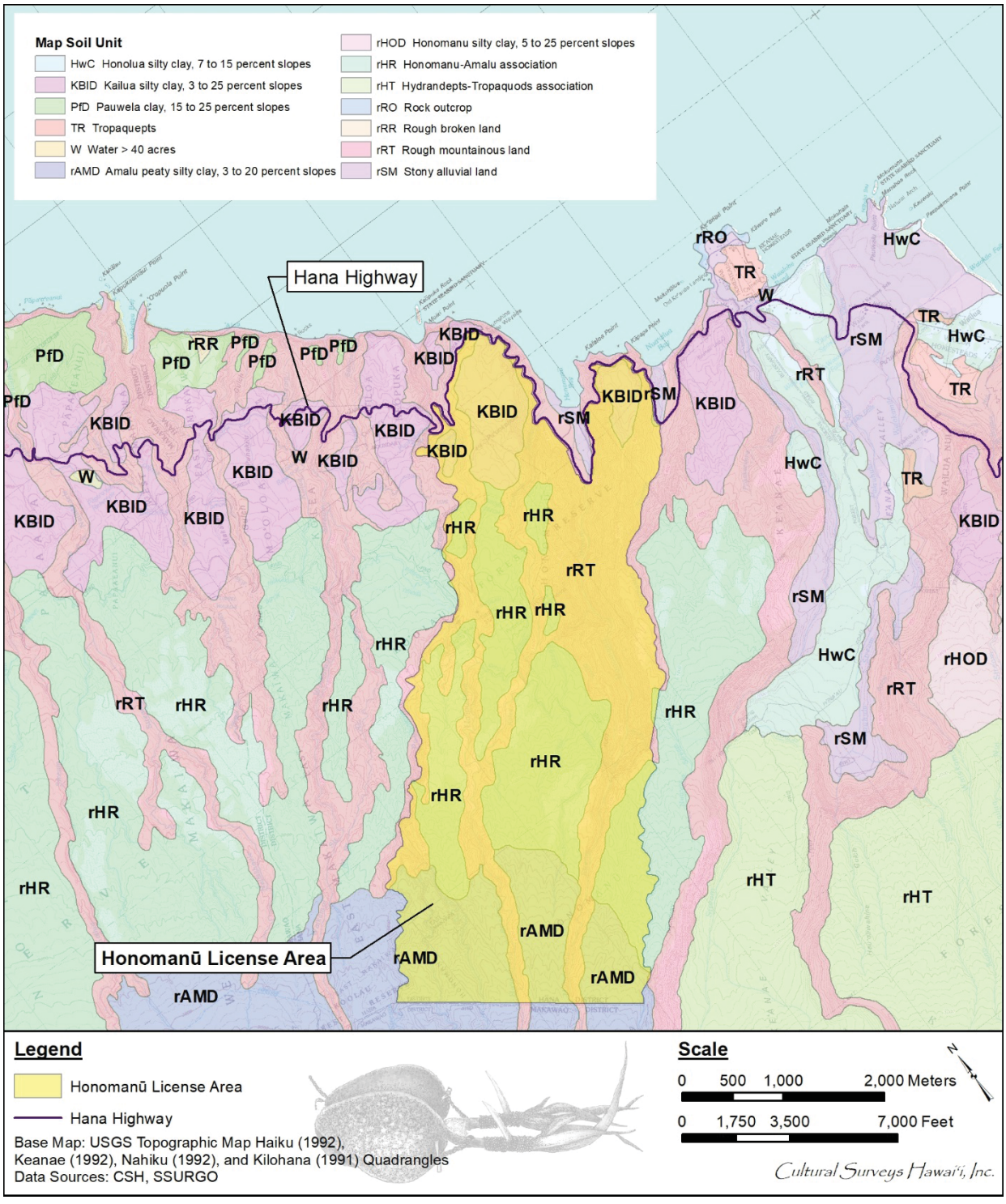


Figure 4-6. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Honomanū License Area (U.S. Department of Agriculture 2001)

Cultural Surveys Hawai‘i, Inc provided map that depicts soil within portions of License Area

> The natural vegetation consists of kiawe, klu, ilima, piligrass, and lantana in the dry areas and guava, kukui, hilograss, and Christmas berry in the wet areas. Improvement of this land is difficult because of the stones and boulders. (Capability classification VIIs, nonirrigated). (Foote et al. 1972:120)

According to the USDA (2001) SSURGO database and soil survey data gathered by Foote et al. (1972), soils within the Ke'anae portion of the License Area consists of Kailua silty clay (3 to 25 percent slopes) (KBID), Stony alluvial land (rSM), Honolua silty clay (7 to 15 percent slopes) (HwC), Honomanu-Amalu association (rHR), Rough mountainous land (rRT), Honomanu silty clay (5 to 25 percent slopes) (rHOD), and Hydrandepts-Tropaquods association (rHT) (See Figure 4-7).

Honolua silty clay (7 to 15 percent slopes) (HwC) is described as follows:

> This soil is on smooth interfluves on uplands. Included in mapping were small areas of Alaeloa and Olelo soils. Also included were small, gently sloping areas and small, eroded spots.
>
> In a representative profile, the surface layer is dark-brown silty clay about 12 inches thick. The subsoil, about 58 inches thick, is dark reddish-brown and reddish-brown silty clay that has subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is strongly acid in the surface layer and subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1.2 inches per foot in the surface layer and about 1.4 inches per foot in the subsoil. In places roots penetrate to a depth of 5 feet or more…
>
> This soil is used for pineapple, pasture, and woodland. (Capability classification IIIe, nonirrigated; pineapple group 3; pasture group 8; woodland group 7). (Foote et al. 1972:42)

Honomanu silty clay (5 to 25 percent slopes) (rHOD) soils are described as follows:

> This soil is on the wettest parts of the northeastern slopes of Haleakalā. Included in mapping were small areas of Amalu and Kailua soils and rock outcrops.
>
> In a representative profile the surface layer is very dark brown silt loam and dark yellowish-brown silty clay about 11 inches thick, capped with an organic layer about 3 inches thick. The subsoil, about 26 inches thick, is dark yellowish-brown and brown silty clay that has subangular blocky structure. The substratum is dark yellowish-brown loam and fragmental basic igneous rock. The soil is extremely acid in the surface layer and subsoil.
>
> Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. In places roots penetrate to a depth of 4 feet or more…

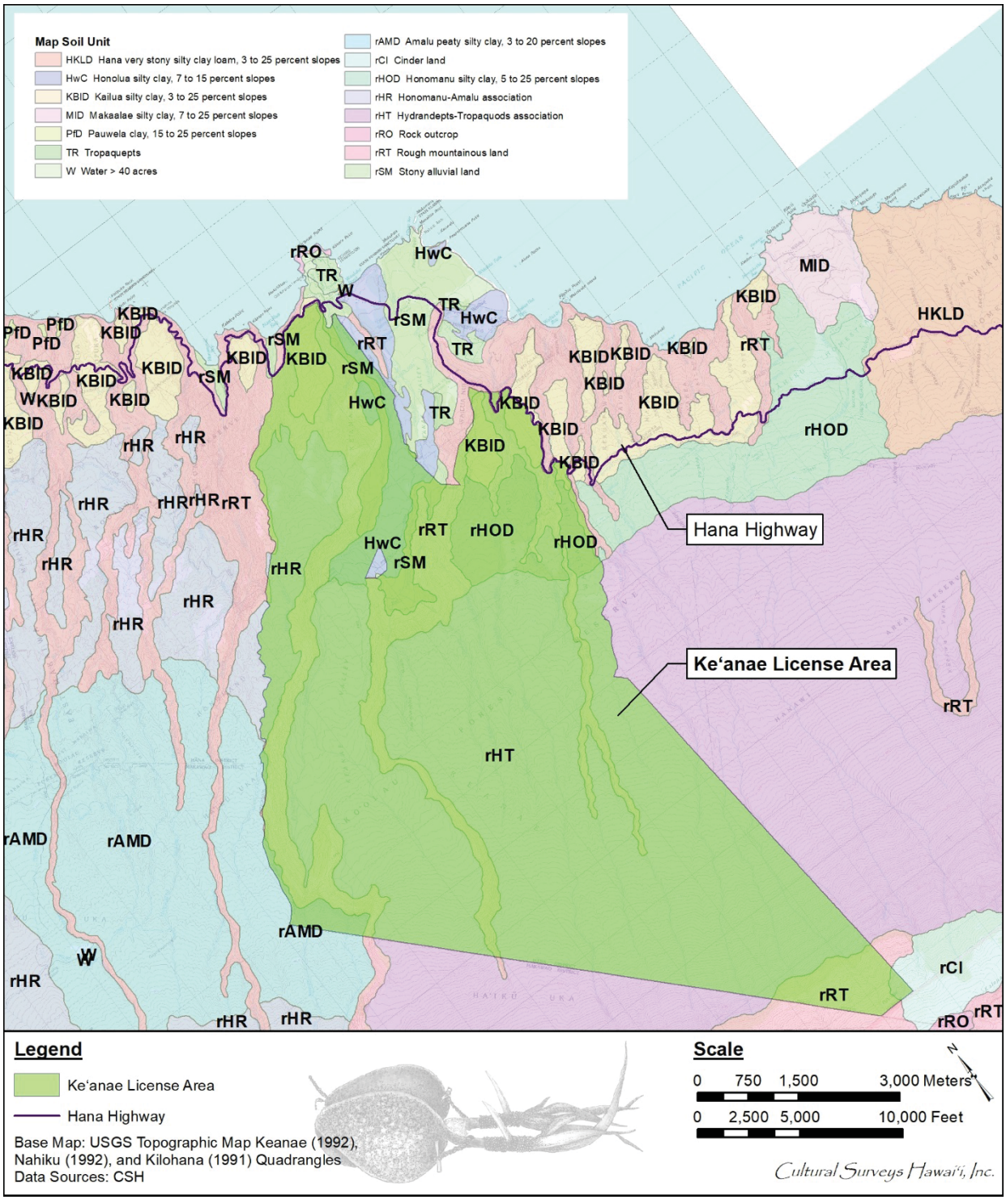


Figure 4-7. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Keanae License Area (U.S. Department of Agriculture 2001)

Cultural Surveys Hawai‘i, Inc provided map that depicts soil within portions of License Area

> This soil is used for water supply and wildlife habitat. (Capability classification IVe, nonirrigated; pasture group 11; woodland group 8). (Foote et al. 1972:43)

Hydrandepts-Tropaquods association (rHT) soils are described as follows:

> Areas mapped as Hydrandepts-Tropaquods association (rHT) consist of well-drained to poorly drained soils on uplands. These soils are on the northern slopes of West Maui and the northern and eastern slopes of East Maui. They developed in volcanic ash and in material weathered from cinders and basic igneous rock. They are moderately sloping to steep. Elevations range from 1,000 to 6,000 feet: The annual rainfall amounts to 100 to 350 inches. The mean annual soil temperature is 60° F. This association is geographically associated with soils of' the Amalu, Honomanu, and Olelo series.
>
> Hydrandepts make up about 60 percent of the association, and Tropaquods 40 percent. Included in mapping were small areas of Rough mountainous land. Also included were small peat bogs.
>
> Hydrandepts are the steeper areas of the association. These are well drained to moderately well drained soils that are similar to those of the Honomanu series. The surface layer is high in organic-matter content. The subsoil is dark-brown or dark yellowish-brown, smeary silty clay loam or silty clay. The substratum consists of volcanic ash and cinders or weathered basic igneous rock. These soils dehydrate irreversibly into fine pebble size aggregates.
>
> Tropaquods are poorly drained soils that are similar to those of the Amalu and Olokui series. They have a peaty or mucky surface layer that overlies a dark gray to very dark gray, mottled layer. The mottled layer rests on an ironstone sheet ¼ to 1 inch thick. The ironstone is at a depth of 10 to 20 inches. It normally caps highly weathered basic igneous rock.
>
> The soils in this association have low bearing capacity and low shear strength. They are slippery and difficult to traverse. Because of their ability to absorb water and to transmit it rapidly, these soils are important for maintenance of ground water for domestic use and irrigation.
>
> This association is used for water supply and wildlife habitat. The natural vegetation consists of ohia, puakeawe, sedges, false staghorn fern, tree fern, and other rain forest vegetation. (Hydrandepts soils are in capability classification VIIe, nonirrigated. Tropaquods soils are in capability classification VIIw, nonirrigated). (Foote et al. 1972:46)

According to the USDA (2001) SSURGO database and soil survey data gathered by Foote et al. (1972), the soils within the Nāhiku portion of the License Area consists of Kailua silty clay (3 to 25 percent slopes) (KBID), Honomanu silty clay (5 to 25 percent slopes) (rHOD), Hana very stony silty clay loam (3 to 25 percent slopes) (HKLD), Rough mountainous land (rRT), Hydrandepts-Tropaquods association (rHT), and Cinder land (rCl) (See Figure 4-8).

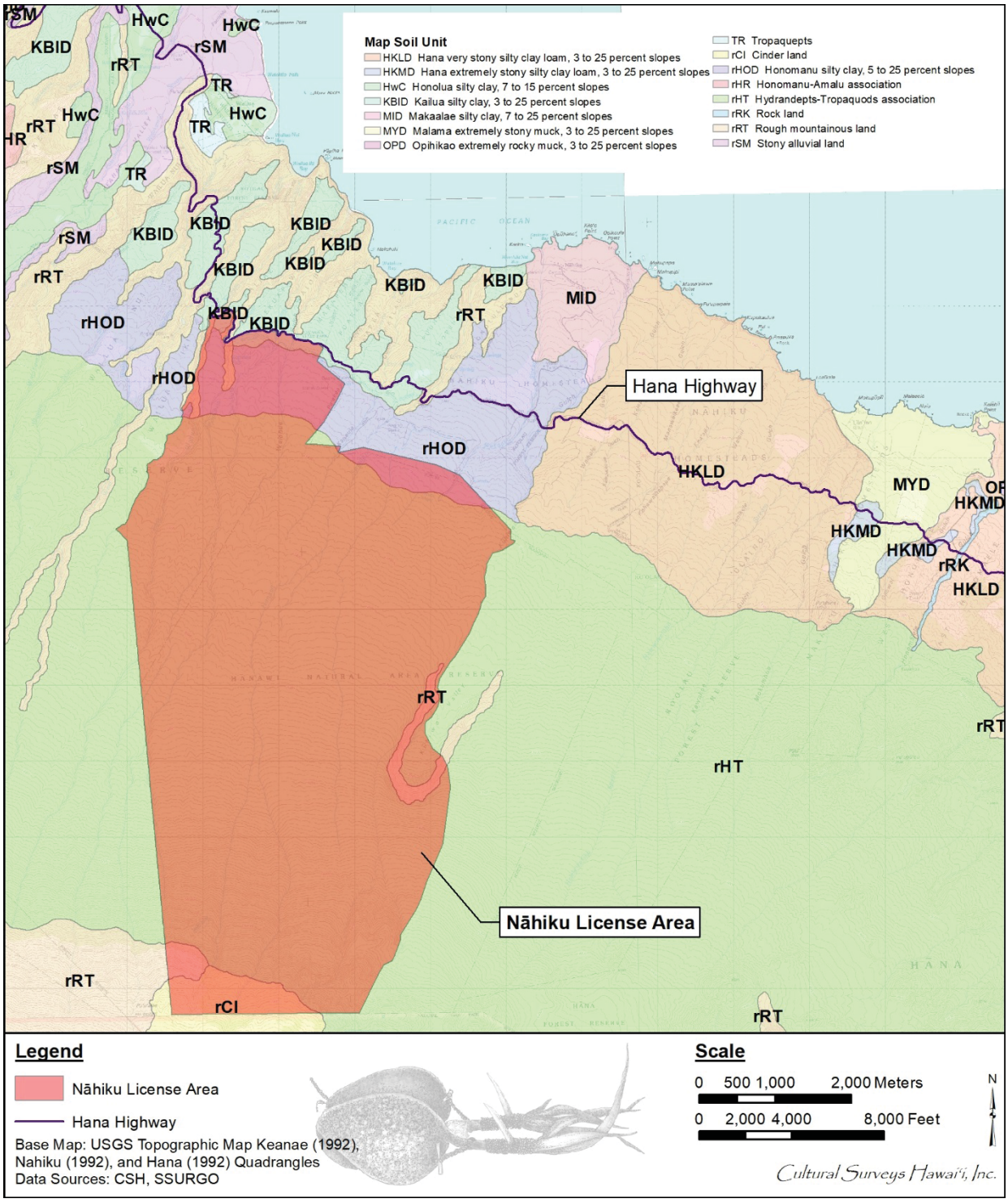


Figure 4-8. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the Nāhiku License Area (U.S. Department of Agriculture 2001)

Cultural Surveys Hawai‘i, Inc provided map that depicts soil within portions of License Area

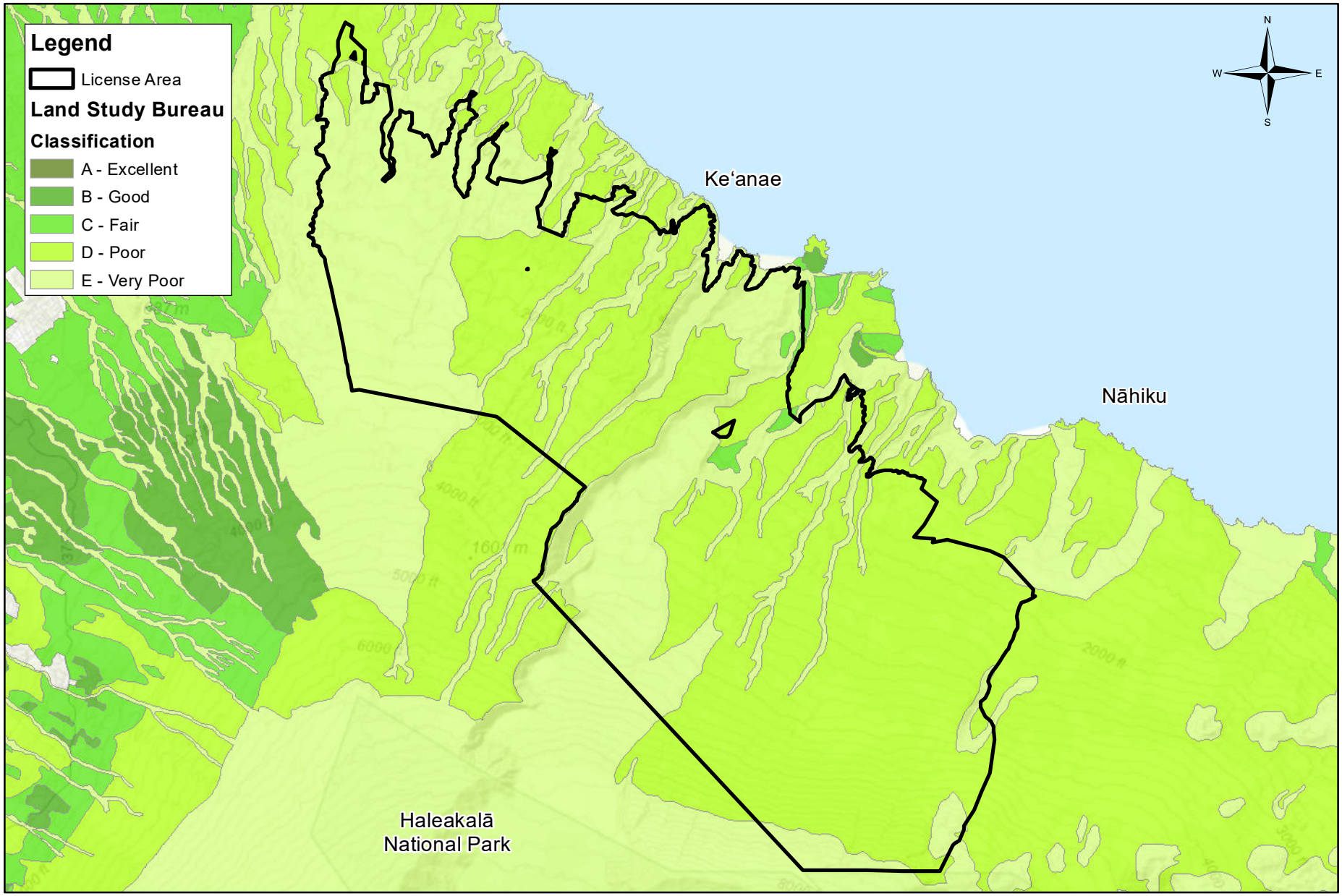
Hana very stony silty clay loam (3 to 25 percent slopes) (HKLD) soils are described as follows:

> This soil is on smooth, low mountain slopes. Included in mapping were small areas of Honomanu soils. Also included were small, steep areas near cinder cones.
>
> In a representative profile, the surface layer is very dark-brown and very dark grayish-brown silty clay loam about 12 inches thick. The subsoil, about 22 inches thick, is dark-brown silty clay loam that has subangular blocky structure. The substratum is moderately weathered, pebble-size cinders overlying ʻaʻā lava. The soil is strongly acid to medium acid in the surface layer and slightly acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. In places roots penetrate to a depth of 3 to 4 feet. The available water capacity is about 1.2 inches per foot in the surface layer and 1.4 inches per foot in the subsoil. ~~..~~
>
> This soil is used for pasture. (Capability classification VIs, nonirrigated; pasture group 11; woodland group 8). (Foote et al. 1972:37)

Cinder land (rCl) is described as follows:

> Cinder land (rCl) consists of areas of bedded magmatic ejecta associated with cinder cones. It is a mixture of cinders, pumice, and ash. These materials are black, red, yellow, brown, or variegated in color. They have jagged edges and a glassy appearance and show little or no evidence of soil development.
>
> Cinder land occurs on the islands of Maui and Oʻahu. On Maui, it is mainly at elevations between 8,000 and 10,000 feet in the Haleakalā National Park. On Oʻahu, it is mainly at elevations between 200 and 2,000 feet, near Mount Tantalus. The annual rainfall amounts to 20 to 30 inches on Maui and 60 to 100 inches on Oʻahu.
>
> Although Cinder land commonly supports some vegetation, it has no value for grazing, because of its loose nature and poor trafficability; It is used for wildlife habitat and recreational areas. (Capability classification VIIIs, nonirrigated)

According to the Hawai'i Land Study Bureau (LSB) Detailed Land Classification, Island of Maui (LSB bulletin no. 7, 1967) and depicted online at the Hawaiʻi LSB Locator-ARC GIS by the Hawai'i Statewide GIS Program, Office of Planning, most of the soils in East Maui, including the License Area have been given an overall master productivity rating of E-Very Poor and D-Poor (See Figure 4-9). Pockets of soils within and makai of the Ke'anae portion of the License Area are rated C-Fair. Much of the land on the Keʻanae Peninsula and some in the Wailua area are rated B-Good.



WILSON OKAMOTO CORPORATION

0 5,000 10,000 20,000 Feet

0 0.5 1 2 3 Miles

1 inch = 11,000 feet

Source: ESRI, State OP, & Akinaka

FIGURE 4-9

EAST MAUI LSB MAP

Proposed Lease for Nāhiku, Ke'anae, Honomanū and Huelo License Areas

The Agricultural Lands of Importance to the State of Hawai'i (ALISH) Classification System was developed and compiled in 1977 by the State Department of Agriculture (DOA) with assistance from the ~~U.S. Department of Agriculture~~ USDA - Natural Resources Conservation Service (NRCS), and the College of Tropical Agriculture, University of Hawai'i. This classification system was developed to identify three classes of agriculturally important lands for the State of Hawai'i as part of a national effort to inventory important farmlands. Lands not considered for classification within this system are those that are not generally considered suitable for agriculture.

The Hawai'i Classification System identifies three categories of land (equivalent NRCS categories in parentheses ~~Parentheses~~): Prime Agricultural Lands (Prime Farmlands), Unique Agricultural Lands (Unique Farmlands), and Other Important Lands (Additional Farmland of Statewide and Local Importance). A general description of each land type classification is as follows:

- Prime Agricultural Lands – Land which has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods.

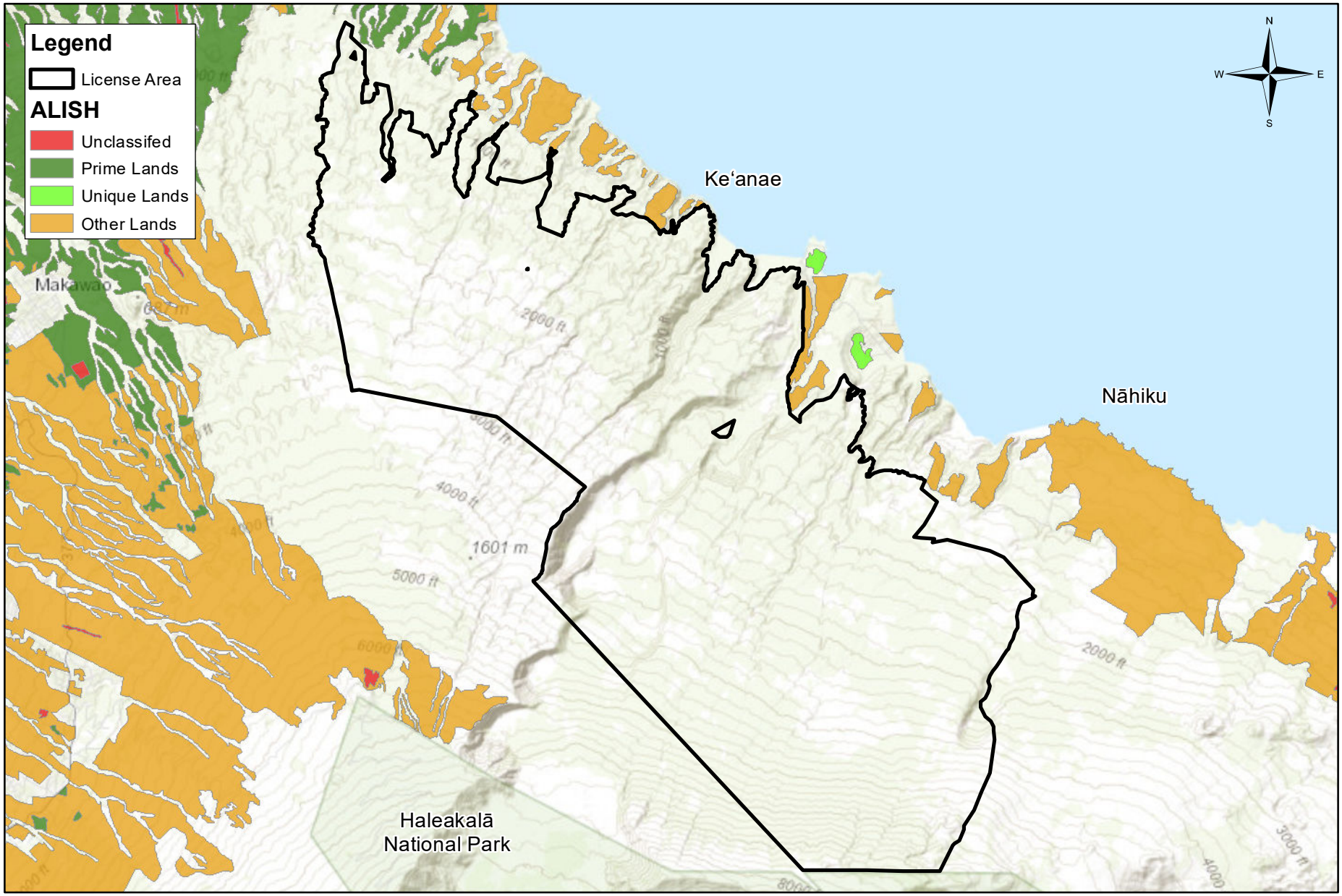
- Unique Agricultural Lands – Land that has a special combination of soil quality, location, growing season, moisture supply, and is used to produce sustained high quality and of high quality yields of a specific crop when treated and managed according to modern farming methods.

- Land other than Prime or Unique Agricultural Land that is also of ~~statewide~~ Statewide or local importance to agricultural use.

According to the ALISH map, some of the coastal area makai of the License Area have been classified "Other Agricultural Land" with some of the land lying below the western end of the License Area classified "Prime Agricultural Land" (See Figure 4-10). The latter areas were formerly in sugarcane cultivation. Notably, the same areas on the Ke'anae Peninisula and in the ~~Wailua~~ Wailuā area that received an overall productivity rating of B-Good by the LSB, were classified Unique Agricultural Land on the ALISH map. However, there are no ALISH classified lands within the License Area itself.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on soils in the East Maui region are anticipated.



0 5,000 10,000 20,000 Feet

0 0.5 1 2 3 Miles

1 inch = 11,000 feet

Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-10

EAST MAUI ALISH MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

Upcountry Maui

According to the USDA (2001) SSURGO database and soil survey data gathered by Foote et al. (1972), soils Upcountry Maui include the Haiku silty clay series (3 to 15 percent slopes), Hamakuapoko silty clay series (3 to 25 percent slopes), Haliimaile silty clay series (3 to 15 percent slopes) Kaipoioi loam series (7 to 40 percent slopes) Keahua silty clay loam series (3 to 25 percent slopes), Kula loam series (4 to 40 percent slopes), and water > 40 acres (W) (See Figure 4-11).

Haiku silty clay (3 to 7 percent slopes) (HaB) soils are described as follows:

> This soil has a profile like that of Haiku clay, 7 to 15 percent slopes, except for the texture of the surface layer. It is a dark brown clay about 14 inches thick. The subsoil, about 31 inches thick, is yellowish-red, dark reddish-brown, and dark-red clay or silty clay that has angular and angular blocky structure. The substratum is soft, weathered, basic igneous rock. The soil is very strongly acid in the surface layer and extremely acid and very strongly acid in the subsoil and substratum. Runoff is slow, and the erosion hazard is slight. Included in mapping were small, nearly level areas. This soil is used for pineapple and homesites. (Foote et al. 1972:32)

Haiku silty clay (7 to 15 percent slopes) (HaC) soils are described as follows:

> This soil has a profile like that of Haiku clay, 7 to 15 percent slopes, except for the texture of the surface layer. It is a dark brown clay about 14 inches thick. The subsoil, about 31 inches thick, is yellowish-red, dark reddish-brown, and dark-red clay or silty clay that has angular and angular blocky structure. The substratum is soft, weathered, basic igneous rock. The soil is very strongly acid in the surface layer and extremely acid and very strongly acid in the subsoil and substratum. This soil is used for pineapple. (Foote et al. 1972:32)

Haiku clay (3 to 7 percent slopes) (HbB) soils are described as follows:

> On this soil, runoff is slow and the erosion hazard is slight. Included in mapping were small, nearly level areas. This soil is used for pineapple, pasture, and homesites. (Foote et al. 1972:32)

Haiku Clay (7 to 15 percent slopes) (HbC) soils are described as follows:

> This soil occurs on uplands. Included in mapping were small areas of Paia and Pauwela soils. Also included were small eroded spots and small areas where the slope is as much as 25 percent.
>
> In a representative profile, the surface layer is dark-brown clay about 14 inches thick. The subsoil, about 31 inches thick, is yellowish-red, dark reddish-brown, and dark-red clay or silty clay that has subangular and angular blocky structure. The substratum is soft, weathered, basic igneous rock. The soil is very strongly acid in the surface layer and extremely acid and very strongly acid in the subsoil and substratum.

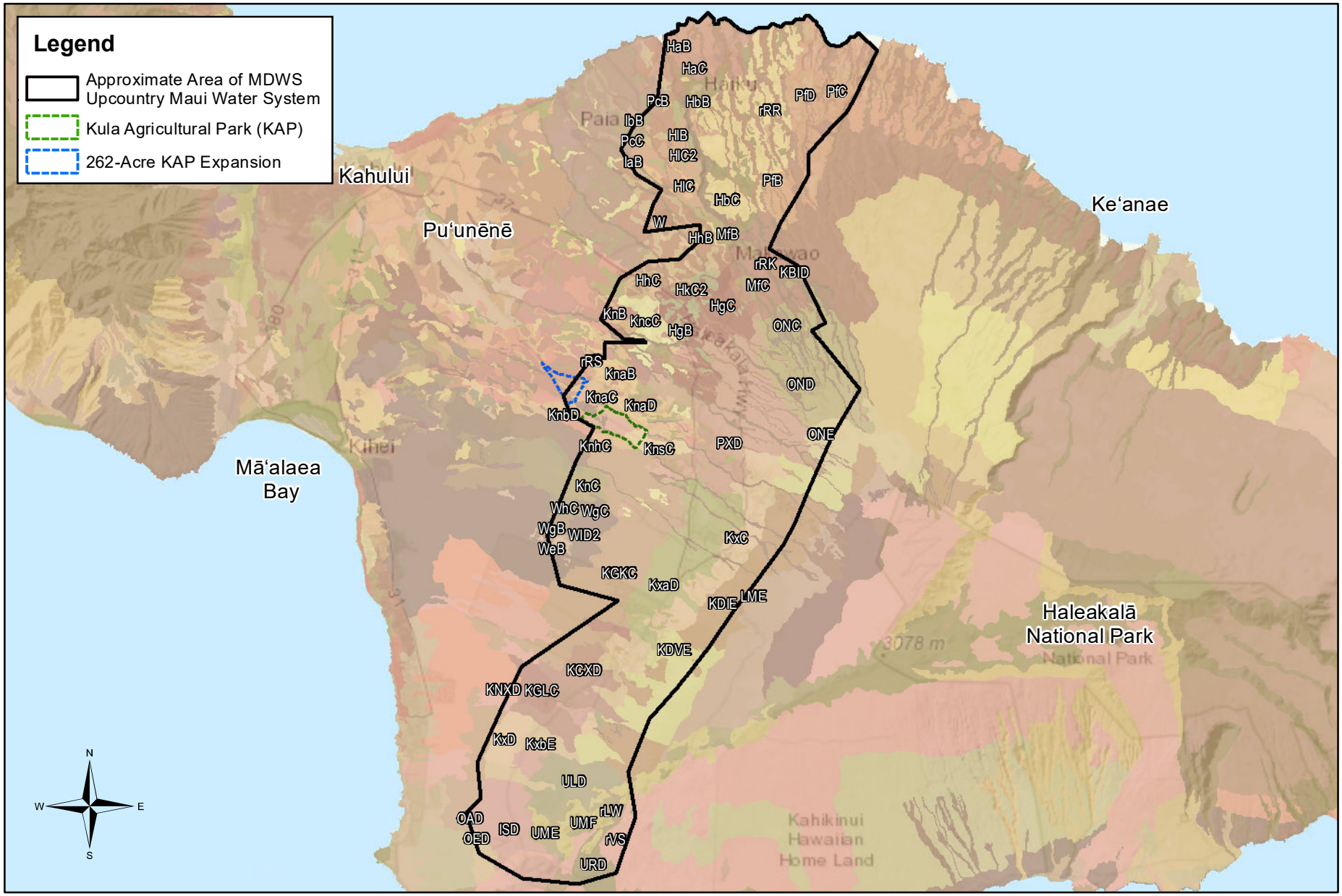


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FIGURE 4-11

UPCOUNTRY MAUI SOILS MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1.4 inches per foot in the surface layer and 1.3 inches per foot in the subsoil. In places roots penetrate to a depth of 3 feet or more. (Foote et al. 1972:32)

Hamakuapoko silty clay (3 to 7 percent slopes) (HlB) soils are described as follows:

> This soil is on smooth slopes in the uplands. Included in mapping were small areas of Haiku and Haliimaile soils. Also included were small, moderately steep areas.
>
> In a representative profile, the surface layer is dark-brown silty clay about 16 inches thick. The subsoil, about 35 inches thick, is dark-brown and very dark grayish brown silty clay that has subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is extremely acid in the surface layer and strongly acid or very strongly acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.2 inches per foot in the surface layer and 1.5 inches per foot in the subsoil. In places roots penetrate to a depth of 4 feet or more. (Foote et al. 1972:36)

Hamakuapoko silty clay (7 to 15 percent slopes) (HlC) soils are described as follows:

> On this soil, runoff is medium and the erosion hazard is moderate. Most of this soil is used for pineapple. A small acreage is used for pasture and homesites. (Foote et al. 1972:36)

Hamakuapoko silty clay (7 to 25 percent slopes, eroded) (HlC2) soils are described as follows:

> This soil has a profile like that of Hamakuapoko silty clay (3 to 7 percent slopes), except that it is eroded. In most places about 50 percent of the original surface layer has been removed by erosion. In a few places all of the surface layer and part of the subsoil have been lost. Runoff is medium to rapid, and the erosion hazard is severe. This soil is used for pineapple. (Foote et al. 1972:36)

Haliimaile silty clay (3 to 7 percent slopes) (HhB) soils are described as follows:

> This soil is on smooth uplands. Included in mapping were small areas of Keahua and Paia soils. In a representative profile, the surface layer is dark reddish-brown silty clay about 15 inches thick. The subsoil, to a depth of more than 60 inches, is dark reddish-brown silty clay and very dark grayish-brown clay. It has subangular blocky and angular blocky structure. The substratum is silt, weathered basic igneous rock. The soil is strongly acid in the surface layer and strongly acid to medium acid in the subsoil. Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.6 inches per foot in the surface layer and about 1.2 inches per foot in the subsoil. In places, roots penetrate to a depth of 5 feet or more. (Foote et al. 1972:35)

Haliimaile silty clay (7 to 15 percent slopes) (HhC) soils are described as follows:

> On this soil, runoff is medium and the erosion hazard is moderate. Included in mapping were small, cobbly areas and small, moderately steep areas. This soil is used for sugarcane, pineapple, and homesites. (Foote et al. 1972:36)

Haliimaile gravelly silty clay (7 to 15 percent slopes, eroded) (HkC2) soils are described as follows:

> This soil has a profile like that of Haliimaile silty clay (3 to 7 percent slopes), except that in most places about 50 percent of the original surface layer has been lost through erosion. In a few places, all the surface layer and part of the subsoil have been removed. Runoff is medium to rapid, and the erosion hazard is severe. (Foote et al. 1972:36)

Haliimaile silty clay loam (3 to 7 percent) (HgB) soils are described as follows:

> This soil has a profile like that of Haliimaile silty clay (3 to 7 percent slopes), except for the texture of the surface layer. Included in mapping were small eroded areas on knolls. The surface layer of the included areas contains few to many pebble-size rock fragments. This soil is used for pineapple, pasture, and homesites. (Foote et al. 1972:36)

Haliimaile silty clay loam (7 to 15 percent) (HgC) soils are described as follows:

> This soil has a profile like that of Haliimaile silty clay (3 to 7 percent slopes), except for the texture of the surface layer. Runoff is medium, and the erosion hazard is moderate. Included in mapping were small eroded areas on knolls. The surface layer of the included areas contains few to many pebble-size rock fragments. This soil was used for pineapple, pasture, and homesites. (Foote et al. 1972:36)

Iao silty clay (3 to 7 percent slopes) (IaB) soils are described as follows:

> This soil has a profile like that of Iao clay (3 to 7 percent slopes), except for the texture of the surface layer. The subsoil, about 45 inches thick, is very dark brown, dark-brown, and very dark grayish-brown clay and silty clay. The substratum is clayey alluvium. The soil is neutral in the surface layer and subsoil. This soil is used for sugarcane. (Foote et al. 1972:47)

Iao cobbly silty clay (3 to 7 percent slopes) (IbB) soils are described as follows:

> This soil has a profile like that of Iao clay (3 to 7 percent slopes), except for the texture of the surface layer and the content of the cobblestones. The subsoil, about 45 inches thick, is very dark brown, dark-brown, and very dark grayish-brown clay and silty clay. The substratum is clayey alluvium. The soil is neutral

in the surface layer and subsoil. This soil is used for sugarcane and homesites. (Foote et al. 1972:47)

Io silt loam (7 to 25 percent slopes) (ISD) soils are described as follows:

> This soil is on smooth, low mountain slopes. Included in mapping were small areas of Kula and Oanapuka soils. Also included were small, cobbly areas and small, steep areas near cinder cones.
>
> In a representative profile, the surface layer is very dark brown silt loam about 10 inches thick. The subsurface layer is dark-brown silty clay loam about 7 inches thick. The subsoil, 10 to 30 inches thick, is dark-brown and dark reddish-brown clay loam that has subangular blocky structure. The substratum is black, unweathered, fine cinders and dark reddish-brown loam. The soil is neutral in the surface layer and mildly alkaline in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1.8 inches per foot in the surface layer and subsoil. In places roots penetrate to a depth of more than 25 inches. This soil is used for pasture, truck crops, and wildlife habitat. (Foote et al. 1972:47)

Kailua silty clay (3 to 25 percent slopes) (KBID) soils are described as follows:

> This soil is on low uplands. Included in mapping were areas of Honomanu and Makawao soils. Also included were small, steep areas near cinder cones.
>
> In a representative profile the surface layer is dark-brown silty clay about 9 inches thick. The upper part of the subsoil, about 18 inches thick, is dark-brown and dark reddish-brown silty clay that has subangular blocky structure. The lower part of the subsoil is very dark gray silty clay loam. The substratum is soft, weathered basic igneous rock. The soil is very strongly acid in the surface layer and strongly acid or medium acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. In places roots penetrate to a depth of 4 feet or more. (Foote et al. 1972:53)

Kaimu extremely stony peat (7 to 25 percent slopes) (KCXD) soils are described as follows:

> This soil is on rough, undulating, relatively young 'A'ā lava flows. Included in mapping were small areas of 'Io and Kula soils. Outcrops of 'A'ā lava are common.
>
> In a representative profile, the surface layer is extremely stony black peat about 8 inches thick. The substratum is fragmental 'A'ā lava that has a little soil material in voids and cracks. The soil is neutral in reaction.

> Permeability is very rapid. Runoff is very slow, and the erosion hazard is no more than slight. In places roots penetrate to a depth of 2 feet. (Foote et al. 1972:53)

Kaipoioi loam (7 to 40 percent slopes) (KDIE) soils are described as follows:

> This soil is on smooth to rolling high mountain slopes. Included in mapping were small areas of Laumaia and Olinda soils and a few scattered rock outcrops.
>
> In a representative profile, the surface layer is black loam about 10 inches thick. The subsoil, about 51 inches thick, is black and very dark brown silt loam or silty clay loam that has subangular blocky structure. The substratum is ash and cinders. The soil is neutral in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 2.6 inches per foot in the surface layer and about 1.6 inches per foot in the subsoil. In places roots penetrate to a depth of 60 inches or more. (Foote et al. 1972:54)

Kaipoioi very rocky loam (7 to 40 percent slopes) (KDVE) soils are described as follows:

> This soil is similar to Kaipoioi loam (7 to 40 percent slopes), except that rock outcrops cover 10 to 25 percent of the surface. Workability is very difficult. Included in mapping were small, very steep areas and small, eroded spots. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:54)

Kamaole very stony silt loam (3 to 15 percent slopes) (KGKC) soils are described as follows:

> This soil is on uplands. Included in mapping were small areas of Keawakapu and Kula soils. Also included were small areas where slopes have been removed. Outcrops of 'A'ā lava are common.
>
> In a representative profile, the surface layer is dark-brown and dark reddish-brown silt loam and silty clay loam about 8 inches thick. The subsoil, about 12 inches thick, is dark reddish-brown silty clay that has subangular blocky structure. The substratum is fragmental 'A'ā lava that has very little soil material in voids. The soil is medium acid and slightly acid in the surface layer and mildly alkaline in the subsoil.
>
> Permeability is moderate. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1. Inches per foot in the surface layer and subsoil. In places roots penetrate to a depth of 2 feet. (Foote et al. 1972:59)

Kama'ole extremely stony silt loam (3 to 15 percent slopes) (KGLC) soils are described as follows:

> This soil is similar to Kama'ole very stony silt loam (3 to 15 percent slopes), except that stones cover 3 to 15 percent of the surface. Included in mapping were small areas of rock outcrop. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:59)

Keahua silty clay loam (3 to 7 percent slopes) (KnB) soils are described as follows:

> This soil is on uplands. Included in mapping were small areas of Haliimaile and Molokai soils, and small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. Also included were small areas of silty clay and some areas that are nearly level.
>
> In a representative profile, the surface layer is dark reddish-brown silty clay loam about 10 inches thick. The subsoil, about 50 inches thick, is dark reddish-brown silty clay loam and very dark gray clay loam that has subangular blocky structure. The substratum is dominantly soft, weathered basic igneous rock. The soil is slightly acid in the surface layer and slightly acid to neutral in the subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. In places, roots penetrate to a depth of 4 feet or more. (Foote et al. 1972:65)

Keahua cobbly silty clay loam (3 to 7 percent slopes) (KnaB) soils are described as follows:

> This soil has a profile like that of Keahua silty clay loam (3 to 7 percent slopes), except that it is cobbly on the surface. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. Also included were small areas of silty clay. This soil is used for sugarcane. A few acres are used for truck crops. (Foote et al. 1972:66)

Keahua cobbly silty clay loam (7 to 15 percent slopes) (KnaC) soils are described as follows:

> On this soil, runoff is low to medium and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. This soil is used for sugarcane and pasture. A few acres are used for truck crops. (Foote et al. 1972:66)

Keahua cobbly silty clay loam (15 to 25 percent slopes) (KnaD) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is moderate. Included in mapping were small areas that are not cobbly. Also included were a few steep areas. This soil is used for sugarcane and pasture. (Foote et al. 1972:66)

Keahua very stony silty clay loam (7 to 25 percent slopes) (KnbD) soils are described as follows:

> This soil has a profile like that of Keahua silty clay loam (3 to 7 percent slopes), except that stones cover as much as 3 percent of the surface. Runoff is slow to medium, and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. In a few places tones cover 3 to 15 percent of the surface. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:66)

Keahua silty clay loam (7 to 15 percent slopes) (KnC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. This soil is used for sugarcane and pasture. Small acreages are used for pineapple and truck crops. (Foote et al. 1972:66)

Keahua silty clay (7 to 15 percent slopes) (KncC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. This soil is used for pineapple, pasture, and homesites. (Foote et al. 1972:66)

Keahua cobbly silty clay (7 to 15 percent slopes) (KnhC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered igneous rock. This soil is used for sugarcane and pasture. Small acreages are used for truck crops. (Foote et al. 1972:66)

Keahua stony silty clay (7 to 15 percent slopes) (KnsC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small, moderately steep areas. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:66)

Keawakapu extremely stony silty clay loam (3 to 25 percent slopes) (KNXD) soils are described as follows:

> This soil is low on uplands. Included in mapping were small areas of Kama'ole and Oanapuka soils.
>
> In a representative profile the surface layer, about 2 inches thick, is dark reddish-brown extremely stony silt loam that has platy structure. The subsoil, about 16 inches thick, is dark reddish-brown silty clay loam and silty clay that has prismatic and subangular blocky structure. The substratum is fragmental 'A'ā lava that has a little soil material in the voids. The soil is neutral in the surface layer and subsoil.

> Permeability is moderate. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1.5 inches per foot of soil. In places roots penetrate to a depth of 30 inches. (Foote et al. 1972:68)

Kula cobbly loam (12 to 20 percent slopes) (KxaD) soils are described as follows:

> This soil is on intermediate uplands. Included in mapping were small areas of Kaipoioi and Kamaole soils. Also included were small areas of gently sloping soils.
>
> In a representative profile, the surface layer is dark reddish-brown loam about 8 inches thick. The subsoil, about 46 inches thick, is dark reddish-brown loam, silt loam, and silty clay loam that has subangular blocky structure. The substratum is slightly weathered basic igneous rock. The soil is slightly acid in the surface layer and slightly acid to neutral in the subsoil.
>
> Permeability is moderately rapid. Runoff is medium, and the erosion hazard is moderate. The available water capacity is about 1.8 inches per foot of soil. In places roots penetrate to rock.
>
> This soil is used for pasture. Small areas are used for truck and orchard crops. Most of the cobblestones have been removed in areas where truck crops are grown. (Foote et al. 1972:78)

Kula loam (4 to 12 percent slopes) (KxC) soils are described as follows:

> This soil has a profile like that of Kula cobbly loam (12 to 20 percent slopes), except that it is nearly free of cobblestones. This soil is used for truck crops and pasture. (Foote et al. 1972:78)

Kula loam (12 to 20 percent slopes) (KxD) soils are described as follows:

> This soil has a profile like that of Kula cobbly loam (12 to 20 percent slopes), except that it is nearly free of cobblestones. Included in mapping were small, stony areas and a few rock outcrops, mainly on knolls and the sides of small gulches. This soil is used for pasture and truck crops. (Foote et al. 1972:78)

Kula loam (12 to 40 percent slopes) (KxbE) soils are described as follows:

> This soil has a profile like that of Kula cobbly loam (12 to 20 percent slopes), except that rock outcrops cover 10 to 25 percent of the surface. Runoff is medium, and the erosion hazard is moderate. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:78)

Laumaia loam (7 to 40 percent slopes) (LME) soils are described as follows:

> This soil is on complex, high mountain slopes. Included in mapping were small areas of Kaipoioi and Uma soils. Also included were small areas of eroded, extremely stony soils and rock outcrops.
>
> In a representative profile, the surface layer is very dark brown or black loam about 9 inches thick. The subsoil, about 33 inches thick, is very dark brown silty clay loam and silt loam that has subangular blocky structure or is massive. The substratum consists of hard, cemented layers of volcanic ash and cinders interbedded with loamy soil material. The soil is mildly alkaline in the surface layer and neutral to medium acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. In places roots penetrate to a depth of 3 feet or more. (Foote et al. 1972:80)

Lava flows, Aa(rLW) soils are described as follows:

> Lava flows, Aa consists of areas of geologically recent lava flows on the island of Maui. The flows are a mass of clinker, hard, glassy, sharp pieces of lava on rough to undulating topography. The areas are difficult to traverse. Elevations range from nearly sea level to 8,000 feet. The annual rainfall amounts to 20 to 75 inches.
>
> This miscellaneous land type is used for water supply, wildlife habitat, and recreation. Vegetation is limited to lichens, a few grasses, herbs, shrubs, and scrubby trees. (Foote et al. 1972:80)

Makawao silty clay (3 to 7 percent slopes) (MfB) soils are described as follows:

> This soil is on smooth side slopes and intermediate slopes in the uplands. Included in mapping were small areas of Haiku and Kailua soils.
>
> In a representative profile, the surface layer is dark reddish-brown silty clay about 9 inches thick. The subsoil, about 30 inches thick, is dark reddish-brown silty clay that has subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is strongly acid to medium acid in the surface layer and slightly acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow, and the erosion hazard slight. In places roots penetrate to a depth of 5 feet or more. (Foote et al. 1972:89)

Oanapuka very stony silt loam (7 to 25 percent slopes) (OAD) soils are described as follows:

> This soil is on the lower uplands. Included in mapping were small areas of 'Io and Makena soils.

> In a representative profile the surface layer, about 6 inches thick, is very dark brown and very dark grayish brown silt loam that has granular and subangular blocky structure. The subsoil, about 9 inches thick, is very dark grayish-brown silt loam that has prismatic structure. The substratum is dark yellowish-brown silt loam, loam, and stone-size 'A'ā lava. The soil is medium acid to slightly acid in the surface layer, neutral in the subsoil, and neutral to mildly alkaline in the substratum.
>
> Permeability is moderately rapid. Runoff is low, and the erosion hazard is slight to moderate. The available water capacity is about 1.0 inch per foot of soil. In places roots penetrate to a depth of 4 feet or more. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:101)

Oanapuka extremely stony silt loam (7 to 25 percent slopes) (OED) soils are described as follows:

> This soil is similar to Oanapuka very stony silt loam (7 to 25 percent slopes) except that stones cover 3 to 15 percent of the surface area. Included in mapping were small areas of rock outcrop. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:101)

Olinda loam (4 to 12 percent slopes) (ONC) soils are described as follows:

> On this soil, runoff is slow and the erosion hazard is slight. Included in mapping were small, eroded spots. This soil is used for truck crops and pasture. Small acreages are used for orchards. (Foote et al. 1972:103)

Olinda loam (12 to 20 percent slopes) (OND) soils are described as follows:

> This soil is on smooth, intermediate to high mountain slopes. Included in mapping were small areas of Kaipoioi and Pane soils. In a few places small, eroded spots were included.
>
> In a representative profile, the surface layer is dark reddish-brown loam about 6 inches thick. The subsoil, about 5 inches thick, is dark reddish-brown and yellowish-red silty clay loam that has subangular blocky structure. Below this is yellowish-red and reddish-brown silty clay loam and gravelly silty clay loam. This is underlain by slightly weathered basic igneous rock. The soil is slightly acid in the surface layer and subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 2.4 inches per foot in the surface layer and about 1.6 inches per foot in the subsoil. In places roots penetrate to a depth of 3 feet or more. (Foote et al. 1972:103)

Olinda loam (20 to 40 percent slopes) (ONE) soils are described as follows:

> This soil is subject to frequent fog and cloud cover. Small gullies are common. Runoff is medium to rapid, and the erosion hazard is moderate to severe. Included in mapping were small areas of rock outcrop and small, eroded spots. This soil is used for pasture. (Foote et al. 1972:104)

Paia silty clay (3 to 7 percent slopes) (PcB) soils are described as follows:

> This soil is on uplands. Included in mapping were small areas of Haliimaile and Molokai soils. Also included were small, nearly level areas.
>
> In a representative profile, the surface layer is dark reddish-brown silty clay and clay about 19 inches thick. The subsoil, about 41 inches thick, is dark reddish-brown clay that has angular and subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is mildly alkaline in the surface layer and subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot in the surface layer and about 1.6 inches per foot in the subsoil. In places roots penetrate to a depth of 4 feet or more. This soil is used for sugarcane. Small acreages are used for homesites. (Foote et al. 1972:107)

Paia silty clay (7 to 15 percent slopes) (PcC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small, moderately steep areas. This soil is used for sugarcane. (Foote et al. 1972:107)

Pane silt loam (7 to 25 percent slopes) (PXD) soils are described as follows:

> This soil is on rough side slopes and intermediate slopes in the uplands. Included in mapping were small areas of Haliimaile and Kaipoioi soils. Also included were small areas of moderately shallow soils and soils that have a gravelly surface layer. In addition, small areas where the topography is undulating were included.
>
> In a representative profile, the surface layer is dark reddish-brown silt loam about 8 inches thick. The subsoil, about 49 inches thick, is dark reddish-brown, reddish-brown, and dark-brown silt loam and loam that has prismatic and subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is slightly acid in the surface layer and neutral in subsoil.
>
> Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 1.8 inches per foot in the surface layer and subsoil. (Foote et al. 1972:111)

Pauwela clay (3 to 7 slopes) (PfB) soils are described as follows:

> This soil is on smooth uplands. Included in mapping were small areas of Haiku and Kailua soils.
>
> In a representative profile, the surface layer is dark grayish-brown clay about 12 inches thick. The subsoil, about 21 inches thick, is dark reddish-brown clay that has angular blocky and subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is very strongly acid to extremely acid in the surface layer and subsoil.
>
> Permeability is moderately rapid. Runoff is low, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. In places roots penetrate to a depth of 3 feet or more. This soil is used for pasture and water supply. Small acreages are used for pineapple and woodland. (Foote et al. 1972:111)

Pauwela clay (7 to 15 percent slopes) (PfC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is light to moderate. This soil is used for pasture and water supply. Small acreages are used for woodland. (Foote et al. 1972:112)

Pauwela clay (15 to 25 percent slopes) (PfD) soils are described as follows:

> On this soil, runoff is medium and the erosion hazard is moderate. Included in mapping were areas that are steep and moderately eroded. This soil is used for pasture and woodland. (Foote et al. 1972:112)

Rock land (rRK) soils are described as follows:

> Rock land is made up of areas where exposed rock covers 25 to 90 percent of the surface. It occurs on all five islands. The rock outcrops and very shallow soils are the main characteristics. The rock outcrops are mainly basalt and andesite. This land type is nearly level to very steep. Elevations range from nearly sea level to more than 6,000 feet. The annual rainfall amounts to 15 to 16 inches.
>
> Rock land is used for pasture, wildlife habitat, and water supply. The natural vegetation at the lower elevations consists mainly of kiawe, klu, piligrass, Japanese tea, and koa haole. Lantana, guava, Natal redtop, and molasses grass are dominant at the higher elevations. This land type is also used for urban development. In many areas, especially on the island of O'ahu, the soil material associated with the rock outcrops is very sticky and very plastic. It also has high shrink-swell potential. Buildings on the steep slopes are susceptible to sliding when the soil is saturated. Foundations and retaining walls are susceptible to cracking. (Foote et al. 1972:119)

Rough broken land (rRR) is described as follows:

> Rough broken land (rRR) consists of very steep land broken by numerous intermittent drainage channels. In most places, it is not stony. It occurs in gulches and on mountainsides on all the Islands except O'ahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches.
>
> These soils are variable. They are 20 to more than 60 inches deep over soft, weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common. Included in mapping were areas of colluvium and alluvium along gulch bottoms.
>
> This land type is used primarily for watershed and wildlife habitat. In places, it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, natal redtop, Bermuda grass, koa haole, and molasses grass. 'Ōhi'a, kukui, koa, and ferns are dominant in the wetter areas. Puakeawe, 'a'ali'i, and sweet vernal grass are common at the higher elevations. (Capability classification VIIe, nonirrigated). (Foote et al. 1972:119)

Rough broken and stony land (rRS) soils are described as follows:

> This type of soil consists of very steep, stony gulches. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. Elevations range from nearly sea level to 3,000 feet. The annual rainfall amounts to 20 to 40 inches.
>
> The soil material is generally less than 20 inches deep over saprolite or bedrock. About 3 to 25 percent of the surface is covered with stones, and there are a few rock outcrops. Included in mapping were small areas of colluvium and alluvium along the bottoms of gulches.
>
> This land type is used for pasture, wildlife habitat, and watershed. The dominant natural vegetation consists of lantana, koa, haole, klu, feather fingergrass, Bermuda grass, and 'ilima. (Foote et al. 1972:119)

Ulupalakua silt loam (7 to 25 percent slopes) (ULD) soils are described as follows:

> This soil is on smooth intermediate mountain slopes. Included in mapping were small areas of 'Io and Kaipoioi soils. Also included were small, very steep areas.
>
> In a representative profile the surface layer is very dark brown silt loam about 9 inches thick. The subsoil, about 24 inches thick, is dark reddish-brown silt loam and clay loam that has subangular blocky structure. The substratum is black, unweathered cinders. The soil is slightly acid in the surface layer and neutral to mildly alkaline in the subsoil.

> Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. In places roots penetrate to a depth of 3 feet or more. (Foote et al. 1972:122)

Uma loamy coarse sand (15 to 40 percent slopes) (UME) soils are described as follows:

> This soil is on smooth, intermediate mountain slopes. Included in mapping were small areas of Puʻu Pa and Ulupalakua soils. Also included were a few cinder cones and small areas of rock outcrop.
>
> In a representative profile, the surface layer, about 6 inches thick, is black loamy coarse sand that has granular structure. The substratum is black, unweathered cinders, 3 to 10 millimeters in size. The soil is mildly alkaline in the surface layer.
>
> Permeability is very rapid. Runoff is slow, and the erosion hazard is slight to moderate. In places, roots penetrate to a depth of about 1 foot. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:123)

Uma loamy coarse sand (40 to 70 percent slopes) (UMF) soils are described as follows:

> This soil is similar to Uma loamy coarse sand (15 to 40 percent slopes), except for the slope. The erosion hazard is severe. Included in mapping were small areas of outcrop and cinder cones. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:123)

Uma rocky loamy coarse sand (7 to 25 percent slopes) (URD) soils are described as follows:

> This soil is similar to Uma loamy coarse sand (15 to 40 percent slopes) except that rock outcrops cover 5 to 10 percent of the surface. Runoff is medium, and the erosion hazard is moderate. Included in mapping were small areas where there are few to many stones on the surface and in the profile. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:123)

Very stony land (rVS) soils are described as follows:

> This land type occurs on Maui, Molokaʻi, and Lānaʻi ~~Lanaʻi~~. The slope ranges from 7 to 30 percent. Included in mapping were very steep gulches.
>
> On Maui, this land type consists of young ʻAʻā lava that has a thin covering of volcanic ash that locally extends deep into cracks and depressions. It occurs as large areas, mainly on the upper slopes of Haleakalā at elevations between 4,000 and 9,000 feet. The annual rainfall amounts to 30 to 40 inches. The ash-covered areas support a stand of shrubs and grasses. Puakeawe, Yorkshire foggrass, and orchard grass are common at the higher elevations. Lantana, kiawe, Natal redtop, and pitted beardgrass are common at the lower elevations. This land type is used for pasture and wildlife habitat. Pasture improvement is very difficult because of the many stones. (Foote et al. 1972:124)

Waiakoa silty clay loam (3 to 7 percent slopes) (WeB) soils are described as follows:

> This soil has a profile like that of Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that it is nonstony. Included in mapping were small, nearly level areas. This soil is used for sugarcane. Small acreages are used for pasture and homesites. (Foote et al. 1972:127)

Waiakoa very stony silty clay loam (3 to 7 percent slopes) (WgB) soils are described as follows:

> This soil is on smooth, low uplands. Included in mapping were small areas of Keahua and Keawakapu soils. Also included were small, nearly level areas.
>
> In a representative profile the surface layer is dark reddish-brown silty clay loam about 2 inches thick. The subsoil, about 23 inches thick, is dark reddish-brown and very dark grayish-brown silty clay loam that has prismatic structure or is massive. The substratum is very dark brown silty clay loam and hard, basic igneous rock. The soil is neutral in the surface layer and slightly acid to neutral in the subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.5 inches per foot of soil. In places roots penetrate to bedrock. This soil is used for sugarcane, pasture, and wildlife habitat. (Foote et al. 1972:126)

Waiakoa very stony silty clay loam (7 to 15 percent slopes) (WgC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:127)

Waiakoa extremely stony silty clay loam (7 to 15 percent slopes) (WhC) soils are described as follows:

> This soil is similar to Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that stones cover 3 to 15 percent of the surface. Runoff is slow to medium, and the erosion hazard is slight to moderate. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:127)

Waiakoa extremely stony silty clay loam (3 to 25 percent slopes) (WlD2)

> This soil is similar to Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that it is eroded and stones cover 3 to 15 percent of the surface. In most areas about 50 percent of the surface layer has been removed by erosion. Runoff is medium, and the erosion hazard is severe. Included in mapping were small, steep areas. Also included were a few cinder cones. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:127)

Water (W) soils are described as follows:

> Soils are labeled "W" when over 40 acres of land is 100 percent water.

According to the LSB Detailed Land Classification, Island of Maui (1967), much of Upcountry Maui has an overall productivity rating of C-Fair, which particularly dominates the lower elevation of the MDWS's ~~s~~ Upcountry Maui Water System Service Area ~~service area~~ around Haʻikū (See Figure 4-12). Areas mauka of Makawao - Pukalani have ratings of B-Good, as do pockets of land flanking the Kula Highway down to ʻUlupalakua Ranch. Some areas west and southwest of Pukalani are rated A-Excellent, including much of the proposed KAP expansion, which were formerly in sugar cultivation.

According to the ALISH map, most of Upcountry Maui above the approximately 1,000-foot msl elevation is classified Other Land (See Figure 4-13). Areas around Makawao - Pukalani are classified Prime Lands, as are lands in the lower portion of MDWS's Upcountry Maui Water System Service Area ~~service area~~ around Haʻikū.

Impacts and Mitigation Measures

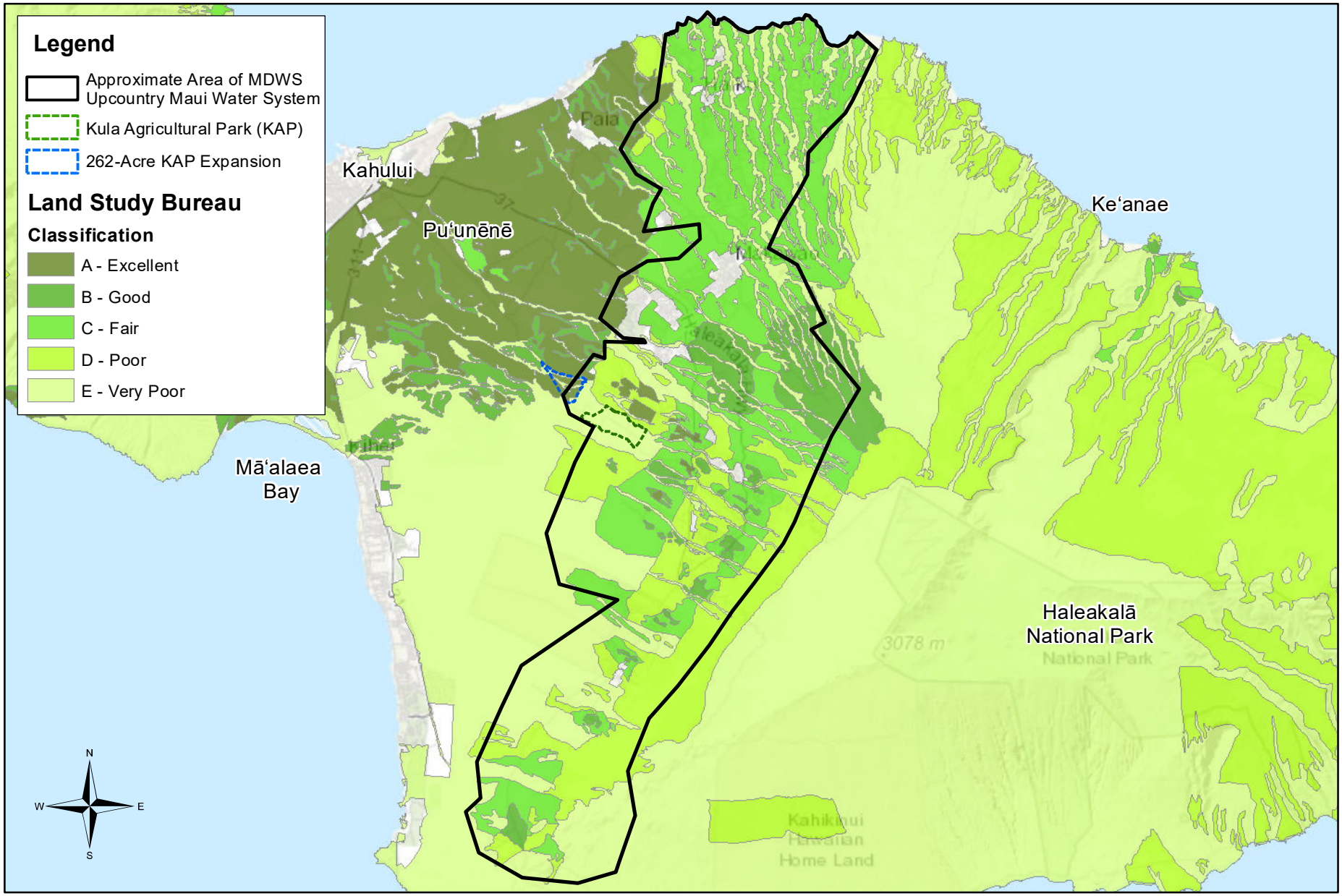
The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the ~~system~~ EMI Aqueduct System for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on soils in the Upcountry Maui region are anticipated. There may be some beneficial alteration to soils in Upcountry Maui as more currently fallow former sugarcane fields will be put into productive agricultural uses at the County's planned 262-acre expansion to KAP, and the continued supply of irrigation water to the County's existing KAP would maintain status quo or potentially allow for greater improvements to the soils at KAP.

Central Maui

According to the USDA (2001) SSURGO database and soil survey data gathered by Foote et al. (1972), soils in Central Maui include ʻAlae loam series (0 to 3 percent slopes), Haiku silty clay series (3 to 15 percent slopes), Hamakuapoko silty clay series (3 to 25 percent slopes), Haliimaile silty clay series (3 to 15 percent slopes) Kaipoioi loam series (7 to 40 percent slopes) Keahua silty clay loam series (3 to 25 percent slopes), Molokai silty clay series (0 to 15 percent slopes), Paia silty clay series (7 to 15 percent slopes), and Pulehu series (0 to 7 percent slopes) and water > 40 acres (W) (See Figure 4-14).

Alae cobbly sandy loam (0 to 3 percent slopes) (AcA) soils are described as follows:

> This soil occurs on smooth alluvial fans. Included in mapping were small areas of Ewa and Pulehu soils. In a representative profile, the surface layer, about 7 inches thick, is very dark grayish-brown sandy loam and coarse and very coarse sand.



0 10,000 20,000 40,000 Feet

0 1 2 4 6 Miles

1 inch = 20,000 feet

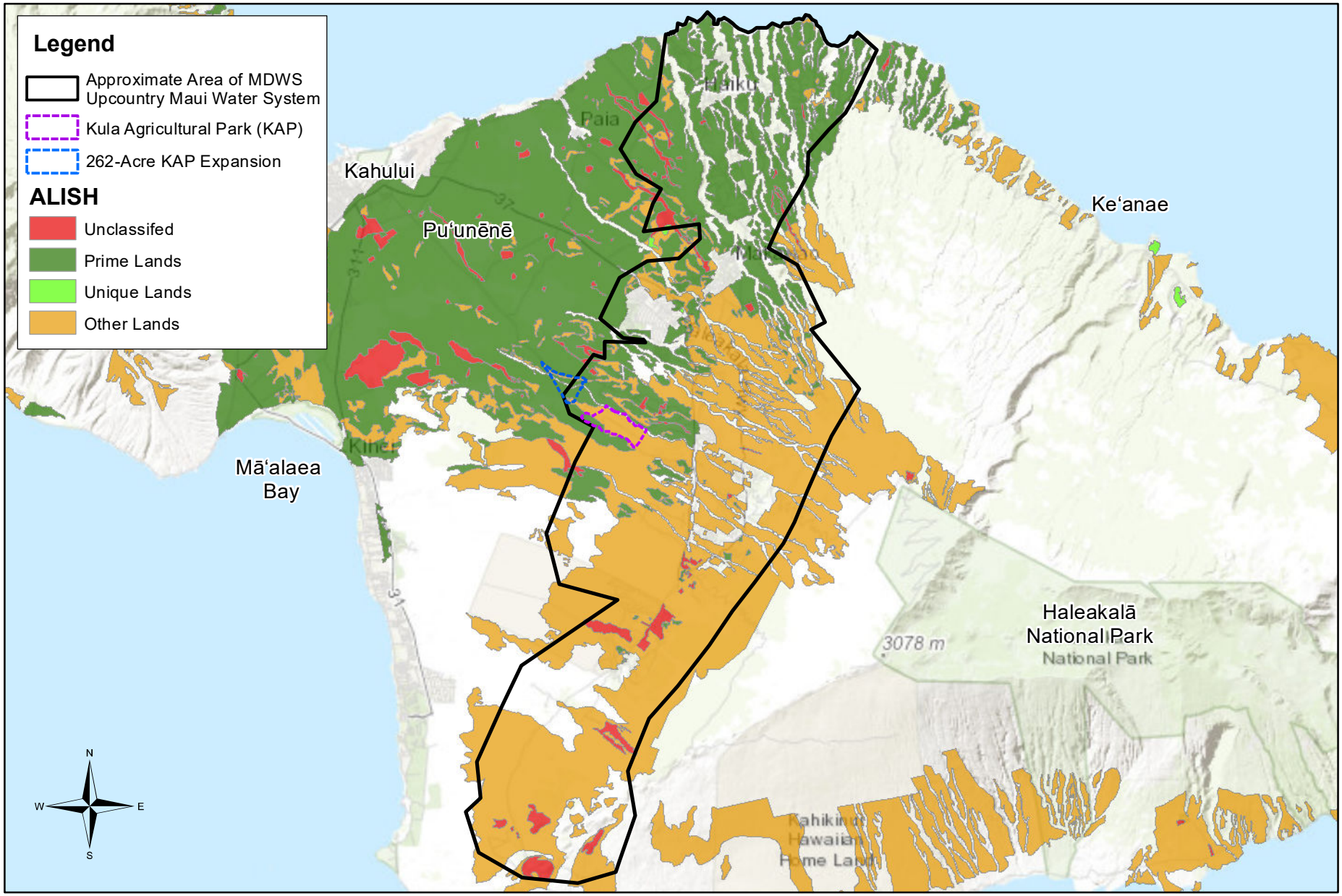
Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-12

UPCOUNTRY MAUI LSB MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas



0 10,000 20,000 40,000 Feet

0 1 2 4 6 Miles

1 inch = 20,000 feet

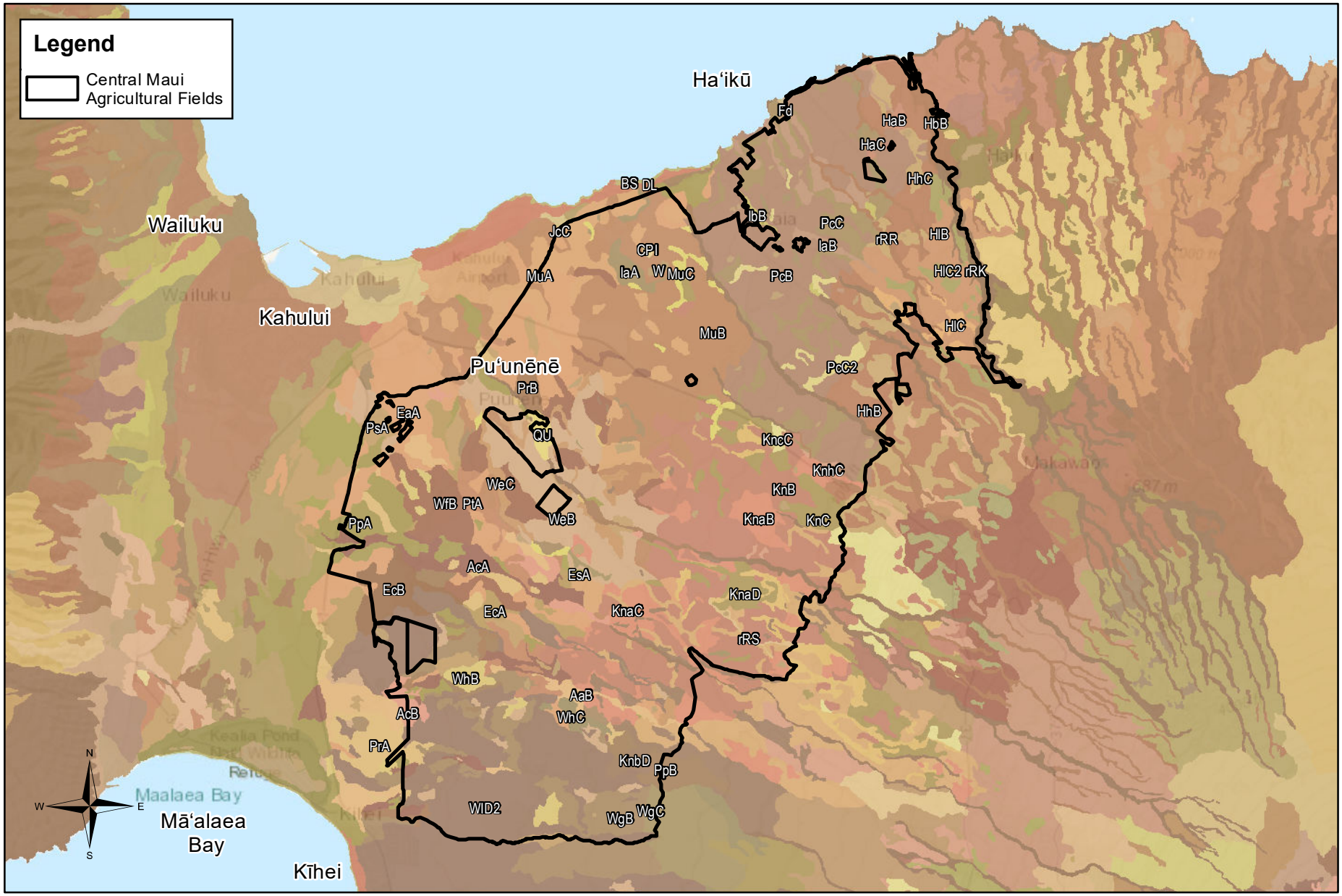
Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-13

UPCOUNTRY MAUI ALISH MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas



1 inch = 11,000 feet

Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-14

CENTRAL MAUI SOILS MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

> The soil is neutral or mildly alkaline in the surface layer and mildly to moderately alkaline in the substratum. Permeability is rapid. Runoff is slow, and the erosion hazard is no more than slight. The available water capacity is about 1.2 inches per foot in the surface layer and 0.9 inch per foot in the substratum. In some places roots penetrate to a depth of 4 feet or more. (Foote et al. 1972:14; 25)

Alae cobbly sandy loam (3 to 7 percent slopes) (AcB) soils are described as follows:

> On this soil, runoff is slow and the erosion hazard is slight. This soil is used for sugarcane and pasture. (Foote et al. 1972:26)

Alae sandy loam (3 to 7 percent slopes) (AaB) soils are described as follows:

> This soil is similar to Alae cobbly sandy loam (0 to 3 percent slopes), except that there are no cobblestones on the surface. Runoff is slow, and the erosion hazard is slight. Included in mapping were small, nearly level areas. In places there are few to many pebble-size rock fragments in the surface layer. Most of this soils is used for sugarcane and pasture. A small acreage is used for truck crops. (Foote et al. 1972:26)

Beaches (BS) soils are described as follows:

> Beaches occur as sandy, gravelly, or cobbly areas on all the islands in the survey area. They are washed and rewashed by ocean waves. The beaches consist mainly of light-colored sands derived from coral and seashells. A few of the beaches, however, are dark colored because their sands are from basalt and andesite.
>
> Beaches have no value for farming. Where accessible and free of cobblestones and stones, they are highly suitable for recreational uses and resort development. (Foote et al. 1972:28)

Cinder pit (CPI) or cinder land (rCl) soils are described as follows:

> Cinder land consists of areas of bedded magmatic ejecta associated with cinder cones. It is a mixture of cinders, pumice, and ash. These materials are black, red, yellow, brown, or variegated in color. They have jagged edges and a glassy appearance and show little or no evidence of soil development.
>
> Cinder land occurs on the islands of Maui and O'ahu. On Maui, it is mainly at elevations between 8,000 and 10,000 feet, in the Haleakalā National Park. The annual rainfall amounts to 20 to 30 inches on Maui.
>
> Although Cinder land commonly supports some vegetation, it has no value for grazing, because of its loose nature and poor trafficability. It is used for wildlife habitat and recreational areas. (Foote et al. 1972:29)

Dune land (DL) soils are described as follows:

> Dune land consists of hills and ridges of sand-size particles drifted and piled by wind. The hills and ridges are actively shifting or are so recently fixed or stabilized that no soil horizons have developed. The sand is dominantly from coral and seashells. This miscellaneous land type occurs in coastal areas on the islands of Maui and Kaua'i. Elevations range from nearly sea level to 150 feet. The annual rainfall amounts to 15 to 90 inches.
>
> This land type is used for wildlife habitat and recreational areas and as a source of liming material. Vegetation is sparse, but ironwood trees, koa haole, tropical almond, kiawe, and mixed grasses have gained a foothold in places. (Foote et al. 1972:29)

Ewa cobbly silty clay loam (0 to 3 percent slopes) (EcA) soils are described as follows:

> This soil has a profile like that of Ewa silty clay loam (3 to 6 percent slopes), except that it is cobbly on the surface. Runoff is very slow, and the erosion hazard is no more than slight. Most of this soil is used for sugarcane. A small acreage is used for pasture. (Foote et al. 1972:30)

Ewa cobbly silty clay loam (3 to 7 percent slopes) (EcB) soils are described as follows:

> This soil has a profile like that of Ewa silty clay loam (3 to 6 percent slopes), except that it is cobbly on the surface. Included in mapping were a few small, stony areas. Most of this soil is used for sugarcane. A small acreage is used for pasture. (Foote et al. 1972:30)

Ewa cobbly silty clay loam (0 to 3 percent slopes) (EsA) soils are described as follows:

> This soil has a profile like that of Ewa silty clay loam (3 to 6 percent slopes), except for the texture of the surface layer. Runoff is very slow, and the erosion hazard is no more than slight. This soil is used for sugarcane. (Foote et al. 1972:30)

Fill land (Fd) soils are described as follows:

> This land type consists mostly of areas filled with bagasse and slurry from sugar mills. A few areas are filled with material from dredging and from soil excavations. Generally, these materials are dumped and spread over marshes, low-lying areas along the coastal flats, coral sand, coral limestone, or areas shallow to bedrock. (Foote et al. 1972:31)

Haiku silty clay (3 to 7 percent slopes) (HaB) soils are described as follows:

> This soil has a profile like that of Haiku clay, 7 to 15 percent slopes, except for the texture of the surface layer. It is a dark brown clay about 14 inches thick.

> The subsoil, about 31 inches thick, is yellowish-red, dark reddish-brown, and dark-red clay or silty clay that has angular and angular blocky structure. The substratum is soft, weathered, basic igneous rock. The soil is very strongly acid in the surface layer and extremely acid and very strongly acid in the subsoil and substratum. Runoff is slow, and the erosion hazard is slight. Included in mapping were small, nearly level areas. This soil is used for pineapple and homesites. (Foote et al. 1972:32)

Haiku silty clay (7 to 15 percent slopes) (HaC) soils are described as follows:

> This soil has a profile like that of Haiku clay, 7 to 15 percent slopes, except for the texture of the surface layer. It is a dark brown clay about 14 inches thick. The subsoil, about 31 inches thick, is yellowish-red, dark reddish-brown, and dark-red clay or silty clay that has angular and angular blocky structure. The substratum is soft, weathered, basic igneous rock. The soil is very strongly acid in the surface layer and extremely acid and very strongly acid in the subsoil and substratum. This soil is used for pineapple. (Foote et al. 1972:32)

Haiku clay (3 to 7 percent slopes) (HbB) soils are described as follows:

> On this soil, runoff is slow and the erosion hazard is slight. Included in mapping were small, nearly level areas. This soil is used for pineapple, pasture, and homesites. (Foote et al. 1972:32)

Hamakuapoko silty clay (3 to 7 percent slopes) (HlB) soils are described as follows:

> This soil is on smooth slopes in the uplands. Included in mapping were small areas of Haiku and Haliimaile soils. Also included were small, moderately steep areas.
>
> In a representative profile, the surface layer is dark-brown silty clay about 16 inches thick. The subsoil, about 35 inches thick, is dark-brown and very dark grayish brown silty clay that has subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is extremely acid in the surface layer and strongly acid or very strongly acid in the subsoil.
>
> Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.2 inches per foot in the surface layer and 1.5 inches per foot in the subsoil. In places roots penetrate to a depth of 4 feet or more. (Foote et al. 1972:36)

Hamakuapoko silty clay (7 to 15 percent slopes) (HlC) soils are described as follows:

> On this soil, runoff is medium and the erosion hazard is moderate. Most of this soil is used for pineapple. A small acreage is used for pasture and homesites. (Foote et al. 1972:36)

Hamakuapoko silty clay (7 to 25 percent slopes, eroded) (HlC2) soils are described as follows:

> This soil has a profile like that of Hamakuapoko silty clay (3 to 7 percent slopes), except that it is eroded. In most places about 50 percent of the original surface layer has been removed by erosion. In a few places all of the surface layer and part of the subsoil have been lost. Runoff is medium to rapid, and the erosion hazard is severe. This soil is used for pineapple. (Foote et al. 1972:36)

Haliimaile silty clay (3 to 7 percent slopes) (HhB) soils are described as follows:

> This soil is on smooth uplands. Included in mapping were small areas of Keahua and Paia soils. In a representative profile, the surface layer is dark reddish-brown silty clay about 15 inches thick. The subsoil, to a depth of more than 60 inches, is dark reddish-brown silty clay and very dark grayish-brown clay. It has subangular blocky and angular blocky structure. The substratum is silt, weathered basic igneous rock. The soil is strongly acid in the surface layer and strongly acid to medium acid in the subsoil. Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.6 inches per foot in the surface layer and about 1.2 inches per foot in the subsoil. In places, roots penetrate to a depth of 5 feet or more. (Foote et al. 1972:35)

Haliimaile silty clay (7 to 15 percent slopes) (HhC) soils are described as follows:

> On this soil, runoff is medium and the erosion hazard is moderate. Included in mapping were small, cobbly areas and small, moderately steep areas. This soil is used for sugarcane, pineapple, and homesites. (Foote et al. 1972:36)

Iao silty clay (0 to 3 percent slopes) (IaA) soils are described as follows:

> On this soil, runoff is slow and the erosion hazard is no more than slight. This soil is used for sugarcane. (Foote et al. 1972:46-47)

Iao silty clay (3 to 7 percent slopes) (IaB) soils are described as follows:

> This soil has a profile like that of Iao clay (3 to 7 percent slopes), except for the texture of the surface layer. The subsoil, about 45 inches thick, is very dark brown, dark-brown, and very dark grayish-brown clay and silty clay. The substratum is clayey alluvium. The soil is neutral in the surface layer and subsoil. This soil is used for sugarcane. (Foote et al. 1972:47)

Iao cobbly silty clay (3 to 7 percent slopes) (IbB) soils are described as follows:

> This soil has a profile like that of Iao clay (3 to 7 percent slopes), except for the texture of the surface layer and the content of the cobblestones. The subsoil, about 45 inches thick, is very dark brown, dark-brown, and very dark grayish-brown clay and silty clay. The substratum is clayey alluvium. The soil is neutral

> in the surface layer and subsoil. This soil is used for sugarcane and homesites. (Foote et al. 1972:47)

Jaucas sand, saline (0 to 12 percent slopes) (JcC) soils are described as follows:

> This soil occurs near the ocean in areas where the water table is near the surface and salts have accumulated. It is somewhat poorly drained in depressions but excessively drained on knolls. In the depressions there is normally a layer of silty alluvial material flocculated by the high concentration of soluble salts. The water table is normally within a depth of 30 inches.
>
> This soil is used for pasture, wildlife habitat, and urban development. Vegetation on the salty soil in the depressions consists of salt-tolerant plants. Kiawe grows profusely on the better drained soils on knolls. (Foote et al. 1972:49)

Keahua silty clay loam (3 to 7 percent slopes) (KnB) soils are described as follows:

> This soil is on uplands. Included in mapping were small areas of Haliimaile and Molokai soils, and small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. Also included were small areas of silty clay and some areas that are nearly level.
>
> In a representative profile, the surface layer is dark reddish-brown silty clay loam about 10 inches thick. The subsoil, about 50 inches thick, is dark reddish-brown silty clay loam and very dark gray clay loam that has subangular blocky structure. The substratum is dominantly soft, weathered basic igneous rock. The soil is slightly acid in the surface layer and slightly acid to neutral in the subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. In places, roots penetrate to a depth of 4 feet or more. (Foote et al. 1972:65)

Keahua cobbly silty clay loam (3 to 7 percent slopes) (KnaB) soils are described as follows:

> This soil has a profile like that of Keahua silty clay loam (3 to 7 percent slopes), except that it is cobbly on the surface. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. Also included were small areas of silty clay. This soil is used for sugarcane. A few acres are used for truck crops. (Foote et al. 1972:66)

Keahua cobbly silty clay loam (7 to 15 percent slopes) (KnaC) soils are described as follows:

> On this soil, runoff is low to medium and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. This soil is used for sugarcane and pasture. A few acres are used for truck crops. (Foote et al. 1972:66)

Keahua cobbly silty clay loam (15 to 25 percent slopes) (KnaD) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is moderate. Included in mapping were small areas that are not cobbly. Also included were a few steep areas. This soil is used for sugarcane and pasture. (Foote et al. 1972:66)

Keahua very stony silty clay loam (7 to 25 percent slopes) (KnbD) soils are described as follows:

> This soil has a profile like that of Keahua silty clay loam (3 to 7 percent slopes), except that stones cover as much as 3 percent of the surface. Runoff is slow to medium, and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. In a few places tones cover 3 to 15 percent of the surface. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:66)

Keahua silty clay loam (7 to 15 percent slopes) (KnC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. This soil is used for sugarcane and pasture. Small acreages are used for pineapple and truck crops. (Foote et al. 1972:66)

Keahua silty clay (7 to 15 percent slopes) (KncC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered basic igneous rock. This soil is used for pineapple, pasture, and homesites. (Foote et al. 1972:66)

Keahua cobbly silty clay (7 to 15 percent slopes) (KnhC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small areas that are 20 to 40 inches deep over soft, weathered igneous rock. This soil is used for sugarcane and pasture. Small acreages are used for truck crops. (Foote et al. 1972:66)

Molokai silty clay loam (0 to 3 percent slopes) (MuA) soils are described as follows:

> The soil is on smooth slopes. In a representative profile the surface layer is dark reddish-brown silty clay loam about 15 inches thick. The subsoil, about 57 inches thick, is dark reddish-brown silty clay loam that has prismatic structure. The material at depths between 35 and 64 inches is moderately compact in place. The substratum is soft, weathered rock. The soil is slightly acid to neutral, except that areas used for pineapple are commonly very strongly acid or extremely acid in the surface layer.

> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. In places roots penetrate to a depth of 5 feet or more. This soil is used entirely for sugarcane on Maui. (Foote et al. 1972:96)

Molokai silty clay loam (3 to 7 percent slopes) (MuB) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were a few small areas that are eroded to soft, weathered rock. This soil is used for sugarcane, pineapple, pasture, wildlife habitat, and homesites. (Foote et al. 1972:96)

Molokai silty clay loam (7 to 15 percent slopes) (MuC) soils are described as follows:

> This soil occurs on knolls and sharp slope breaks. Runoff is medium, and the erosion hazard is moderate. This soil is used for sugarcane, pineapple, pasture, wildlife habitat, and homesites. (Foote et al. 1972:97)

Paia silty clay (3 to 7 percent slopes) (PcB) soils are described as follows:

> This soil is on uplands. Included in mapping were small areas of Haliimaile and Molokai soils. Also included were small, nearly level areas.
>
> In a representative profile, the surface layer is dark reddish-brown silty clay and clay about 19 inches thick. The subsoil, about 41 inches thick, is dark reddish-brown clay that has angular and subangular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is mildly alkaline in the surface layer and subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot in the surface layer and about 1.6 inches per foot in the subsoil. In places roots penetrate to a depth of 4 feet or more. This soil is used for sugarcane. Small acreages are used for homesites. (Foote et al. 1972:107)

Paia silty clay (7 to 15 percent slopes) (PcC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Included in mapping were small, moderately steep areas. This soil is used for sugarcane. (Foote et al. 1972:107)

Paia silty clay (7 to 15 percent slopes) (PcC2) soils are described as follows:

> This soil is similar to Paia silty clay (3 to 7 percent slopes), except that it is eroded. In most of the area, about 50 percent of the original surface layer has been lost. Runoff is medium, and the erosion hazard is moderate to severe. In places roots penetrate to a depth of 3 or 4 feet. This soil is used for sugarcane. (Foote et al. 1972:107)

Pulehu clay loam (0 to 3 percent slopes) (PsA) soils are described as follows:

> This soil is on alluvial fans and stream terraces and in basins. Included in mapping were small areas of 'Ewa, Mala, and Waiālua soils. Also included were small areas of gravelly, stony, and gently sloping soils.
>
> In a representative profile the surface layer is dark-brown clay loam about 21 inches thick. This is underlain by dark-brown, dark grayish-brown, and brown, massive and single grain, stratified loam, loamy sand, fine sandy loam, and silt loam about 39 inches thick. Below this is coarse, gravelly or sandy alluvium. The soil is neutral in the surface layer and neutral to mildly alkaline below the surface layer.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is no more than slight. The available water capacity is about 1.4 inches per foot in the surface layer and subsoil. In places roots penetrate to a depth of 5 feet or more. Low areas are subject to flooding. This soil is used for sugarcane, truck crops, and pasture. (Foote et al. 1972:115-116)

Pulehu silt loam (0 to 3 percent slopes) (PpA) soils are described as follows:

> This soil is similar to Pulehu clay loam (0 to 3 percent slopes), except that the texture is silt loam. This soil is used for sugarcane. Small acreages are used for homesites. (Foote et al. 1972:116)

Pulehu silt loam (3 to 7 percent slopes) (PpB) soils are described as follows:

> This soil is similar to Pulehu clay loam (0 to 3 percent slopes), except that the texture is silt loam. Runoff is slow, and the erosion hazard is slight. Included in mapping were small areas underlain by coral sand at a depth of 20 to 36 inches. This soil is used for sugarcane and pasture. (Foote et al. 1972:116)

Pulehu cobbly silt loam (0 to 3 percent slopes) (PrA) soils are described as follows:

> This soil is similar to Pulehu clay loam (0 to 3 percent slopes), except that the texture is silt loam and there are many cobblestones on the surface. In a few places cobblestones are common throughout the profile. Included in mapping were small areas underlain by coral sand at a depth of 20 to 36 inches. This soil is used for sugarcane and pasture. (Foote et al. 1972:116)

Pulehu cobbly silt loam (3 to 7 percent slopes) (PrB) soils are described as follows:

> This soil is similar to Pulehu clay loam (0 to 3 percent slopes), except that the texture is silt loam and the surface layer is cobbly. Runoff is slow, and the erosion hazard is slight. Included in mapping were small areas underlain by coral sand at a depth of 20 to 36 inches. This soil is used for sugarcane. Small areas are used for pasture. (Foote et al. 1972:116)

Pulehu cobbly clay loam (0 to 3 percent slopes) (PtA) soils can be described as follows:

> This soil is similar to Pulehu clay loam (0 to 3 percent slopes), except that it is cobbly. This soil is used for sugarcane. Small acreages are used for pasture. (Foote et al. 1972:116)

Quarry (QU) soils are described as follows:

> This soil type is made up of areas that are 100 percent quarry.

Rock land (rRK) soils are described as follows:

> Rock land is made up of areas where exposed rock covers 25 to 90 percent of the surface. It occurs on all five islands. The rock outcrops and very shallow soils are the main characteristics. The rock outcrops are mainly basalt and andesite. This land type is nearly level to very steep. Elevations range from nearly sea level to more than 6,000 feet. The annual rainfall amounts to 15 to 16 inches.
>
> Rock land is used for pasture, wildlife habitat, and water supply. The natural vegetation at the lower elevations consists mainly of kiawe, klu, piligrass, Japanese tea, and koa haole. Lantana, guava, Natal redtop, and molassesgrass are dominant at the higher elevations. This land type is also used for urban development. In many areas, especially on the island of O'ahu, the soil material associated with the rock outcrops is very sticky and very plastic. It also has high shrink-swell potential. Buildings on the steep slopes are susceptible to sliding when the soil is saturated. Foundations and retaining walls are susceptible to cracking. (Foote et al. 1972:119)

Rough broken land (rRR) is described as follows:

> Rough broken land (rRR) consists of very steep land broken by numerous intermittent drainage channels. In most places, it is not stony. It occurs in gulches and on mountainsides on all the Islands except O'ahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches.
>
> These soils are variable. They are 20 to more than 60 inches deep over soft, weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common. Included in mapping were areas of colluvium and alluvium along gulch bottoms.
>
> This land type is used primarily for watershed and wildlife habitat. In places, it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, natal redtop, Bermuda grass, koa haole, and molasses grass. 'Ōhi'a, kukui, koa, and ferns are dominant in the wetter

areas. Puakeawe, 'a'ali'i, and sweet vernal grass are common at the higher elevations. (Capability classification VIIe, nonirrigated). (Foote et al. 1972:119)

Rough broken and stony land (rRS) soils are described as follows:

This type of soil consists of very steep, stony gulches. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. Elevations range from nearly sea level to 3,000 feet. The annual rainfall amounts to 20 to 40 inches.

The soil material is generally less than 20 inches deep over saprolite or bedrock. About 3 to 25 percent of the surface is covered with stones, and there are a few rock outcrops. Included in mapping were small areas of colluvium and alluvium along the bottoms of gulches.

This land type is used for pasture, wildlife habitat, and watershed. The dominant natural vegetation consists of lantana, koa, haole, klu, feather fingergrass, Bermuda grass, and 'ilima. (Foote et al. 1972:119)

Waiakoa silty clay loam (3 to 7 percent slopes) (WeB) soils are described as follows:

This soil has a profile like that of Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that it is nonstony. Included in mapping were small, nearly level areas. This soil is used for sugarcane. Small acreages are used for pasture and homesites. (Foote et al. 1972:127)

Waiakoa cobbly silty clay loam (7 to 15 percent slopes) (WeC) soils are described as follows:

This soil has a profile like that of Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that it is nonstony. Runoff is slow to medium, and the erosion hazard is slight to moderate. Included in mapping were small, moderately steep areas and small areas where cobblestones are on the surface. This soil is used for sugarcane. (Foote et al. 1972:127)

Waiakoa cobbly silty clay loam (3 to 7 percent slopes) (WfB) soils is described as follows:

This soil is similar to Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that it is cobbly on the surface. This soil is used for sugarcane. (Foote et al. 1972:127)

Waiakoa very stony silty clay loam (3 to 7 percent slopes) (WgB) soils are described as follows:

This soil is on smooth, low uplands. Included in mapping were small areas of Keahua and Keawakapu soils. Also included were small, nearly level areas.

In a representative profile the surface layer is dark reddish-brown silty clay loam about 2 inches thick. The subsoil, about 23 inches thick, is dark reddish-brown and very dark grayish-brown silty clay loam that has prismatic structure or is

> massive. The substratum is very dark brown silty clay loam and hard, basic igneous rock. The soil is neutral in the surface layer and slightly acid to neutral in the subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.5 inches per foot of soil. In places roots penetrate to bedrock. This soil is used for sugarcane, pasture, and wildlife habitat. (Foote et al. 1972:126)

Waiakoa very stony silty clay loam (7 to 15 percent slopes) (WgC) soils are described as follows:

> On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:127)

Waiakoa extremely stony silty clay loam (3 to 7 percent slopes) (WhB) soils are described as follows:

> This soil is similar to Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that stones cover 3 to 15 percent of the surface. Included in mapping were small, nearly level areas.

Waiakoa extremely stony silty clay loam (7 to 15 percent slopes) (WhC) soils are described as follows:

> This soil is similar to Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that stones cover 3 to 15 percent of the surface. Runoff is slow to medium, and the erosion hazard is slight to moderate. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:127)

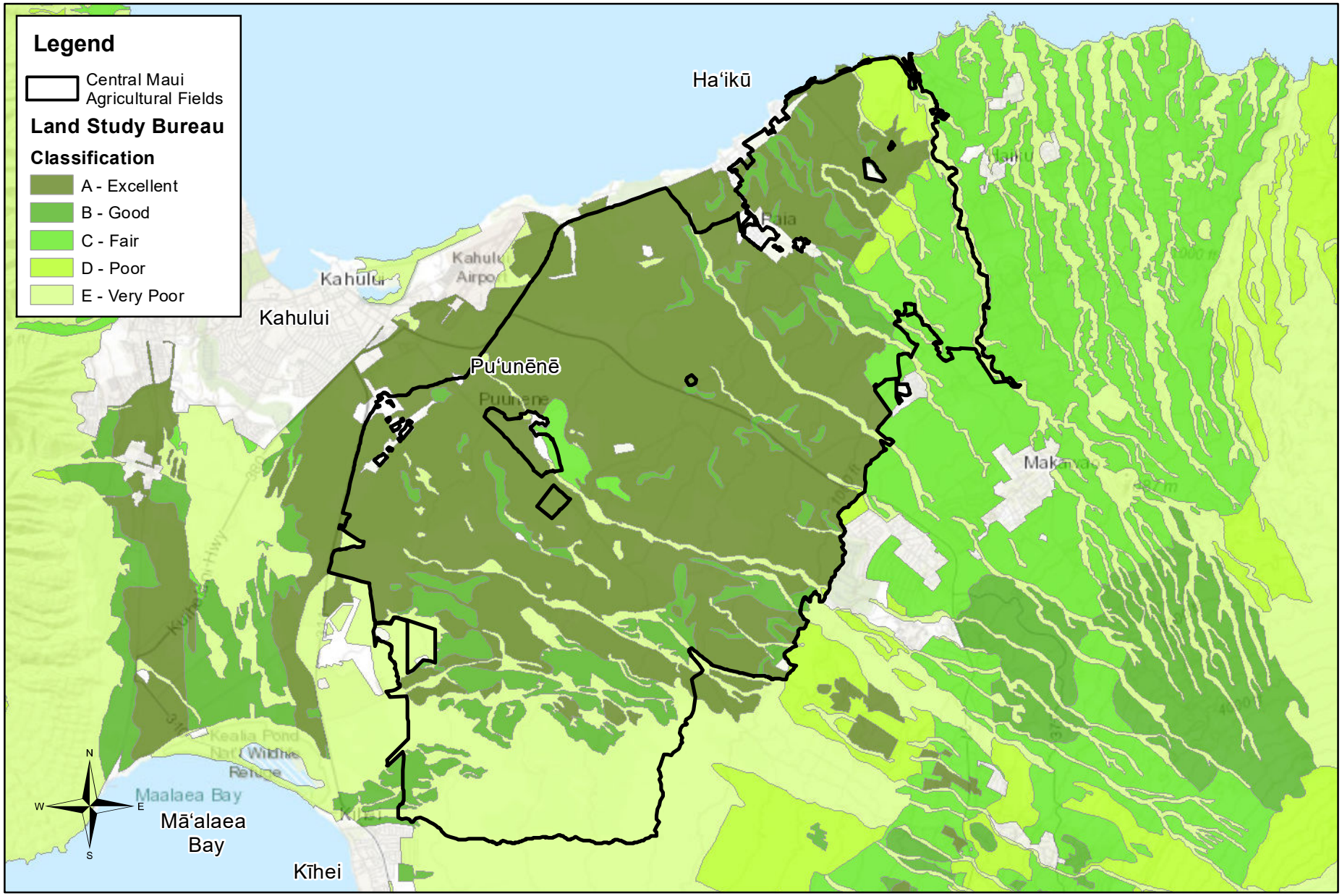
Waiakoa extremely stony silty clay loam (3 to 25 percent slopes) (WlD2)

> This soil is similar to Waiakoa very stony silty clay loam (3 to 7 percent slopes), except that it is eroded and stones cover 3 to 15 percent of the surface. In most areas about 50 percent of the surface layer has been removed by erosion. Runoff is medium, and the erosion hazard is severe. Included in mapping were small, steep areas. Also included were a few cinder cones. This soil is used for pasture and wildlife habitat. (Foote et al. 1972:127)

Water (W) soils are described as follows:

> Soils are labeled "W" when over 40 acres of land is 100 percent water.

According to the LSB Detailed Land Classification, Island of Maui (1967), the agricultural fields of Central Maui that were previously cultivated in sugarcane have an overall productivity rating of A-Excellent (See Figure 4-15).



0 5,000 10,000 20,000 Feet

0 0.5 1 2 3 Miles

1 inch = 11,000 feet

Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-15

CENTRAL MAUI LSB MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

The southern end of the Central Maui agricultural fields, which is at the farthest reach of the Central Maui Field Irrigation System ~~field irrigation system~~ is largely rated E-Very Poor with patches of B-Good. The northeastern end of the agricultural fields west of Māliko ~~Maliko~~ Gulch includes land rated C-Fair and D-Poor.

According to the ALISH map, the agricultural fields of Central Maui are predominantly classified Prime Land (See Figure 4-16).

Impacts and Mitigation Measures

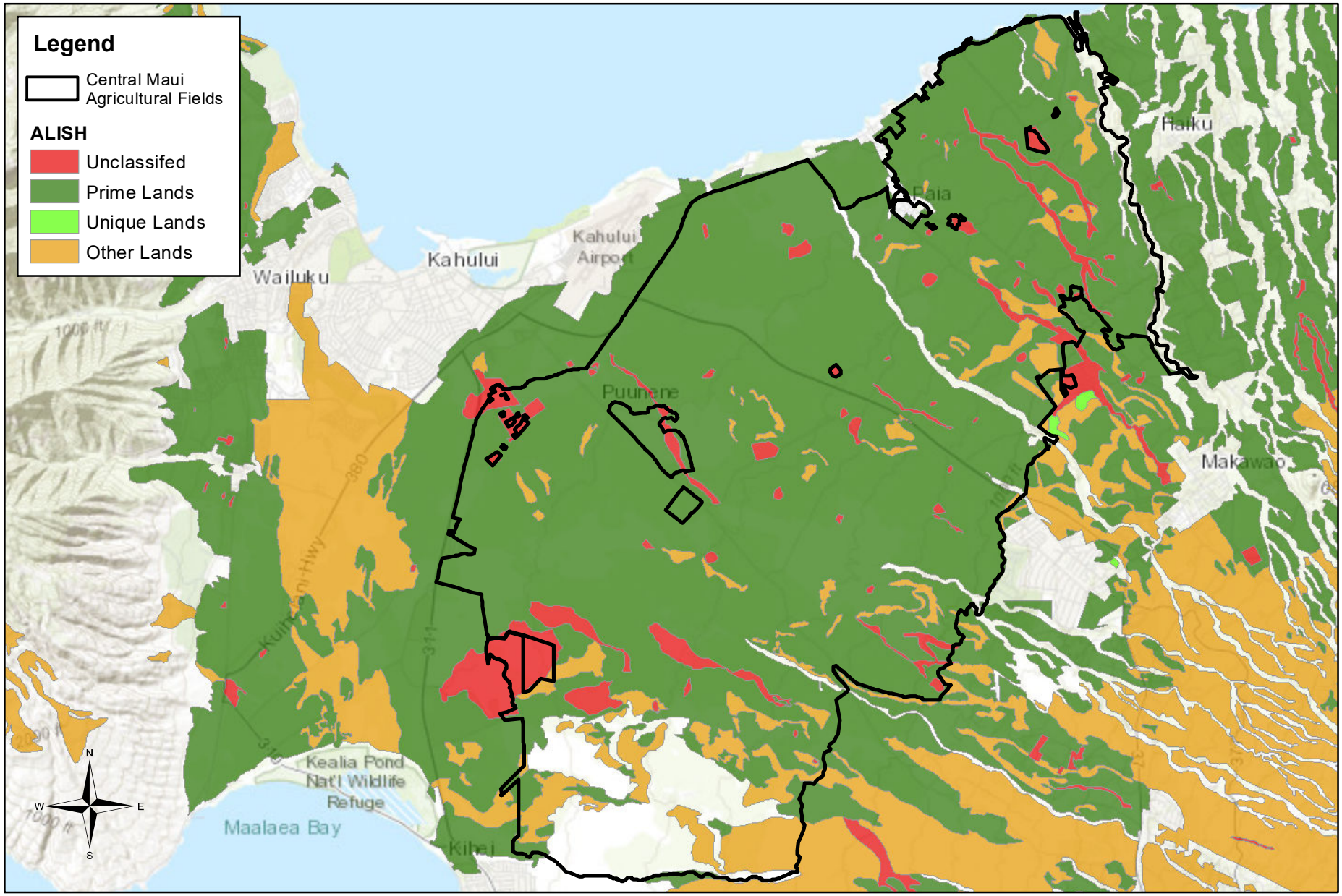
Under the Proposed Action, the agricultural fields in Central Maui will be converted to a diversified agricultural farming operation by Mahi Pono. The soils in Central Maui have already been disturbed from over a century of sugarcane cultivation in the region. Mahi Pono's diversified agricultural operation will include soil preparation to remove the remnants of sugarcane and other vegetation from the fields as needed. These preparations include the application of effective micronutrients, plastic removal, pH adjustments, and the application of organic matter. Soils will be gathered and replaced or moved into other field locations, as needed, and activities such as soil amendment will follow in preparation for planting.

Mahi Pono has also implemented several soil-beneficial water saving strategies for the Central Maui agricultural fields, including:

- Planting windbreaks in the fields.
- Incorporating significant uses of weed mat along plant lines, which will reduce evapotranspiration and erosion.
- Mowing rather than plowing inter-rows to preserve organic matter and keep cover to prevent soil erosion.
- Operating within the terms of a Conservation Plan from NRCS, which includes swales and diversions for erosion protection.
- Practicing rotational grazing of livestock.
- Planting permanent tree crops that will develop canopies that will assist with soil moisture retention and reduce evapotranspiration.

The overall topography will not be significantly modified and the configuration of the fields to prevent surface runoff and soil loss will be retained.

Mahi Pono proposes to construct approximately 319,000 square feet of building space related to its agricultural operations such as washing and packing areas, storage, etc. It is anticipated that the processing facilities will be located within a half-mile from the former HC&S Mill. All appropriate County grading and grubbing permits will be sought for such construction. The construction of these facilities will minimally disturb soils. If soil disturbance of one-acre or more for new construction is required, it would be subject to the National Pollutant Discharge Elimination System Permit for stormwater runoff. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in HAR Chapters 11-54 and 11-55 Water Pollution Control, DOH. Excavation and grading activities will be regulated by applicable provisions of the County's grading ordinance.



0 5,000 10,000 20,000 Feet

0 0.5 1 2 3 Miles

1 inch = 10,000 feet

Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-16

CENTRAL MAUI ALISH MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

4.2 Hydrology

4.2.1 Surface Waters

East Maui

Surface waters within East Maui are predominantly characterized by the various streams, which are generally fed by abundant rainfall and groundwater discharge, flowing through the numerous valleys within the watersheds that comprise the region. The drainage pattern of the stream valleys on East Maui is radial from the summit of Haleakalā Volcano to the ocean. The streams within the License Area located within East Maui drain to the north. Regional valley development is in a relatively youthful stage as streams are eroding downward into the original volcano slope, forming steep-sided valleys and leaving nearly un-eroded upland areas (planezes) between the stream valleys. Streamflow consists of direct runoff and base flows which represent ground-water discharge to the stream.

Issuance of the proposed Water Lease involves the diversion of "government-owned" waters from several East Maui streams situated within the License Area. As discussed in Section 2.1.4 in more detail, as of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd from these East Maui streams, which is far less than the historic diversion amounts or the amounts projected under the Proposed Action. To better understand the impact of the surface water diversion on native stream animals and their habitats, Trutta Environmental Solutions, LLC (Trutta) was contracted to develop a Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model to assess impacts on ~~33~~ the License Area streams/tributaries[1] associated with the Proposed Action ~~proposed Water Lease~~. (Trutta, Updated December 2020 ~~p. 11, 2019~~) (See Appendix A).

The HSHEP model was designed to quantify how various man-made changes affect native Hawaiian amphidromous stream animals, whether positive or negative, and is based on ~~statewide~~ Statewide observations of these animals' distribution and habitat. The HSHEP model considers the primary impacts of surface water diversion, which include loss of instream habitat from constriction or diversion of stream flow, creation of barriers to stream animal upstream movement and entrainment of downstream drifting larvae. (Trutta, Updated December 2020 ~~p. 11, 2019~~) While suitable habitat is fundamental for a species' persistence and is the focus of the HSHEP model, it is not the only factor that may affect species populations. Other factors such as pollution, disease, or competition with introduced species may also influence the observed distribution and densities of native animals. These factors, while important, were not

[1] Any reference to a stream or streams within Trutta's analysis (Appendix A) summarized in this EIS is intended to include related tributaries unless stated otherwise. The CWRM D&O was used to identify the streams ~~to be~~ studied. The CWRM D&O identified 36 streams associated with the License Area (CWRM D&O, FOF 58). Two of these streams, Kualani and 'Ōhi'a streams were not included in the HSHEP model as they were not diverted by the EMI Aqueduct System and another, Palauhulu Stream, is considered a tributary of Pi'ina'au Stream and thus was combined with Pi'ina'au Stream for purposes of this study. The DEIS identified ~~identifies~~ 37 streams associated with the License Area. In the DEIS stage ~~It includes~~ Puakea Stream was assumed to be an individual stream. However, it has since been determined that Puakea is in fact a tributary to Pa'akea Stream. Hence, it was assessed in the HSHEP model. The version of the report included as Appendix A in the DEIS erroneously stated that "Puakea Stream was not mentioned in the CWRM D&O and therefore was not assessed in the HSHEP model." That statement was incorrect. See Trutta, Updated 2020 at 7 ~~which was not mentioned in the CWRM D&O and therefore was not assessed in the HSHEP model. This resulted in 33 distinct streams impacted by the EMI Aqueduct System~~.

included in the HSHEP model for two general reasons. First, at the time of the development of the HSHEP model, a scientific consensus on how these excluded factors influence and structure observed native stream species populations did not exist. Second, the Habitat Evaluation Procedure (HEP) model[2] is primarily focused on the link between physical habitat and species occurrence. Understanding the distribution of physical habitat and species occurrence is important even without those excluded factors.

The HSHEP modeling approach was developed for, applied on, and critically reviewed for use in Hawaiian streams. The HSHEP model approach has been used extensively in Hawai'i, including, among others, for instream flow decisions made by the CWRM for East and West Maui streams and Waimea River on Kaua'i, for hydropower impact assessment on Wailua River on Kaua'i, for flood mitigation impact assessment on the Ala Wai Streams on O'ahu, and for various other stream assessments across the State. (Trutta, Updated December 2020 ~~p. 12, 2019~~) In addition, the integrated field surveys and the HSHEP model approach underwent and passed formal professional review by the USACE for its application on the Ala Wai Streams Flood Mitigation Project. Using the HSHEP model, data on water depth, habitat type, substrate, and stream width can be converted into suitability criteria and estimates of overall habitat area. In addition to habitat measures, stream discharge was measured upstream and downstream of diversions to help document the proportion of flow diverted. (Trutta, Updated December 2020 ~~p. 15, 2019~~)

The HSHEP model assumes that habitat quality and quantity are related to the number of animals using a habitat over the long term. (Trutta, Updated December 2020 ~~p. 23, 2019~~) Habitat quality and quantity determine overall habitat units ~~Habitat Units~~ (HU) within the area of concern, and the HSHEP model is designed to, among other things, provide impact assessments of the changes of HU within the study area under different management scenarios. (Trutta, Updated December 2020 ~~p. 24, 2019~~) Generally, a HU is is a weighted measure of the unit area. For example, if one was measuring the suitability of the habitat within a $1m^2$ area and half of the area is suitable for the species (Habitat Suitability Indices (HSI) = 0.5) then the HU at that location is 0.5 HU of the possible 1.0 units of the area. By definition, since the HSI ranges from 0 to 1, the maximum HU for an area is equal to the area. It is also by definition that if the HU were added together for multiple non-competitive species in a given area, and the HU could be greater than the area. It is important to understand that the HU were created for a single species at a time. The native amphidromous species can co-occur but also have a natural stratification among species found in the lower sections, middle sections and upper sections of streams. The accumulation of the HU into an overall total habitat unit for all amphidromous species is additive. Thus, a single unit of stream may have a total HU in excess of the stream area quantified. While the total habitat units may exceed the stream area, it is not a measure of area lost or gained. Thus, it is incorrect to use the total HU as a measure of the change in area in response to a management action. If 1-unit area, contained suitable habitat units for 3 species (3 HU total), the loss or gain of that unit is still only 1-unit area although it contains HU for 3 species. Misapplication of the total HU counted as an area will overestimate the "size" of low reach areas, as these stream reaches commonly contain multiple species, while underestimating the "size" of upper reach stream reaches that may contain only

[2] Concepts developed by the U.S. Fish and Wildlife Service (USFWS) to evaluate the quantity and quality of habitat available for a species of concern.

one species naturally. This is important to understand when considering the total HU for all amphidromous species in a stream as the total HU may be greater than the total stream area.

For this HSHEP model of the License Area streams, the focus is primarily the assessment of flow alteration. The HSHEP model assesses the impacts of proportional amounts of baseflow diversion.[3] The HSHEP model is proportional to discharge so that flow alteration shows in the model results.

~~Habitat suitability indices~~ HSI were developed for the typical group of native freshwater fish and macroinvertebrates found in Hawaiian streams, namely: 'O'opu nākea (*Awaous stamenius*); 'O'opu alamo'o (*Lentipes concolor*); 'O'opu naniha (*Stenogobius hawaiiensis*); 'O'opu nōpili (*Sicyopterus stimpsoni*); 'O'opu akupa (*Eliotris sandwicensis*); 'Ōpae kala'ole (*Atyoida bisulcata*); 'Ōpae 'oeha'a (*Macrobrachium grandimanus*); and Hīhīwai (*Neritina granosa*).

In addition to the species listed above, three native damselflies (*Megalagrion xanthomelas*, *Megalagrion pacificum*, and *Megalagrion nesiotes*) and an introduced mosquito (Culex quinquefasiatus) habitats were also modeled to see how the water diversions may impact their population sizes. (Trutta, Updated December 2020 ~~p. 26, 2019~~) In general, restoration of stream flow should improve damselfly habitat and decrease mosquito habitat where these species use instream habitats. Restoration of baseflow, however, will likely also improve habitat conditions for a number of introduced predator and competitor species of the native damselflies and thus may not, in itself, increase damselfly populations. (Trutta, Updated December 2020 ~~p. 58, 59, 60, 2019~~) Anecdotal observations made by Trutta staff members, support the continued presence of Culex mosquitoes under a wide range of stream flows as they reported being swarmed by mosquitos in both diverted and undiverted streams in Hawai'i.

Many comments submitted in response to the DEIS, including from East Maui residents, noted observations of an increase in stream fish populations since the cessation of sugarcane operations which is also discussed in Section 4.6 below with regards to cultural practices and resources. However, the commenters do not list specific streams where they have observed these increases but rather generally within the East Maui region. As noted above, as of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd. Hence it can be assumed that current water diversion rates from the License Area are comparable to the amount that would be diverted under the No Action alternative, which is estimated to be approximately 26.39 mgd. The HSHEP model estimated that approximately 79.8% of total HU would be available under the No Action alternative whereas under the Full Diversion Condition (comparable to historical sugarcane operations – discussed further below) approximately 50.1% of the total HU in the License Area streams remained. Therefore, it is reasonable to assume that there have been increases in HU within the License Area streams under current conditions.

[3] With appropriate data, the HSHEP model could be used to measure impacts from other factors. For example, if the effects of climate change were known to cause X% change in total stream discharge, there would be X% change in HU.

To assess the impacts of the Proposed Action, the HSHEP model for the East Maui License Area streams developed four water flow scenarios associated with the EMI Aqueduct System.[4] These scenarios allowed for the comparison and quantification of the changes in suitable habitat for native stream animals as a result of the different flow modifications. The scenarios discussed in this section are:

~~Baseline Condition – Natural Flow~~ Natural Condition

It is important to understand that ~~The~~ the EMI Aqueduct System has diverted water in its current configuration for nearly 100 years and baseline environmental condition studies (including the distribution and habitat of native stream animals) prior to its construction do not exist. Although there were no studies that describe ~~describing~~ East Maui stream biota conditions as they existed prior to the construction of the EMI Aqueduct System, the HSHEP model provides a means of estimating the naturally available habitat for stream species under natural conditions, i.e., no water diversions and no impacts on passage or entrainment of animals. (Trutta, Updated December 2020 ~~p. 12, 2019~~) This was the maximum boundary comparison scenario created for modeling, in which all diversions were modeled as closed with no water diversion and no impact on passage or entrainment of animals and resulted in the maximum available HU predicted (in other words, this is a theoretical scenario, as even under the No Action/No Water Lease scenario, some degree of diversions would continue). The assumption with the Natural Condition is if no modifications or diversions existed, then this would be the maximum available HU for native stream species. As noted above, Trutta cautions, however, that suitable habitat (number of HU's), which is the focus of the HSHEP model, is not the only thing that may affect species populations. Other factors, such as pollution, disease, or competition with introduced species may also influence the distribution and densities of native animals. ~~(Trutta, p. 66, 2019) This Natural Flow condition, while not, strictly speaking, a baseline condition in that it has not existed for at least 100 years, nevertheless sets the upper boundary for the HSHEP model. (Trutta, p. 41, 2019) In other words, the~~ The Natural ~~Flow~~ Condition ~~condition~~ represents 100% of the HU in the License Area ~~33~~ streams assessed. Trutta estimates a total of ~~1,982,176~~ 1,747,390 HU for all the streams in the License Area under the Natural Condition. (Trutta, Updated December 2020 ~~p. 57, 59, 60, 61, 2019~~)

The number of HU for the native damselflies under the Natural Condition is 10,366. The number of HU for the introduced mosquito, *Culex quinquefasiatus* under the Natural Condition is 48,702.

~~Baseline Condition – Full Diversion~~ Full Diversion Condition (Comparable to Historical Sugarcane Operations)

The Full Diversion Condition scenario represents the ~~The~~ lower boundary for the HSHEP model. The scenario is comparable to the historical diversions made ~~was full diversion~~ by the EMI Aqueduct System in its current configuration as existed under sugar cultivation operations, which was the prevailing condition ~~conditions~~ for nearly 100 years. (Trutta, Updated December 2020 ~~p. 41, 2019~~) The Full Diversion Condition scenario assumes that all the diversions in the EMI Aqueduct System are fully open or diverting 100% of available low flows, which are

[4] The fourth scenario, the No Action alternative is not discussed within this section. It is discussed in Section 3.4.3 of the EIS

roughly analogous to the stream's baseflow. These low flows are critical to protecting instream habitat for stream species. The diversions in the EMI Aqueduct System were built to capture 100% of normal low flows plus some small amount of storm runoff. Hawaiian streams are considered to be "flashy", meaning discharge (volume of water moving down a stream) rises quickly in response to rainfall and then quickly falls back to low flow conditions. When low flow conditions persist and overall diversion amounts do not exceed the conveyance capacity of the EMI Aqueduct System, ~~water needs call for all the low flow to be diverted~~, the streams can be dewatered below the diversions resulting in negative impacts on species habitat and passage. Although the Full Diversion Condition ~~condition~~ has not existed for more than ten years, it is the minimum boundary comparison scenario for modeling, in which all diversions were modeled as fully open or diverting 100% of available low flows. It is comparable to ~~it is identified as a baseline condition in that it was~~ the prevailing condition for nearly 100 years when sugarcane was in full production and provides context to a well-known historical condition. (Trutta, Updated December 2020 ~~p. 55-56, 2019~~) Under the Full Diversion Condition ~~conditions~~ Trutta estimates a total of 876,017 HU are available to stream animals.~~,~~ In other words approximately 50.1% ~~46%~~ of the total HU in the License Area streams remained; or conversely, the Full Diversion Condition ~~conditions~~ reduced the number of HU by approximately 49.9% ~~54%.~~

The number of HU for the native damselflies under the Full Diversion Condition is 8,005. The number of HU for the introduced mosquito, Culex quinquefasiatus, under the Full Diversion Condition is 68,852.

~~2018 CWRM D&O – Setting the IIFS~~ 2018 IIFS (Proposed Action)

This scenario represents the flow conditions as required under the IIFS set forth in the 2018 CWRM D&O ~~described in the CWRM D&O setting the IIFS, which included 24 streams and mandated restoration of flows in all but three streams~~ as discussed in Section 1.3.4. Four ~~main~~ types of flow restoration were mandated under the CWRM D&O: Full-flow Restoration, Habitat-flow Restoration, Connectivity-flow Restoration, and No-Flow Restoration (status quo). The diversion amount was estimated as available flow after compliance with the CWRM D&O. (Trutta, Updated December 2020 ~~p. 56, 2019~~).

The CWRM D&O ordered that flows in Makapipi, Waiohue, West Wailuāiki, Wailuānui, Waiokamilo, Pi'ina'au (and its tributary Palauhulu ~~Palahulu~~), Hanehoi (Huelo/Puolua), and Honopou streams be fully restored. The primary reason for Full-flow Restoration is not the improvement of instream habitat for stream animals, but for the downstream passage of water for customary and traditional uses on these priority streams identified as such by Native Hawaiian communities during the IIFS proceedings. Nevertheless, Full-flow Restoration does provide significant instream habitat benefits for the native amphidromous stream animals in these eight streams. According to the HSHEP model, these streams contain about one-third of the potential HU (under the Natural Condition ~~natural flow conditions)~~ within the entire License Area. Even under the Full Diversion Condition, within these streams, 72.6% of HU for all species were predicted to be available. After implementation of Full-flow Restoration as defined in the CWRM D&O, ~~96.7%~~ 98.3 % of native stream animal HUs for these streams are estimated to exist. (Trutta, Updated December 2020 ~~p. 57, 2019~~) The reason the HU return does not result in 100% is because some minor diversions were not required to be modified or removed to meet the IIFS under the CWRM D&O.

Additional flow restoration in the Habitat-flow Restoration streams and the Connectivity-flow Restoration streams further increases the ~~HUs~~ HU existing in the License Area as compared to the Full Diversion scenario. Under the Full Diversion scenario (diverting 100% of available low flows), ~~less than~~ approximately half of the HU ~~Hus~~ remained in the License Area; whereas under the 2018 IIFS scenario, ~~CWRM D&O standards~~, the number of ~~remaining~~ HU ~~HUs~~ increases to nearly 63.9% ~~60%~~ (i.e., under the 2018 IIFS scenario, 1,116,581 HU are estimated to exist). (Trutta, Updated December 2020 ~~p. 59-61, 2019~~) Stated another way, the Proposed Action (i.e., Water Lease consistent with the CWRM D&O) results in approximately a 36.1% decrease from the Natural Condition scenario for the License Area.

The License Area also includes streams that were not the subject of the CWRM D&O, but are diverted ~~into~~ by the EMI Aqueduct System ~~system~~. The ~~majority of these 13 non-IIFS~~ 12 non-petitioned streams are located on the western side of the License Area and all are located in the Huelo portion of the License Area ~~East Maui stream group~~. This area receives less rain than the streams further east. Most of the ~~non-IIFS~~ non-petitioned streams have diversions at four levels; on the Wailoa and New Hamakua Ditches at higher levels, and on ~~two of~~ the Spreckels, Center, ~~and~~ Lowrie, or ~~of~~ Haiku Ditches at the lower levels. (Trutta, Updated December 2020 ~~p. 61, 2019~~) Inasmuch as the ~~non-IIFS~~ non-petitioned streams were not part of the decision-making ~~included~~ in the CWRM D&O, the 2018 IIFS scenario assumes these streams will be at Full Diversion conditions. (Trutta, Updated December 2020 ~~p. 61, 2019~~) The resulting HU counts for these non-petitioned streams are included in the figures and percentages cited in the paragraph above for the entire License Area. Taken in isolation, for the non-petitioned streams, Trutta estimates that approximately 57,782 HU are available under the Proposed Action, or approximately an 88.2% reduction from the Natural Condition scenario for these 12 streams.

The number of HU for the native damselflies under the Proposed Action is 9,117. The number of HU for the introduced mosquito, Culex quinquefasiatus, under the Full Diversion Condition is 61,808.

Impacts and Mitigation Measures

Under the Proposed Action, it is assumed that the Water Lease would grant the right to collect government-owned waters from the License Area up to the maximum allowed after compliance with the ~~under the~~ CWRM D&O. Thus, under the Proposed Action, the number of HU within the entire License Area is decreased by approximately 36.1% ~~40%~~ from the Natural ~~Flow~~ Condition (no diversion) scenario ~~condition~~, but is increased by approximately ~~more than~~ 13.8% ~~10%~~ over the Full Diversion scenario (comparable to historical sugar operations) ~~condition~~. In other words, 63.9% ~~60%~~ of the total HU remains within the License Area under the Proposed Action. ~~This ranges from 96.7% of the HU in the Full-flow Restoration streams to 15% remaining HU in the No-Flow Restoration streams (including the streams for which no IIFS was set in the 2018 CWRM D&O).~~

As discussed in Section 2.1.4 of the EIS, as of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd. These conditions are comparable to the No Action scenario discussed within Section 3.4.3 of the EIS where approximately 79.8% of the total HU remains in the License Area. In other words, the Proposed Action would

reduce total HU as compared to existing conditions by approximately 15.9%. However, this reduction would occur over time as not all of the available surface water under the Proposed Action would be needed, and thus diverted immediately. Rather, the amount of water diverted at any given time will be only what is needed to meet the needs of the MDWS and of Mahi Pono's agricultural operations in Central Maui. Moreover, the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within the EMI Aqueduct System. The information obtained is reported to CWRM on a monthly basis.

In summary, ~~The~~ the HSHEP model results conclude that the Proposed Action would have a negative impact by reducing native stream animal habitat from Natural ~~Flow~~ (undiverted) Condition ~~conditions~~. However, in making decisions about instream flows, the CWRM must weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses. It is also its duty to establish IIFS that protect instream values to the extent practicable and to protect the public interest. The public interest includes not only protecting instream values but also preserving agricultural lands and assuring adequate water supplies for Maui. (CWRM D&O, p. 267, items b.-d.). Further explaining its decision-making process, the CWRM stated:

> *The Commission first evaluated each stream individually, looking at their flow characteristics, instream uses, habitat restoration potential for fish and other stream animals, recreation opportunities, and scenic values. We then looked at all of the affect streams in an integrated manner with consideration for the overall ecological ramifications of our decision. We used those factors to align instream flow standards with our public trust responsibilities.*

The CWRM then considered offstream uses and weighed the importance of those uses against instream uses. In addition to the recognized public trust use for drinking water, the CWRM acknowledged the importance of diversified agriculture in Central Maui for both food sustainability and for ecological reasons. Expounding on its rationale the CWRM stated:

> *For over 100 years, the East Maui watershed forests have provided water for offstream uses that meet our consumptive needs and enable economic opportunities. These benefits provide additional impetus for sustainable management of the watershed. Therefore, the Commission considered the economic impact of our decision upon offstream uses, with a specific focus on supporting public uses such as drinking water, as well as diversified agriculture. We also considered factors that contribute to the operational capacity of the existing ditch system to deliver those offstream uses. Where necessary, changes were made to our original estimates of instream flow standards to accommodate reasonable and beneficial offstream uses.*

(CWRM D&O at ii.)

> *Yet, we believe it to be reasonable and beneficial to use a portion of East Maui stream water for the development of diversified agriculture on Maui's central plains. Diversified agriculture has and should continue to provide economic benefits and can now make a larger contribution to Hawai'i's food sustainability. We are also concerned that leaving these lands in an un-cultivated state will increase wind-blown erosion that will damage Maui's near shore marine environment, air quality, and tourism competitiveness. The Commission's intent in this decision is to ensure that a sufficient amount of offstream water is available to support the cultivation of diversified agricultural crops on the lands designated as IAL in Central Maui.*

(CWRM D&O at vi.)

Even with stream flow restoration and creation of wetted pathways to the ocean, entrainment of larvae, which can occur at the diversions ~~remains an issue and~~ contributes to the loss of HU.

Trutta documented site-specific conditions at stream diversions along the EMI Aqueduct System in order to assess the impacts that diversion designs have on native stream species. Trutta recorded type, size, its potential impact to passage, and its potential impact to entrainment and other factors. To convert the field information into data usable for the HSHEP model, the impacts of loss of instream habitat, barriers to passage, and entrainment of species into the EMI Aqueduct System were determined by classifying the diversion into type and then estimating the effect based on the size (See Appendix A).

The four main barrier types were:

1. Bottom Grate Diversion: This diversion type removes water from a grate-covered channel that usually spans the stream channel bottom. A portion of the water falls into the diversion channel below the grate. They are usually sized to remove 100% of baseflow. At higher flows water can pass over the grate and the higher flows can also sweep the grate clean of any debris. Entrainment rates are modeled with respect to the portion of base flow diverted. Entrainment is higher than with side diversion as moving animals are easily trapped in the diversion as they try to pass over the bottom grate.

2. Side Diversion: This type of diversion removes water from the stream through a side intake structure. The water in a natural stream channel flows downstream past the diversion and a portion is removed by the intake. These side diversions typically have a small dam to help increase the amount of water diverted. Both ditch and auwai diversion can fall into this group. Entrainment and barrier impacts are lower than other diversion types because animals have a clear path to move up and downstream past the diversion. Although a path past the diversion exists when water is diverted, some animals may be entrained.

3. Pipe Diversion: This is a diversion where a pipe gathers water and directs it to the diversion channel. The size of the pipe determines the proportion of stream flow diverted. In addition to issues with loss of habitat downstream of the pipe diversion and entrainment of individuals into the diversion, pipe diversion can increase the difficulty of upstream passage as the downstream outlet of the pipe may be far from the natural stream channel, making passage only available at the higher flows.

4. Direct Diversions: At direct diversion locations, the stream flows directly into the diversion channel. There is no overtopping the diversion channel unless it is at full capacity and even then, it may spill water at a different location. These diversions effectively entrain and block the majority of animals at most streamflow levels.

Loss of instream habitat is related directly to the proportion of stream flow removed and the amount of stream flow recovery accumulated from rainfall on downstream areas of the watershed below the diversion. A structural barrier to passage could effectively eliminate upstream habitat if there was no way for the upstream migrating animals to surmount the barrier. Entrainment is related to the amount of water removed by the diversion. Newly hatched larvae drift almost passively downstream. Thus, entrainment can be considered as a proportion of the amount of water diverted. For example, when 100% of baseflow is diverted, the entrainment is modeled at 80%. This would represent the entrainment of all animals drifting downstream in the baseflow and leaves a portion of animals at higher flows that overtop the diversion without entrainment. At diversion rates lower than total baseflow removal, the entrainment value is a portion of baseflow (Q_{70}) remaining after the diversion compared to natural baseflow (Q_{70}) multiplied by the maximum entrainment rate.

Hence, altering the natural streamflow could have a negative impact on the stream and stream animal habitat. Additional HU may be gained for the native stream species by decreasing entrainment at the diversion locations. Removal of portions or circumvention of the diversion structure that cause flow restrictions, passage barriers, or unnatural impounding of the water (primarily the diversion dam) would mitigate these negative impacts. Or in other words, any ~~Any~~ action or modification of the diversion to decrease entrainment would increase the total restored HU without having to release ~~any~~ additional water ~~released~~ to the stream. ~~(Trutta, p. 59, 2019)~~ It should be noted that while complete elimination of the diversion structure that causes entrainment is one way to accomplish the goal, complete removal may not be required or preferred in terms of environmental impacts. Specific structure modification needs to be addressed on a case-by-case basis as anticipated after compliance with the CWRM D&O, to prevent or mitigate potential adverse impacts while taking total impacts caused into consideration. The physical act of removing diversions structures could generate adverse impacts to the surrounding environment in certain circumstances that would not occur if the structures were left in place.

It is important to note that diversions closer to the stream mouth have more of an impact on HU than those farther from the stream mouth. Also, some diversion designs can entrain larvae or block passage more than other designs, and the amount of water passing the diversion structure is also important to consider when quantifying impacts on HU. However, as long as the diversion does not remove water from the stream,

does not change the natural path of the water, or create a barrier to movement, then the physical structure will have a negligible impact on native species habitat at best.

For example, Diversion K-15 on West Kopili'ula Stream was closed with 100% of the water flowing through the bypass and continuing downstream. However, the physical diversion structure was still present. Immediately upstream of this diversion, numerous native stream animals were observed. 409 'ōpae kala'ole (*Atyioda bisulcata*) and 5 'o'opu alamo'o (*Lentipes concolor*) were counted in the stream above the diversion in less than 200 m^2 of habitat sampled. Even though the physical diversion structure still exists, the stream flowed downstream uninterrupted and no entrainment or barrier to movement is present. The native stream animals observed were using the habitat immediately upstream of the diversion. Because these animals climb upstream from the ocean, this shows that the physical diversion structure did not prevent the animals from using the area. This being said, if the diversion structure was partially removed to make sure that the bypass opening would not be blocked by debris, then it would almost guarantee that this physical structure would continue to have no or very minor impact on native stream species habitat.

Conversely, meeting the IIFS at a specified downstream location does not guarantee that no impacts will occur. In a situation where changes to a diversion result in the water flowing into the diversion and back to the stream from another location in the diversion ditch, impacts are likely to continue to occur.

Any action or modification of the diversion to decrease entrainment that may occur during the IIFS implementation process would increase the total restored HU without any additional water released to the stream.

In summary, the primary mitigation measure for the instream habitat lost to the water diversion is flow restoration. The intent of the HSHEP model is to quantify the flow restoration effect on the native stream species habitat. The HSHEP model addresses impacts to habitat, entrainment and passage. Given the 250+ diversions within the EMI Aqueduct System, incremental changes to each aspect of diversion amount on habitat, entrainment, and passage for each diversion individually and all diversion combinations would result in too many model results for rational use (the number of possible combinations with just one change at each diversion is far over a billion different results, 2^250-1 = combinations). Once a specific scenario is determined such as the 2018 IIFS or the No Action Alternative, then the HSHEP model can be used to a quantify the changes that occur.

From a technical perspective, there are more than 300 individual nodes (stream mouths, diversions, springs and sinks) in the EMI Aqueduct System. Potentially any of these diversions within the node group could (1) have different levels of water restoration mandated at the diversion location (2) could have engineering changes to increase fish passage and decrease larval entrainment and/or (3) have the sequence of water restoration or engineering changes include numerous different scenarios with for example, 50% water return on diversion 1, an engineering fix to eliminate a barrier on diversion 2, a 60 % water return and an engineering fix to decrease entrainment on diversion 3, and so on. This could result in many different scenarios. To be more

specific on the number of potential iterative scenarios, there is a formula for the number of permutations = nr. So, in a stream with 3 diversions, if we are interested different flow restoration levels 0 to 100% in 10% intervals, we get 113 which equals 1331 different scenarios. If we add a single engineering fix (2 options of no change and new design), we get 223 which equals 10,648 scenarios. Clearly, the number of possibilities increased quickly.

For example, there are 10 diversions on Nā'ili'ilihaele Stream. If we were interested in different flow restoration levels ranging from 0 to 100 in 10% intervals, we get 25,937,424,601 scenarios. Twenty-five billion scenarios are far too many to reasonably understand or consider for management actions (and these vast number of scenarios does not even account for any engineer changes to those diversions to increase fish passage or decrease larval entrainment). In short, the number of permutations involved in considering all options for all diversions in the East Maui streams precluded a systematic optimization of all possible scenarios.

With that understanding, the HSHEP model report presented general guiding concepts associated with flow modification and changes to diversion design to minimize barriers to passage and larval entrainment.

With respect to diversion amount:

- Regardless of the way the water was diverted, greater percentages of total streamflow diverted generally resulted in lower amounts of instream habitat for native stream species.

With respect to diversion location:

- When comparing the location of a diversion, diverting comparable amounts of water at higher elevation diversions was less damaging to instream habitat for native stream species than diverting that water at lower elevation diversions. In this case, as the diversion occurred further upstream in the stream, more natural stream flow recovered downstream of the diversion. Additionally, any water passing the diversion resulted in more instream habitat with unobstructed connection (no entrainment or passage issues) to the ocean.

With respect to a single diversion in comparison to multiple diversions:

- Similar to the previous statement, a single diversion at the upstream most diversion location capturing X amount of stream flow will result in more instream habitat than multiple diversions throughout the stream diverting the same amount of stream flow in total (sum of multiple diversion = X). The lower amount of total habitat under the partial water diversion at multiple diversions was the result of the compounding impact of entrainment/passage barriers at each division.

With respect to modifications of the diversion for improved passage and decreased entrainment:

- Improvements in diversion passage resulted in more suitable habitat at most flow levels.

- At lower flow restoration amounts, modifications to improve passage resulted in greater gains in suitable habitat than at higher flow restoration level.

For the native damselflies and invasive mosquito, a return to natural conditions should improve damselfly habitat and decrease mosquito habitat where these species use instream habitats. The potential beneficiaries were the endangered damselfly, *Megalagrion xanthomelas* and *Megalagrion pacificum*. Small gains in potential suitable habitat units occurred in these streams and restoration of flow to a more natural condition should directly benefit the species. The restoration of baseflow however will likely also improve habitat conditions for a number of introduced predator and competitor species of the native damselflies and thus may not in itself increase damselfly populations. It should be noted that although the HSHEP model assessed potential changes of mosquito habitat in response to stream flow, several problems occur with the concept controlling or eliminating mosquitos with increased streamflow. First, in addition to breeding in streams, the mosquitos are crevice breeders and small pockets of water throughout the forest will still exist under any streamflow scenario. Second, Hawaiian streams are naturally flashy (i.e., they rise and fall quickly after rainfall) and this results in numerous shallow, slow-moving pockets of water along the stream margins at many different levels of streamflow. It may be difficult to control mosquitos by increased streamflow alone.

As set forth in the HSHEP model report, the analysis resulting from the combination of field surveys and habitat modeling supports the flow restoration under the CWRM D&O 2018 IIFS in improving instream habitat conditions for native amphidromous stream animals. While suitable habitat is fundamental for a species' persistence and is the focus of the HSHEP model, it may not be the only thing that may affect species populations. Other factors, such as pollution, disease, or competition with introduced species, may also influence the observed distribution and densities of native animals. Yet understanding the natural distribution of animals without the presence of these additional factors is still important. From a habitat availability perspective, the 2018 IIFS does a good job at improving instream habitat over a wide range of streams within the License Area. As noted above, the 2018 IIFS results in 1,116,581 HU within the License Area, which is equivalent to 63.9% of the highest possible amount of HU within the License Area.

It should also be noted that the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within the EMI Aqueduct System. The information obtained is reported to CWRM on a monthly basis.

Upcountry Maui

Within Upcountry Maui there are no perennial streams (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). However, there are several intermittent streams such as Kailua Gulch, Waikapu Stream, Kulanihakoi Gulch, and Waipuilani Gulch.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM's D&O and any reservations in favor of the DHHL. No significant impacts on surface waters in the region are anticipated as the Proposed Action does not involve any uses of or changes to any Upcountry Maui streams.

Central Maui

Within the agricultural fields in Central Maui there are no perennial streams (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). However, there are ~~48~~ 35 major reservoirs throughout the agricultural fields that are used for water storage, which are supplied by excess diverted stream flow from East Maui by the EMI Aqueduct System. These reservoirs are not lined and the water that is stored within the reservoirs seeps into the ground, recharging the Central Maui aquifers, as discussed more in Section 4.2.2 (Groundwater).

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on surface waters in the region are anticipated because there are no streams within Central Maui.

4.2.2 Groundwater

East Maui

East Maui hydrologic resources are largely controlled by the ability of surface geology to absorb the relatively abundant rainfall that is typical of the region. The geologic surfaces of East Maui are comprised of highly permeable lava flow remnants of the Hāna Volcanic Series, which allows for rainwaters to easily penetrate and recharge groundwater bodies in the region.

Fresh ground water in the subject License Area is found in two main forms: (1) as perched high-level water held up by relatively low-permeability geologic layers, and (2) as a freshwater lens floating on denser, underlying saltwater. The rocks beneath the contact between the Kula Volcanic Series and the underlying Honomanū Basalt and above the freshwater lens appear to be unsaturated. This is based upon observations that: (a) streams are dry or losing water where they are incised into the Honomanū Basalt, (b) the hydraulic conductivity of the Honomanū Basalt is too high to support a thick ground-water lens given the estimated recharge to the area, and (c) wells that penetrate through the contact have encountered conditions of

cascading water from above the contact and dry lava tubes in the Honomanū Basalt (Draft Maui Island Water Use & Development Plan, March 2019, Updated July 2020).

It should be noted that by comparing the CWRM's 1987, 2008 and 2018 maps of SY for the island of Maui, it shows an overall decrease of 25 mgd from 452 mgd (1987) to 427 mgd (2008), then a decrease of 70 mgd from 427 mgd (2008) to 357 mgd (2018) for the entire island of Maui. East Maui is within the MDWS's Ko'olau Aquifer Sector which includes four aquifer systems: Ha'ikū, Honopou, Waikamoi, and Ke'anae (See Figure 4-17). The Ko'olau Aquifer Sector, where the License Area is situated, shows a decrease in SY from 186 mgd (1987) to 175 mgd (2008) and then to 152 mgd (2018).

The groundwater SY is the maximum rate that groundwater can be withdrawn without impairing the water source as determined by the CWRM. Generally, SY is conservatively set at the low end of the estimated range of predicted SY for an aquifer. Below are ~~tables~~ Tables 4-1 and 4-2 that summarize each of the East Maui aquifer's SY and amount of groundwater pumped by mgd ~~MGD~~ per use category.

While no groundwater is transferred from the Ko'olau Aquifer Sector, surface water is conveyed from the sector to the Central Aquifer Sector via the EMI Aqueduct System. Since surface and groundwater interchange depends on the underlying geology, the increase in surface flow since the cessation of sugar cultivation in 2016 also contributes to an increase in groundwater in East Maui.

Table 4-1 Sustainable Yields for Ko'olau Aquifer System Areas

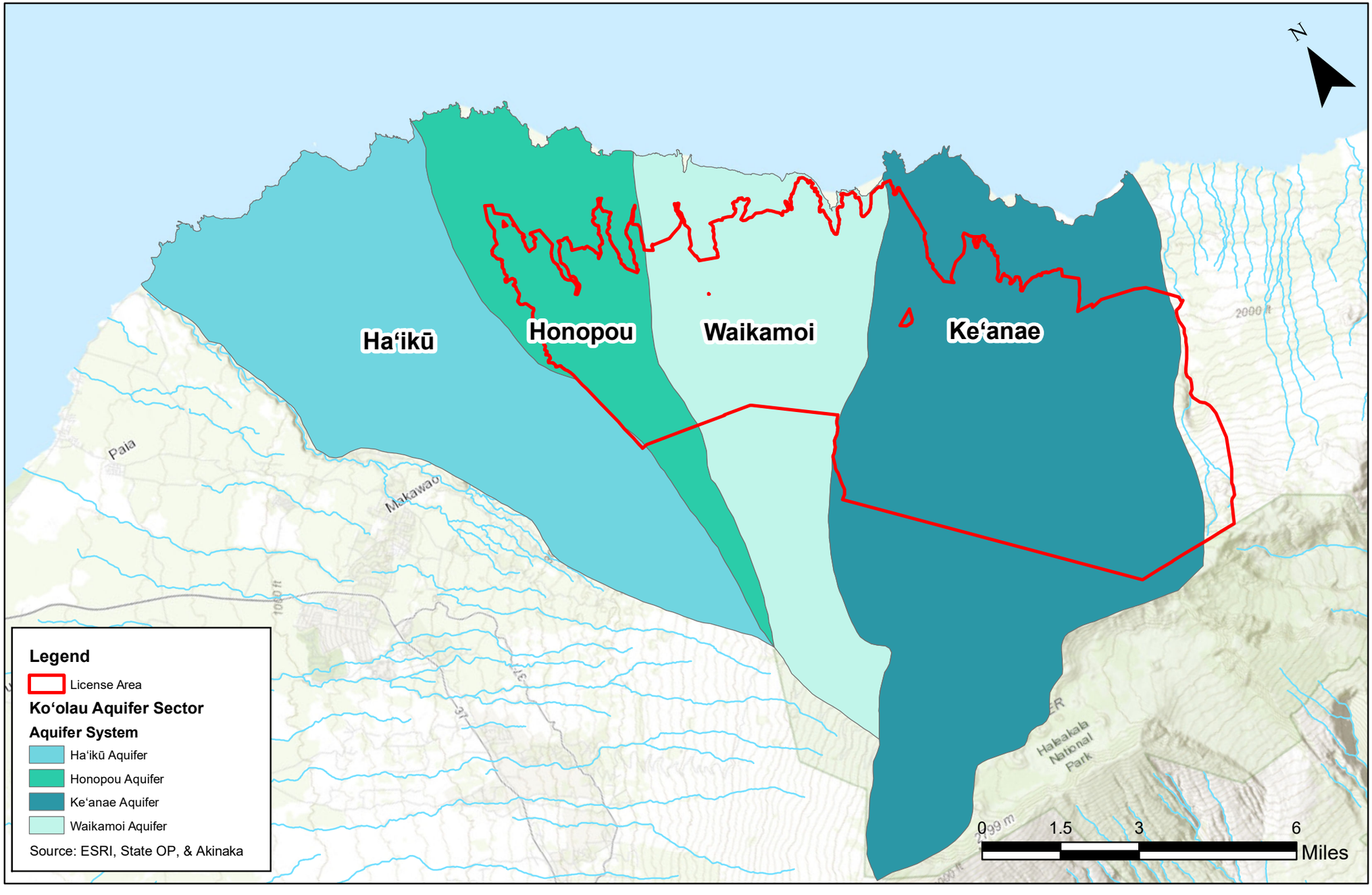
Ko'olau aquifer system area	Aquifer code	Sustainable yield ~~range~~ (mgd)
Ha'ikū	60401	24 ~~27~~
Honopou	60402	16 ~~25 26~~
Waikamoi	60403	37~~40~~
Ke'anae	60404	75~~83~~
Total		**152**

Source: ~~Draft Maui Island Water Use & Development Plan, March 2019~~ (CWRM Water Resources Protection Plan, 2019)

Table 4-2 Pumpage in MGD by Well Type for Ko'olau Aquifer System Areas

Aquifer	Domestic	Industrial	Agriculture	Irrigation	Municipal county	Municipal private public	Municipal total	Total
Ha'ikū	0.007	0	0.0139	0.0017	0.811	0.005	0.816	0.839
~~e~~ Honopou	0.0007	0	0	0		0.0097	0.0097	0.0104
Waikamoi	0	0	0	0	0	0	0	0
Ke'anae	0	0	0	0	0.066	0	0.066	0.066
Ko'olau Total	**0.0078**	**0**	**0.0139**	**0.0017**	**0.877**	**0.0149**	**0.982**	**0.916**
% of Total	**0.85%**	**0%**	**1.52%**	**0.19%**	**95.81%**	**1.63%**	**97.44%**	**100%**

Source: Draft Maui Island Water Use & Development Plan, March 2019, Updated July 2020



WILSON OKAMOTO CORPORATION

FIGURE 4-17

East Maui Aquifer Sector Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KEʻANAE, HONOMANŪ, AND HUELO LICENSE AREAS

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on groundwater in the region are anticipated.

Groundwater levels are expected to be greater than historic levels due to increased recharge from stream restoration actions under the CWRM D&O. Moreover, according to a USGS publication (2019) on estimating the groundwater of Maui through 2035, the Ko'olau Aquifer System is expected to see an increase in groundwater from recharge rates due to changes in rainfall patterns from future climate change trends. Thus, even lesser impacts to East Maui groundwater are anticipated as a result of the Proposed Action.

Upcountry Maui

Upcountry Maui groundwater recharge replenishes aquifers and is fed mainly by precipitation and irrigation that infiltrates the ground surface and percolates beyond the root zone in the soil. Recharge is greatest in the inland mountainous regions.

Upcountry Maui is within the ~~MDWS's~~ Central ~~Maui~~ Aquifer Sector[25] which includes four aquifer systems: Pā'ia, Kahului, Kama'ole, and Makawao aquifers and within the Ko'olau Aquifer Sector which includes four aquifer systems: Ha'ikū, Honopou, Waikamoi, and Ke'anae (See Figure 4-17 and 4-18). Below are ~~tables~~ Tables 4-3 and 4-4 that summarize each aquifer's SY and amount of groundwater pumped per category for the Central Aquifer Sector. Tables 4-1 and 4-2 above, summarizes each of the East Maui aquifer's SY and amount of groundwater pumped by mgd per use category for the Ko'olau Aquifer Sector.

Table 4-3 Sustainable Yields for Central Aquifer System Areas

Aquifer system	Aquifer code	~~Sustainable yield range (mgd)~~	Sustainable yield (mgd)
Kahului	60301	~~1~~	1
Pā'ia	60302	~~7-8~~	7
Makawao	60303	~~7-20~~	7
Kama'ole	60304	~~11-16~~	11
Total			**26**

Source: ~~Draft Maui Island Water Use & Development Plan, March 2019~~(CWRM Water Resources Protection Plan, 2019)

[25] Note that the Central Aquifer ~~this aquifer~~ sector is also the source for the irrigation wells serving the agricultural lands in Central Maui.

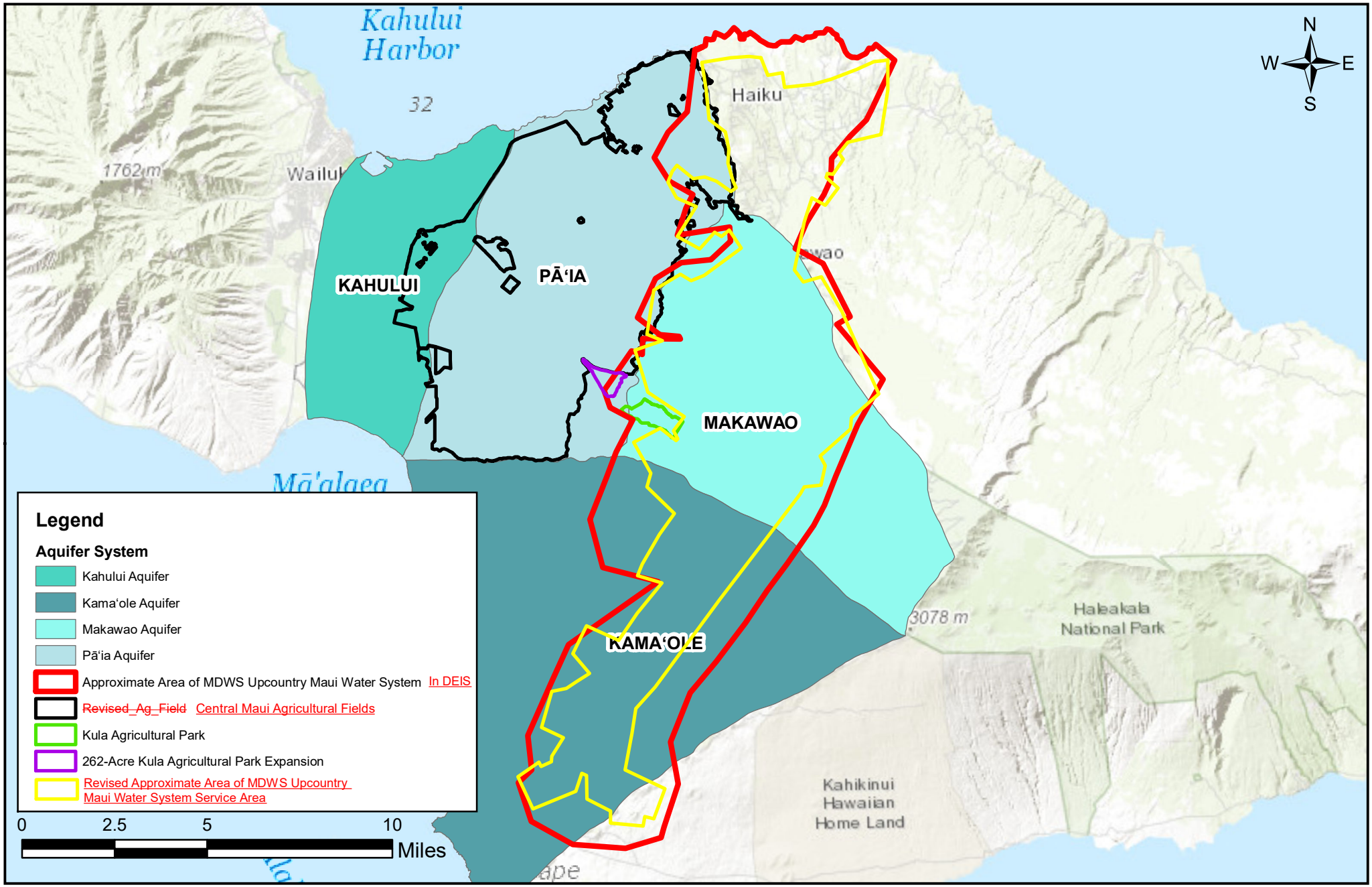


FIGURE 4-18

Central ~~Maui~~ Aquifer Sector Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

Table 4-4 Pumpage in MGD by Well Type for Central Aquifer System Areas

Aquifer	Domestic	Industrial	Agriculture	Irrigation	Municipal	Military	Total
Kahului	0	0.208	28.222	0.476	1.093	0	29.999
Pā'ia	0	0	29.097	0.161	0.248	0	29.506
~~e~~ Makawao	0	0	0	0.220	0.139	0	0.366
Kama'ole	0	0	0	2.826	0.027	0	2.853
Central Total Pumpage	**0**	**0.208**	**57.319**	**3.683**	**1.507**	**0**	**62.724**
% of Total Pumpage	**0%**	**0.33%**	**91.39%**	**5.87%**	**2.40%**	**0%**	**100%**

Source: Draft Maui Island Water Use & Development Plan, March 2019, Updated July 2020

10-20 percent of water delivered through the Upcountry Maui Water System comes from a series of basal aquifer wells: the Ha'ikū Well, Po'okela Well, and the ~~two~~ Kaupakalua Well ~~wells~~ (See Appendix P). The rest comes from surface ~~surfaced~~ water sources. These three ~~four~~ wells account for a total of ~~4.9~~ 3.3 mgd of production capacity ~~water delivered~~. In times of emergency, the Upcountry Maui Water System can draw up to 1.5 mgd from the Hāmākua Poko Wells (CWRM D&O, FOF 809). However, there is concern over this water due to the presence of pesticides from former pineapple production.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL.

In the Proposed Action, the amount of water that can be conveyed by the EMI Aqueduct System will be limited to the amount available after compliance with the CWRM D&O ~~is implemented.~~, The CWRM D&O requires full restoration of ten streams, allows diversion in five streams only after flows exceed 64% of median flow and requires connective flows for seven streams. These instream flow requirements will limit the amount of water that can be diverted, particularly when streams in the License Area are naturally running low during seasonally dry weather conditions. Hence, the amount of water that can be diverted during dry weather conditions would be substantially less than when sugar was being cultivated. As a result, dependence on groundwater resources to supply Upcountry Maui during such conditions may increase and/or water conservation measures may be required. Future climate change could also exacerbate the frequency and length of periods of low rainfall. However, the Proposed Action contemplates a continued supply of surface water to the MDWS to supply Upcountry Maui and therefore no significant effect to Upcountry Maui groundwater resources is

expected as a result of the Proposed Action, and the impacts of the Proposed Action may be beneficial as the Proposed Action will limit the MDWS'~~s~~ need to call upon existing groundwater resources to provide water to Upcountry Maui.

Central Maui

Fresh groundwater in Central Maui occurs mainly in freshwater-lens systems and dike-impounded systems. A freshwater-lens system includes a lens-shaped freshwater body, an intermediate transition zone of brackish water, and underlying saltwater. The thickness of the transition zone depends on the extent of mixing between freshwater and saltwater. Within the Central Maui area under review in this EIS ~~study area~~, freshwater-lens systems are found in dike-free, high-permeability volcanic rocks and sedimentary deposits. A thick wedge of sedimentary deposits that forms a confining unit (caprock) over the high-permeability volcanic rocks near parts of the northeast coast of West Maui Mountain impedes the discharge of water from the freshwater-lens system. Where the coastal confining unit exists, water levels in the freshwater-lens system have exceeded 25 feet above sea level. For example, water ~~Water~~ levels in the freshwater-lens system in areas of West Maui that lack a coastal confining unit generally are lower than 5 feet above sea level, and those in the freshwater-lens system in the isthmus also are generally lower than 5 feet above sea level. The salinity of groundwater in the isthmus is determined primarily by irrigation and withdrawals for agricultural uses (USGS, 2007).

Dike-impounded groundwater systems occur near the caldera and rift zones of the volcanoes, where low-permeability dikes have intruded other rocks. Near-vertical dikes generally compartmentalize areas of more permeable volcanic rocks. Dikes impound water to thousands of feet above sea level in the interior of West Maui Mountain (USGS, 2007).

The agricultural fields within Central Maui are also ~~is~~ within the ~~MDWS's~~ Central ~~Maui~~ Aquifer Sector which includes four aquifer systems: Pāʻia, Kahului, Kamaʻole, and Makawao aquifers (See Figure 4-18). The Central Maui agricultural fields overlie the Pāʻia and Kahului aquifers. Table 4-3 above displays the SY for these four aquifer systems.

SY does not account for water transfers, including surface water conveyed to the Central ~~Maui~~ Aquifer Sector from the Koʻolau Aquifer Sector by the EMI Aqueduct System. Such imported water for irrigation flowing past the root zone of crops enters the aquifer from which it can be pumped and reused. According to the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020), the "impact on 'available' groundwater that can be extracted from the Kahului and Pāʻia aquifers from irrigation return flow is highly uncertain since the cessation of sugarcane cultivation in 2016" (p. 18). The plan further notes that there are no monitoring wells in the Central Aquifer Sector to gauge ~~gage~~ water level changes over time. Nevertheless a simulated scenario in a 2008 USGS study suggests that the complete removal of irrigation return recharge would decrease water levels and increase salinity in the Central ~~Maui~~ Aquifer Sector (Akinaka, 2019).

During sugarcane operation, between 2008 and 2013, HC&S pumped approximately ~~42.50~~ 70 mgd of brackish groundwater to supplement surface water irrigation (Plasch, Updated 2020~~2019~~). This is considerably more than the combined SY of 32 ~~8~~ mgd for the Pāʻia, ~~and for~~ Kahului, and Haʻikū aquifers. More of the brackish water was used on the lower agricultural fields due to the cost of pumping groundwater to the higher-elevation agricultural fields.

HC&S had access to fourteen brackish water wells that historically served the Central Maui agricultural fields. Mahi Pono only has access to 10 brackish groundwater wells that can serve the Mahi Pono agricultural fields in Central Maui. One in the Kahului aquifer, one in the Ha'ikū aquifer, and eight in the Pā'ia aquifer. In the past, actual pumping has exceeded the official SY of these aquifers because, as noted in the WRPP (Appendix F, page 76), 2019 Update, the official SY of these aquifers "*Represents sustainable yield under natural conditions, which ignores significant return irrigation recharge from East Maui."* Thus, pumping capacity can exceed the official SY of the aquifers. However, taking into account a lower rate of irrigation recharge that will occur as compared to under sugar cultivation, less pumping than historically took place will be needed to protect the aquifers.

The 10 brackish groundwater wells available to serve Mahi Pono's Central Maui agricultural fields are provided in Table 4-5:

Table 4-5: Central Maui Brackish Groundwater Well Salinity Range

State Well No.	TMK Number	Installed Pump Capacity	Typical Range of Chlorides (MG/L) from 2003 through 2014[6]	CWRM Delineated Aquifer System
4825-001	(2) 3-8-004:001	20.448	225 to 350	Pā'ia
5226-002	(2) 3-8-006:001	24.048	350 to 550	Kahului
5224-002	(2) 3-8-003:004	15.120	350 to 550	Pā'ia
5323-001	(2) 3-8-001:006	20.016	No data	Pā'ia
5424-001	(2) 3-8-001:007	5.760	400 to 700	Pā'ia
5522-001	(2) 2-5-005:021	8.640	350 to 525	Pā'ia
5422-001	(2) 2-5-005:054	10.080	350 to 525	Pā'ia
5422-002	(2) 2-5-005:020	11.664	325 to 475	Pā'ia
5321-001	(2) 2-5-005:019	30.240	400 to 1600	Pā'ia
5520-001	(2) 2-7-004:032	10.080	900 to 1600	Ha'ikū

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI

[6] There is limited salinity data prior to 2003 and after December 2014, as surface water for irrigation use rapidly declined as A&B ramped down operations prior to closing in 2016. The salinity levels fluctuate and therefore a range is provided. The water from these wells have a high salinity level.

Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL.

It is estimated that at full operation of diversified agriculture, under the Proposed Action approximately 85.22 mgd of water will be directed to the fields of Central Maui from near the MDWS's ~~s~~ Kamole-Weir WTP. Of this amount, approximately 22.7% or approximately 19.34 mgd, is estimated to be lost through system losses in the Central Maui Field Irrigation System (i.e., water lost to seepage and evaporation, and including other water uses, such as water used for reservoirs, fire protection, dust control, and hydroelectric uses).[7] ~~evaporation and seepage in unlined ditches and reservoirs located in the Central Maui agricultural fields.~~ Some portion of this seepage would enter the Pā'ia, ~~and~~ Kahului, and Ha'ikū aquifers. The remaining 65.87 mgd would be used for irrigation and a portion of this amount would seep past the root zone and also enter the aquifers. It is estimated that 21.31 mgd of groundwater could be pumped out of the aquifers to supplement the surface water supply and that 22.7% of that amount, or 4.84 mgd, would also be lost to evaporation and seepage back into the aquifers. Additionally, a portion of the amount used for irrigation would also seep past the root zone and back into the aquifer. However, it is noted that according to a USGS publication (2019) regarding the groundwater of Maui, it is anticipated that recharge rates and the SY will decrease in the Central Aquifer Sector due to changes in rainfall patterns which may further decrease the amount available for pumpage.

Higher salinity water could be used to irrigate sugarcane but it cannot be used for many other crops. As discussed in Section 2.1.4, the Mahi Pono farm plan includes food crops that are not as salt tolerant as sugarcane is. Hence, there is a limit as to how much these brackish water wells can viably supplement the water needs of the Mahi Pono farm plan. Thus, as discussed in Section 2.1.4, it has been assumed that surface water can be supplemented by a brackish groundwater amount equal to 20 percent of the total irrigation need. That brackish groundwater would come from Mahi Pono's Central Maui wells. Under the Proposed Action, with continued importation of East Maui surface water into Central Maui, and the use of that water for irrigation purposes, there will be some recharge to the Central Aquifer groundwater resources, but not as much as during sugar cultivation.

While the Central Aquifer Sector has generally low SY numbers for groundwater pumpage, it is important to note that calculations of SY do not factor in recharge from the surface water diversions. Under the Proposed Action, the wells in Central Maui are not expected to yield as much as when sugar was cultivated in the Central Maui

[7] The assumption of 22.7% for system losses, including other water uses, such as water used for reservoirs, fire protection, dust control, and hydroelectric uses, does not take into account any improvements to the Central Maui Field Irrigation System that could reduce the total amount of system losses.

agricultural fields. Significant recharge did occur for the Central Maui aquifers when sugar was in cultivation as a result of the seepage / system losses from the Central Maui Field Irrigation System which allowed for high pumpage rates exceeding the SY. Thus, under the Proposed Action, it is assumed that at full operation of the Mahi Pono farm planthe Central Maui Field Irrigation System losses would continue to add to the recharge the Central Maui aquifers, but in an amount that is less than when sugar was cultivated. Additionally, the salinity of the water in the 10 wells available to Mahi Pono is likely to increase, also as a result of the lower level of aquifer recharge. Furthermore, when sugar was cultivated, the 70 mgd of brackish water used by HC&S was sourced from 14 wells, but Mahi Pono only has access to 10 wells.

Additionally, the types of crops envisioned for cultivation under the Mahi Pono farm plan are significantly less tolerant than sugarcane of high salinity levels in the irrigation water. Thus, if greater quantities of the brackish water resource are to be relied upon for the Proposed Action, then desalination of the brackish water will need to occur.

Because so little is known about the relationship between system losses and irrigation return water and how much could be reused as groundwater, a definite statement about impacts on groundwater cannot be made. However, the use of East Maui surface water to irrigate the Central Maui agricultural fields has long supplemented the underlying aquifers, and a similar relationship will continue under the Proposed Action, essentially constituting a beneficial impact to the Central Maui aquifers, particularly the Pā'ia and Kahului aquifers, albeit at a smaller scale than when sugarcane was being cultivated.

4.2.3 Coastal Waters

East Maui

A stream and ocean water chemistry assessment was conducted by Sea Engineering, Inc. (SE) and Marine Research Consultants, Inc. (MRC) in 2018 (See Appendix B). Six representative streams (Hanawī, Waia'aka, Kopili'ula, Wailuānui, Honomanū, and 'O'opuola) systems along the coast of East Maui, which flow through the License Area, were investigated during different seasonal conditions, some presently having no diversion of water while others presently have diversions occurring. The study showed that streams on the coast of East Maui have a wide range of geographical/morphological characteristics. Flow in the streams is highly variable and dynamic, with much of the variability resulting from factors in the upland watershed, as well as diversion of stream water. Moreover, as discussed in Section 1.3.4, five of these six streams are subject to the CWRM D&O, each one receiving a different restoration status. The study concluded that the effects of stream water on marine waters is minor in these habitats, which is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing condition of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting.

Surface waters from the License Area discharge into coastal waters north of the License Area. The State DOH classifies these coastal waters as Class AA (See Figure 4-19). The stated objective of Class AA waters is, "that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions." (Water Quality Standards, Title 11, Chapter 54, HAR).

However, due to continual, intense, wave energy, nearshore areas in East Maui do not constitute important habitats for coral reef communities and associated marine species (SE & MRC, 2019). Moreover, several comments submitted in response to the DEIS raised concerns about impacts of stream diversions to the estuarine environments in East Maui located below the diversions. It should be noted that the HSHEP model used by Trutta to conduct an analysis of impacts of streamflow diversions on the habitat of native amphidromous stream animals (see Appendix A), also considered estuarine reaches present in the stream segments subject to analysis.[8] Generally, an estuary may be described as the areas where fresh and saltwater mix forming a brackish water zone. Within the HSHEP model, estuarine reaches are defined as stream segments occurring below the one-meter elevation. This is consistent with the definition in The Atlas of Hawaiian Streams and Their Aquatic Resources (Parham et al., 2009). The use of the elevation from the Digital Elevation Model of Hawaii was chosen to provide a consistent method for all streams Statewide. Under these defined parameters, there are very little estuarine habitats present due to the steep terrain of the streams that flow from the License Area. The HSHEP model coupled with the most recent aerial imagery available through GoogleEarth, reviewed the the stream mouth areas of each stream subject to analysis for the potential for estuary segments present. The presence of a terminal waterfall, possibility of estuary habitat, and the extent of embayment at the stream mouth were also noted. Table 4-6 below shows the results for all the East Maui streams within the License Area associated with aerial imagery that are diverted by the EMI Aqueduct System. Furthermore, the subsequent Table 4-7, notes results in five streams that have any possibility of an estuarine reach based on data contained in the HSHEP model defined by The Atlas of Hawaiian Streams and Their Aquatic Resources and aerial imagery.

For these five streams, three streams (Waiohue, Pi'ina'au, and Honomanū) are the most likely to have estuarine reaches and all three of these streams have either full or habitat flow restoration required under the CWRM D&O. Of the two streams that may have a small estuarine reach, Pa'akea will have connectivity flow restoration, while 'O'opuloa will have no flow restoration and will remain as per the 1988 IIFS. Thus overall, the majority of estuarine habitat will be either fully or partially restored under the Proposed Action.

[8] This analysis was conducted outside the Trutta report contained herein as Appendix A to respond to comments to the DEIS expressing concerns about impacts of stream diversions to the estuarine environments in East Maui located below the diversions.

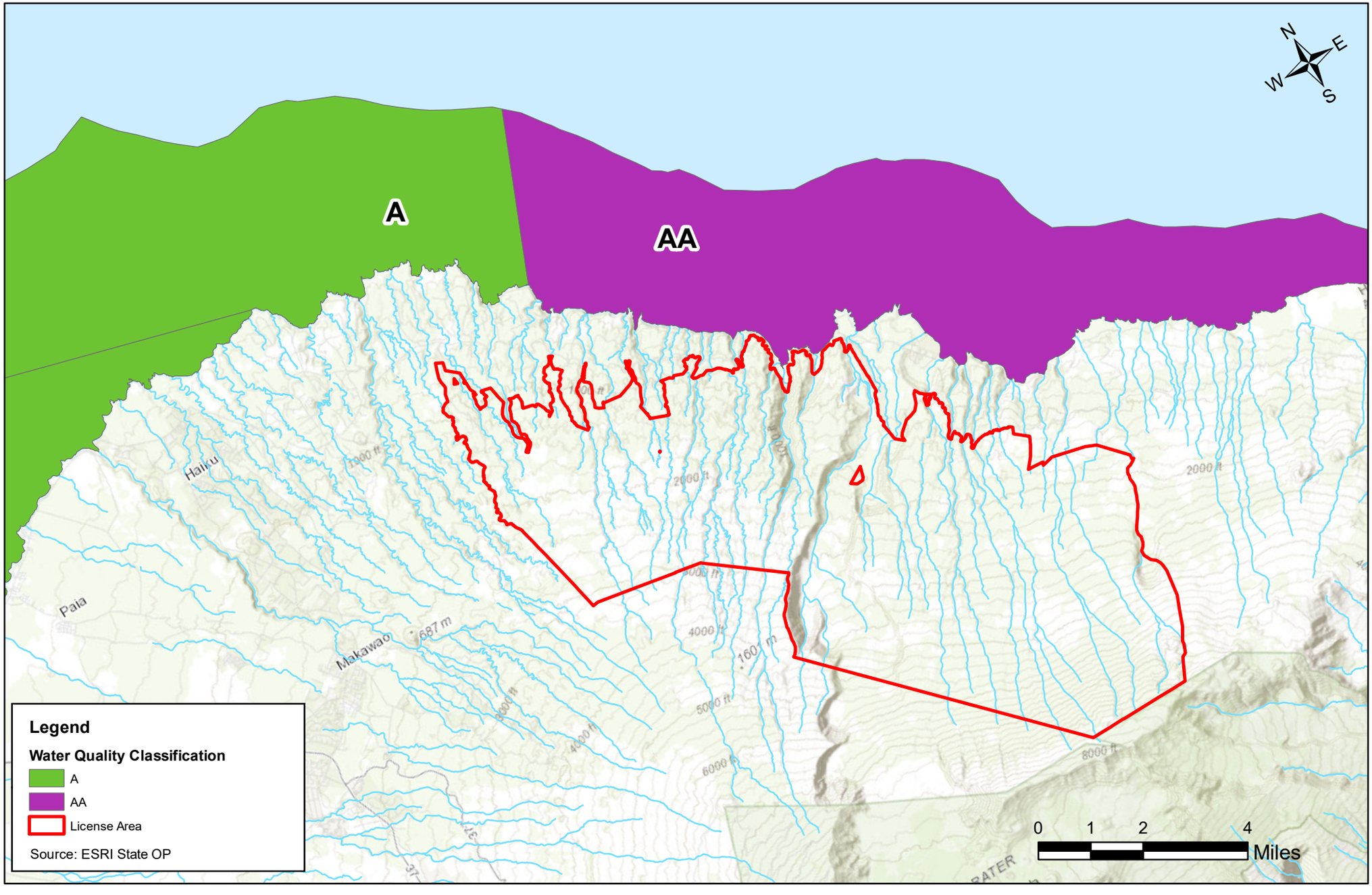


FIGURE 4-19

EAST MAUI WATER QUALITY CLASSIFICATION MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

Table 4-6 Presence of Terminal Waterfall, Estuary, or Embayment Associated with East Maui Streams Based on Aerial Image Review

Watershed ID	Stream	Area	CWRM Ordered Restoration Status	Flow Status	Terminal Waterfall	Estuary	Bay
1	Makapipi	Nāhiku	Full	Perennial	No	No	Little
2	Hanawī	Nāhiku	Connectivity	Perennial	No	No	No
3	Kapāʻula	Nāhiku	Connectivity	Perennial	No	No	Yes
4	Waiaʻaka	Keʻanae	Status Quo	Intermittent	No	No	Yes
5	Paʻakea	Keʻanae	Connectivity	Perennial	No	Maybe	Little
7	Waiohue	Keʻanae	Full	Perennial	No	Yes	Little
8	Kopiliula	Keʻanae	Habitat	Perennial	No	No	No
9	East Wailuāiki	Keʻanae	Habitat	Perennial	No	No	Yes
10	West Wailuāiki	Keʻanae	Full	Perennial	No	No	Yes
11	Wailuānui	Keʻanae	Full	Perennial	No	No	Yes
13	Waiokamilo	Keʻanae	Full	Perennial	Yes	No	No
14	ʻŌhiʻa	Keʻanae	Status quo	Perennial	Yes	No	No
16	Piʻinaʻau	Keʻanae	Full	Perennial	No	Yes	Yes
17	Nuaʻailua	Honomanū	Connectivity	Perennial	No	No	Yes
18	Honomanū	Honomanū	Habitat	Perennial	No	Yes	Yes
19	Punalau	Honomanū	Habitat	Perennial	No	No	Yes
20	Haʻipuaʻena	Honomanū	Connectivity	Perennial	Yes	No	No
21	Puohokamoa	Huelo	Connectivity	Perennial	No	No	Yes
22	Wahinepeʻe	Huelo	Status quo	Intermittent	Yes	No	No
23	Waikamoi	Huelo	Habitat	Perennial	Yes	No	No
24	Kōlea	Huelo	Status quo (non-petitioned stream)	Perennial	Yes	No	No
25	Punaluʻu	Huelo	Status quo (non-petitioned stream)	Intermittent	Yes	No	No
26	Kaʻaiea	Huelo	Status quo (non-petitioned stream)	Perennial	Yes	No	No
27	ʻOʻopuola	Huelo	Status quo (non-	Perennial	No	Maybe	Yes

Watershed ID	Stream	Area	CWRM Ordered Restoration Status	Flow Status	Terminal Waterfall	Estuary	Bay
			petitioned stream)				
28	Puehu	Huelo	Status quo (non-petitioned stream)	Intermittent	No	No	Little
29	Nāʻiliʻilihaele	Huelo	Status quo (non-petitioned stream)	Perennial	Yes	No	No
30	Kailua	Huelo	Status quo (non-petitioned stream)	Perennial	Yes	No	No
31	Hanahana	Huelo	Status quo (non-petitioned stream)	Perennial	No	No	Little
32	Hoalua	Huelo	Status quo (non-petitioned stream)	Perennial	No	No	Yes
33	Hanehoi	Huelo	Full	Perennial	No	No	No
34	Waipiʻo	Huelo	Status quo (non-petitioned stream)	Perennial	No	No	Yes
35	Mokupapa	Huelo	Status quo (non-petitioned stream)	Intermittent	No	No	Little
36	Hoʻolawa	Huelo	Status quo (non-petitioned stream)	Perennial	No	No	Yes
37	Honopou	Huelo	Full	Perennial	No	No	No

Table 4-7 Likely East Maui Streams with some estuarine reach present based on the HSHEP Model + Aerial Image Review Approaches

Watershed ID	Stream	Area	CWRM Ordered Restoration Status	Flow Status	Terminal Waterfall	Estuary	Bay
5	Pa'akea	Ke'anae	Connectivity	Perennial	No	Maybe	Little
7	Waiohue	Ke'anae	Full	Perennial	No	Yes	Little
16	Pi'ina'au	Ke'anae	Full	Perennial	No	Yes	Yes
18	Honomanū	Honomanū	Habitat	Perennial	No	Yes	Yes
27	'O'opuola	Huelo	Status quo (non-petitioned stream)	Perennial	No	Maybe	Yes

The CWRM D&O, however, notes that a total of nine streams (one is considered a tributary to Pi'ina'au Stream) have esturine reaches, four of which were noted by the HSHEP + aerial image review approach as to having estuarine reaches. The streams included in the CWRM D&O are shown in Table 4-8 below along with their overlap with streams determined with the method used by the HSHEP model. According to CWRM, anywhere that the DLNR Division of Aquatic Resources (DLNR-DAR) conducted an estuary survey for the East Maui streams, it was considered an estuary. This includes surveys conducted in bays and/or streams. While the DLNR-DAR's methodology used is for estuary surveys, it does not define the size or extent of an estuary such as the HSHEP model, only that the DLNR-DAR survey was conducted to look for the presence of fish near a stream mouth. Hence, the difference between the two methodologies.

The streams recognized by the CWRM D&O as to having estuarine reaches, four streams (Makapipi, Waiohue, West Wailuāiki, and Pi'ina'au and its tributary Palauhulu) all have full flow restoration ordered and three streams (Kopiliula, East Wailuāiki, and Honomanū) have habitat flow restoration ordered. Based on these flow restoration statuses, the majority of estuarine habitat will be restored in these streams. The remaining two streams (Hanawī and Pa'akea) have connectivity flow restoration ordered. For Hanawī Stream, the connectivity flow restoration is intended to connect the stream segment between the diversion and the large spring. Hanawī Stream already has substantial flow downstream of the spring and therefore any estuarine segment will continue to have a good mix of fresh and saltwater inputs. Pa'akea is a small stream, and the connectivity flow will improve freshwater input to the estuarine stream segment although not as much as in the other streams. Therefore, similar to the combined classification approach in Table 4-7, the majority of estuarine habitat for streams based on the CWRM D&O determination will be restored by the flow restoration ordered under the IIFS.

Table 4-8 Stream with Estuarine Segments Present as Reported within the CWRM D&O

Watershed ID	Stream	Area	IIFS Group	In Table 4-7
1	Makapipi	Nāhiku	Full	No
2	Hanawī	Nāhiku	Connectivity	No
5	Paʻakea	Keʻanae	Connectivity	Yes
7	Waiohue	Keʻanae	Full	Yes
8	Kopiliula	Keʻanae	Habitat	No
9	East Wailuāiki	Keʻanae	Habitat	No
10	West Wailuāiki	Keʻanae	Full	No
16	Piʻinaʻau	Keʻanae	Full	Yes
16b	Palauhulu (tributary of Piʻinaʻau)	Keʻanae	Full	Yes
18	Honomanū	Honomanū	Habitat	Yes

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on coastal water in the region are anticipated. The resulting stream flow into the ocean under the Proposed Action is predicted to be greater than historic flows in the decades prior to the CWRM D&O. However, the amount of stream flow from the License Area into the marine environment, beyond the narrow transition zone, has a minimal influence owing to the naturally occurring rapid and intense mixing. These processes should not be affected by changes in stream flow under the Proposed Action. As it relates to estuarine reaches of streams below the License Area, the majority of estuarine habitat for streams based on the CWRM D&O determination will be restored by the flow restoration ordered under the IIFS as noted in Tables 4-7 and 4-8 above.

Upcountry Maui

The area known as Upcountry Maui is roughly located between the 1,000 to 4,000-foot elevation and is bounded on the west by the agricultural fields in Central Maui and extends out to Kēōkea in the South. There are no coastal waters located within the Upcountry Maui area, however, the service area for the MDWS Upcountry Maui Water System extends to the coast at the community of Haʻikū.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will continue the conveyance of water to MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on coastal waters are anticipated as a result of the continued water service to Upcountry Maui.

Central Maui

Portions of the Central Maui agricultural fields are near, but not abutting, some of Maui's coastal waters. This includes areas in the proximity of Māliko ~~Maliko~~ Bay, Ho'okipa Beach Park, Pā'ia Bay, and Ma'alaea Bay.

The State DOH classified these coastal waters as Class A (See Figure 4-20). The stated objective of Class A waters is, "their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters." (Water Quality Standards, Title 11, Chapter 54, HAR).

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century, including the use of water through the EMI Aqueduct System to supply irrigation water to the Central Maui agricultural fields. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on coastal waters in the region are anticipated as the Proposed Action will reduce wind-blown erosion that could occur if the Central Maui fields were not in cultivation, and which could damage nearshore environments.

Moreover, Mahi Pono will apply BMPs to manage runoff from the agricultural fields that are near coastal waters. The Mahi Pono farm team, as well as its lessees, follow BMPs approved by the DOH, NRCS, the EPA, and other governmental agencies in the use of chemicals, and controlling dust and erosion and runoff associated with its farming activities. Any discharges related to the operation activities within the Central Maui agricultural fields will comply with applicable State Water Quality Standards as specified in HAR, Chapter 11-54 and 11-55 Water Pollution Control, DOH.

4.2.4 Drainage

East Maui

Rainfall in East Maui percolates into the ground and surface flows through naturally formed drainage ways. Surface flows and, in some areas, resurfacing groundwater, feed into streams and eventually discharge into the Pacific Ocean.

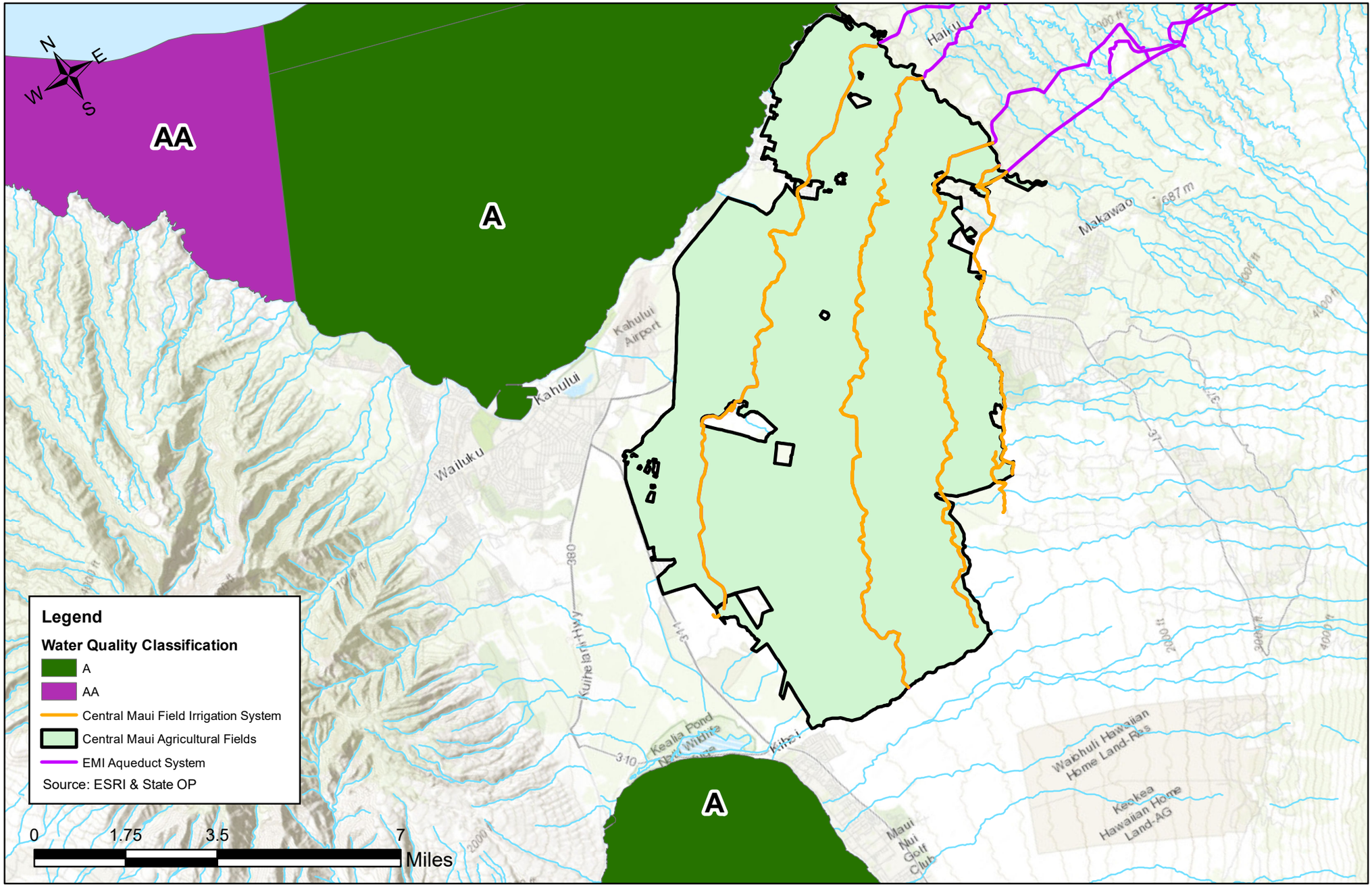


FIGURE 4-20

CENTRAL MAUI WATER QUALITY CLASSIFICATION MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

For more than a century, however the EMI Aqueduct System has diverted flows from East Maui streams for off-stream uses through EMI Aqueduct System. The EMI Aqueduct System ~~system~~ has been used to collect and transport water to meet consumptive needs and enable economic opportunities. The EMI Aqueduct System consists of approximately 388 separate intakes, 24 miles of ditches, and 50 miles of tunnels, as well as numerous small dams, intakes, pipes, 13 inverted siphons and flumes. Water diverted from the streams reduces flows downstream.

Hāna Highway and other improved roadways that are downstream of the EMI Aqueduct System, include bridges and culverts as well as gutters and inverts to accommodate drainage to prevent or minimize ponding or flooding of the roadways.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on drainage in the East Maui region are anticipated. Since the closure of sugar cultivation, the amount of water diverted has been reduced, increasing base flow in diverted streams. While implementation of the Proposed Action will reduce overall streamflow in License Area streams, flow will be greater than when sugar was being cultivated. Surface water hydrology in East Maui is discussed in Section 4.2.1. Drainage facilities, however, are impacted when storm runoff reach extremely high levels. The Proposed Action ~~and the other alternatives~~ will have no discernible impact on such storm flows and their impact on drainage facilities.

Upcountry Maui

Rainfall in Upcountry Maui percolates into the ground so there are no perennial streams. During extremely wet weather conditions, storm runoff will surface flow through naturally formed drainage ways, including Kailua Gulch, Waikapu Stream, Kulanihakoi Gulch, and Waipuilani Gulch as intermittent streams. Improved roadways include drainage features to minimize ponding on road surfaces.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on drainage in the Upcountry Maui region are anticipated.

Central Maui

The Central Maui agricultural fields are designed and operated to efficiently utilize irrigation water from the EMI Aqueduct System so there is no surface runoff. Drainage facilities along improved roadways capture rainfall runoff. Anticipated drainage patterns associated with the Proposed Action are forecasted to match existing drainage conditions.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant changes to existing drainage patterns or systems within Central Maui are anticipated. Any drainage concerns related to construction associated with the Mahi Pono farm plan (i.e., agriculturally related buildings, solar farm(s)) will be addressed through the applicable permitting processes. Irrigation water would be applied at rates that will not cause surface runoff. Severe rainfall can result in localized runoff or ponding but would be unrelated to the amount of irrigation water made available through the EMI Aqueduct System.

4.3 Natural Hazards

The Disaster Mitigation Act of 2000 (DMA, 2000), 44 Code of Federal Regulations, Hazard Mitigation Planning, required states and counties to have approved hazard mitigation plans by November 1, 2004 to receive Pre-Disaster Mitigation funding. The development of State and local hazard mitigation plans is critical for maintaining eligibility for future Federal Emergency Management Agency (FEMA) mitigation and disaster recovery funding.

Given Hawai'i's vulnerability to natural hazards and history of disasters, the State has maintained and implemented a comprehensive, multi-hazard mitigation strategy to reduce loss of life and property damage. This strategy is embodied in the *State of Hawai'i Multi-Hazard Mitigation Plan, 2010 Update*. First adopted by Executive Order in 2004, the 2010 State of Hawai'i Multi-Hazard Mitigation Plan meets a mandatory three-year review and update of State, county and industry capabilities and plans to address natural and man-made hazards.

The County of Maui's Multi-Hazard Mitigation Plan was formally approved in 2005, and updated in 2010 and 2015. The *2015 Multi-Hazard Mitigation Plan* provides an update to all sections of the County's mitigation plan, including hazard identification, asset identification, risk and vulnerability assessments, current mitigation activities and capabilities, mitigation strategy, and plan maintenance to meet requirements set forth by the DMA 2000.

Information from the respective State and County Multi-Hazard Mitigation Plans are included in this section as relevant to the impacted regions of the Proposed Action.

4.3.1 Climate and Climate Change

The topography of the island of Maui and the location of the north Pacific anticyclone relative to Maui affects its climate which is characterized by mild and uniform temperatures ranging from 64 degrees Fahrenheit (F) to 85 degrees F with a mean relative humidity of 66-69%, seasonal variation in rainfall, and great geographic variation in rainfall. The summer season runs from May through September and is generally warm and dry with predominantly northeast trade winds that blow 80-95% of the time. In contrast, the winter season runs from October through April and is associated with lower temperatures, higher rainfall, and less prevalent trade winds that blow 50-80% of the time.

The variation in mean annual rainfall with altitude is extreme on Maui, with differences of more than 130 inches within one mile of Pu'u Kukui in the West Maui Mountains, where average annual rainfall exceeds 355 inches per year. In contrast, mean annual rainfall at the coast in the dry leeward areas is less than 15 inches. At higher altitudes, precipitation is a combination of rainfall and fog drip where the montane forest canopy intercepts cloud water.

Regular trade winds are key in driving the Hawai'i's hydrological cycle, generating rainfall which helps maintain Maui's water supply. However, a recent study showed that Hawai'i's trade winds have decreased in frequency by approximately 30% over the past 37 years, from 291 days per year in 1973, to 210 days per year in 2009 (Garza et. al, 2012). The decrease in the trade winds could have serious implications for the Hawaiian Islands, including adversely impacting local agriculture, native ecosystems and endangered species, and the State's limited freshwater supply.

Overall, the State of Hawai'i is experiencing region-specific impacts that have been attributed to climate change, such as chronic flooding during king tides, severe shoreline erosion, changes in rainfall patterns, severity of storms and coral die off. While there is little consensus about the exact nature, magnitude, and timing of these changes, evidence indicates that there has been a rise in air and sea surface temperatures, a decrease in the prevailing northeasterly trade winds, a decline in average rainfall resulting in a decline in stream base flow, an increase in ocean acidity, and sea level rise (SOEST, 2014).

The United States Environmental Protection Agency states the following:

> *Hawaii's climate is changing. In the last century, air temperatures have increased between one-half and one degree (F). Warming in the oceans around Hawaii has damaged coral reefs, and, in recent decades, increased ocean acidity has threatened reefs and other marine ecosystems. Average precipitation decreased in the last century, reducing freshwater availability on some islands and affecting delicate land-based ecosystems, often harming native species. In the last 50 years, sea level has risen along Hawaii's shores, increasing erosion and threatening coastal communities and infrastructure. (United States Environmental Protection Agency 2016).*

Research indicates that two centuries of unabated greenhouse gas (GHG) emissions, which includes carbon dioxide, methane, nitrous oxide, and fluorinated gases, from anthropogenic sources is responsible for increases in global atmospheric temperatures and ocean warming

over the past century. Climate change has the potential to increase the frequency and intensity of weather-related events, such as tropical storms, hurricanes, and brush fires.

A slight variation of climate patterns are observable throughout Maui. The impacted regions from the Proposed Action are assessed under this FEIS ~~DEIS~~. The following is a description of the climate within the three main geographic areas assessed within this document; East Maui, Upcountry Maui, and Central Maui.

East Maui

The License Area is located along Maui's Ko'olau coastline. Mountains obstruct trade-wind air flow and create wetter climates on north and northeast facing mountain slopes. Persistent trade winds and orographic lifting of moist air result in recurrent clouds and frequent rainfall on windward slopes. When trade winds are present, the vertical development of clouds is restricted by the trade-wind inversion layer. The altitude of the inversion, however, varies over time and space and is affected by thermal circulation patterns, such as land and sea breezes. Most of Maui is usually immersed in the moist air layer below the inversion. On the windward slopes of Haleakalā, which includes the License Area, mean rainfall exceeds 200 inches per year. In the past, this region has experienced as much as 28 inches of rain in 24 hours. Monthly average rainfall is generally evenly distributed, and rainfall levels range from as much as 300 inches in the lands above Nāhiku, to a low of 75 inches found in regions above Ke'anae. On average, USGS data indicates rainfall ranges from 101-454 inches per year, making this region one of the wettest places in the State of Hawai'i.

Climate change trends suggest increased potential for East Maui, including the License Area, to experience periods of intense, episodic rainfall where several inches of rain can fall in a matter of a few hours. According to a USGS publication (2019) on estimating the groundwater of Maui through 2035, the Ko'olau Aquifer System is expected to see an increase in groundwater from recharge rates due to changes in rainfall patterns from future climate change trends. Such rainfall patterns increase the amount of stormwater runoff flowing through the region, including through the streams within the License Area that reach the shoreline. The expected climatic changes in precipitation patterns and streamflow will influence the quantities and concentration of stormwater runoff entering the nearshore environments and coastal waters, resulting in increased sedimentation, impacting coral reefs. However, because of the continuous wave energy in shore areas in East Maui, nearshore areas in East Maui do not constitute important habitats for coral reef communities and associated marine species. (SE & MRC, 2019).

Historic properites and archeological resources, as well as cultural resources and practices, located within chronic flooding areas can experience potential adverse effects due to climate change. For example, burial sites along the Hāmākuapoko District coastline, located approximately 15.0 km (9.3 miles) from the License Area, are being impacted by high surf and high tide events leading to the inadvertent exposure and discovery of human skeletal remains (SHPD 2019a, 2019b, 2020).

As discussed by Tetra Tech and DLNR Office of Conservation and Coastal Lands (2017), the low-lying traditional landscape of the Ke'anae Peninsula in East Maui is particularly vulnerable to sea level rise, which is discussed further in Section 4.3.2 below. Potential impacts could

include inundation of near coastal lo'i and historic structures or indirect impacts to water quality in pond fields with the introduction of increased salinity levels.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on climate in East Maui are anticipated as a result of the Proposed Action. Moreover, because the EMI Aqueduct System is a gravity fed system it is extremely energy efficient and does not rely on non-renewable sources of energy for its operation. A number of comments to the DEIS requested additional information related to climate change. As discussed above, according to a USGS publication (2019) on estimating the groundwater of Maui through 2035, the Ko'olau Aquifer System is expected to see an increase in groundwater from recharge rates due to changes in rainfall patterns from future climate change trends. However, it is noted that climate change also may have the potential to decrease rainfall amounts within the License Area, therefore causing a decrease in stream flow, which could result in an increase in required maintenance and repair of the EMI Aqueduct System. Should happen, repair and maintenance activities would not exceed in scope the current (and long-standing) nature of EMI's maintenance and repair activities, as discussed in Section 2.1.2.

As a general matter, climate change impacts tend to favor invasive non-native botanical species at the expense of native forests. Droughts increase the incidence of fire, which in Hawai'i, tends to favor warm-season grasses and other invasive species (Hughes et al. 1991; Loope and Giambelluca 1998). Flooding and hurricanes open the forest canopy, and that can promote erosion and invasion of non-native pioneer species into the forest understory (Loope and Giambelluca 1998).

Climatic changes would have the most impact on species that require specialized habitats within microclimates, such as endemic damselflies and endemic honeycreepers that are restricted to habitats free of diseases transmitted by mosquitoes. Small environmental changes to microclimates may remove opportunities for foraging, reproduction, and other life history requirements that these species depend on. These changes may ultimately cause a decrease in populations, local extirpations, and in some cases extinction. In addition, an increase in temperature would also be expected to favor invasive alien species at the expense of native vegetation and move alien-dominated forest upward in elevation, ultimately driving out native species through competition (Loope and Giambelluca 1998).

Warming temperatures associated with climate change would allow the Culex mosquito to expand into unoccupied habitat and allow for the development of diseases such as avian malaria above elevations previously occupied (Freed et al. 2005; Samuel et al. 2012). Increasing temperatures would likely increase Hawaiian forest bird exposure to

and increase transmission of avian malaria. Hawaiian forest birds that are susceptible to and cannot tolerate avian malaria would suffer population declines and may become extinct in the wild (Samuel et al. 2012).

Although the USGS publication (2019) has estimated increased rainfall in East Maui as a result of changes in rainfall patterns from future climate change changes, climate change could result in lower rainfall and thus lower levels of streamflow. Notwithstanding, compliance with the IIFS under the CWRM D&O will be required. Hence less flow would be available for the EMI Aqueduct System to divert, which in turn means less water for MDWS and less water to irrigate the Central Maui agricultural fields.

~~However, the~~ The exact nature of how the climate will change and impacts from any changes is unknown. As research into this area continues, there will be increased knowledge of the most effective ways to focus efforts toward adaptation strategies for climatic changes.

Upcountry Maui

Upcountry Maui covers a large range of elevation and area. The average temperature varies at different elevations. As elevation increases, the average temperature decreases. The Leeward side of Upcountry Maui is mostly dry and sunny. The Windward Side of Upcountry Maui tends to be wetter than the Leeward Side. Average annual rainfall ranges from 16-20 inches per year on the Leeward Side to more than 240 inches per year on the Windward Side (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). The KAP receives an average amount of total rainfall of 15 to 25 inches per year.

Climate change trends may increase the potential for altered habitats and conditions. Warming air temperatures could cause ecosystems to shift upslope and decline in size. Changes in precipitation may affect Upcountry Maui's ecosystems and communities include flooding, erosion, drought, and fire. Changes vary from island to island, and even valley to valley. The overarching trend for the State has been a decrease in total rainfall. A decrease in total rainfall, without a reliable source of water delivery, would increase the demand for water in Upcountry Maui for both domestic and agricultural purposes. The demands of water could be potentially minimized through the implementation of water conservation measures, however, the extent to which such efforts would serve to counter reduced levels of water service is uncertain.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on climate in Upcountry Maui due to climate change are anticipated as a result of the Proposed Action.

However, the exact nature of how the climate will change and impacts from any changes is unknown. As research into this area continues, there will be increased knowledge of the most effective ways to focus efforts toward adaptation strategies to address climate change.

Central Maui

Central Maui's climate is typical of Leeward coastal lowlands receiving little rainfall annually, and is relatively dry. The northeast areas receive more rain than the central and southern areas of Central Maui. The average annual rainfall ranges from less than 10 inches in the southern part of the isthmus to over 40 inches in the northeastern areas. Central Maui receives considerable amounts of sunshine, with average daily insolation ranging from slightly less than 450 calories per square centimeter per day in mauka areas to over 500 calories near Kahului.

Climate change trends may suggest an increased potential for the agricultural fields in Central Maui to experience longer, more intense, periods of drought. The overarching trend for the State has been a decrease in total rainfall. It is noted that according to a USGS publication (2019) regarding the groundwater of Maui, that recharge rates and the SY will decrease in the Central Aquifer Sector due to changes in rainfall patterns. A decrease in rainfall would mean less rainfall irrigation of the Central Maui agricultural fields, as well as lower deliveries of East Maui stream water ~~result in less water being conveyed~~ to the agricultural fields. The water conveyed to the agricultural fields in Central Maui also plays a major role in the recharge of the Central Maui aquifers, particularly the Pā'ia and Kahului aquifers. Periods of prolonged and intense drought would further strain the aquifers in Central Maui that depend upon the water conveyed through the EMI Aqueduct System for recharge. Moreover, a simulated scenario in a 2008 USGS study suggests that the complete removal of irrigation return recharge (i.e., imported water from East Maui) would decrease water levels and increase salinity in the Central Aquifer Sector (Akinaka, 2019).

Impacts and Mitigation Measures

The Proposed Action will allow for the continued conveyance of water through the EMI Aqueduct System to allow for the transition of the agricultural fields in Central Maui to a diversified agricultural operation. The Mahi Pono farm plan at full implementation will be predominantly dependent upon the EMI Aqueduct System, a gravity fed irrigation system with little/no energy costs and no GHG emissions, in contrast to water systems that are driven by wells and pumps, which utilize electrical energy generated by fossil fuels.

Various studies indicate that agricultural activities can be a source of GHGs that aggravate climate disruption. Agriculture creates both direct and indirect emissions. Direct emissions come from fertilized soils and livestock manure. While indirect emissions come from runoff and leaching of fertilizers, emissions from land-use changes, use of fossil fuels for mechanization, transport and agro-chemical and fertilizer productions. Various management practices in the agricultural land can lead to production and emission of GHGs, which range from fertilizer application to methods of irrigation, tillage and cattle and feedlots.

However, the agricultural sector has large potential to mitigate climate change. According to the Intergovernmental Panel on Climate Change (IPCC) (2013), mitigation

is an intervention to reduce the emissions sources or enhance the GHG sinks. GHG emissions through energy conservation, lower levels of carbon-based inputs, lower use of synthetic fertilizer and other features that minimize GHG emissions and sequester carbon in the soil.

As Mahi Pono's farm plan becomes operational, GHG emissions from internal combustion engines in farming equipment, and transportation related to crop production and workers will increase over the current fallow conditions. When fully operational, the amount of GHG emissions compared to former sugarcane operations does not suggest that one would be significantly greater than the other. There will be seasonal differences in emissions with a sugar monocrop generating more emissions during seasonal harvests while diversified agriculture would likely be distributed due to differences in crop cycles. Sugar also involved burning but such emissions were not from fossil fuels. Sugar also involved transporting products overseas for processing and distribution while diversified agriculture could reduce the amount of food crops imported from overseas as it increases the amount of local food production. To the extent economically feasible, Mahi Pono and other farmers on its land will grow food crops for the Hawai'i market. Generally, the reduction in imported food would reduce fossil fuel emissions from shiping and airline carriers. However, the Hawai'i market is too small to use all of the available farm product expected to be produced on the Central Maui agricultural lands, and thus some export is necessary.At full development of its farm plan, Mahi Pono expects that its local sales, including those of its farm tenants, will comprise roughly 65% of total sales generated from the Central Maui agricultural fields, with exports being 35%, which is a reduction in the exports and thus a reduction in GHG emissions as compared to a monocrop such as the former sugarcane operations.

Mahi Pono's farm plan proposes livestock operations on the agricultural fields in Central Maui. The livestock sector requires a significant amount of natural resources and has a role in GHG emissions, especially methane and nitrous oxide. Methane, mainly produced by enteric fermentation and manure storage, is a gas which has an effect on global warming 28 times higher than carbon dioxide. Nitrous oxide, arising from manure storage and the use of organic/inorganic fertilizers, is a molecule with a global warming potential 265 times higher than carbon dioxide (IPCC, 2013). However, in comparison to other livestock operations on the island, such as Ulupalakua Ranch, which operates on approximately 18,000 acres, Mahi Pono's livestock operation will be negligible. As mentioned previously, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e., the infrastructure that distributes water from Kamole-Weir to the agricultural fields and also within those fields). As part of this upgrade, Mahi Pono's irrigation engineering team is also implementing high-efficiency irrigation systems. The new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycling and re-using all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Hence, it assumed that under the Proposed Action that the amount of surface water diverted from East Maui streams will be used more efficiently than it was in the past.

Additionally, Mahi Pono's farm plan also includes ~~a~~ utility scale solar(s) farm to supply power to the public power grid, and will also use power from two existing hydro-electric facilities to provide power to pumps and wells, and other infrastructure.

However, the exact nature of how the climate will change and impacts from any changes is unknown. As research into this area continues, there will be increased knowledge of the most effective ways to focus efforts toward adaptation strategies to address climate change.

4.3.2 Sea Level Rise

The present rate of global mean sea level change (SLC) is +3.4 ± 0.4 mm/year (Sweet, 2017), where a positive number represents a rising sea level. SLC appears to be accelerating compared to the mean of the 20th Century. Factors contributing to the measured rise in sea level include decreasing global ice volume and warming of the ocean. Sea level, however, is highly variable. The mean historical rate of sea level change (RSLC) is +2.21 ± 0.42 mm/yr based on monthly data for the period 1947 to 2017 (SE & MRC, 2019).

In 2017, the National Oceanic and Atmospheric Administration (NOAA) revised its SLC ~~sea level change~~ projections through 2100 (NOAA, 2017~~2017 NOAA Report~~) taking into account up-to-date scientific research and measurements NOAA is projecting that global sea level rise as shown by their "Extreme" scenario could be as high as about 8 feet by 2100. NOAA's recent report also identifies specific regions that are susceptible to a higher than average rise in sea level. Hawai'i has thus far experienced a rate of sea level rise that is less than the global average; however, this is expected to change. Hawai'i is in the "far field" of the effects of melting land ice. This means that those effects have been significantly less in Hawai'i compared to areas closer to the ice melt. Over the next few decades, this effect is predicted to spread to Hawai'i, which will then experience sea level rise greater than the global average.

While the projections are based on the most current scientific models and measurements, discretion is necessary in selecting the appropriate scenario. Selecting the appropriate SLC ~~sea level change~~ projection is a function of many parameters, including topography, coastal setting, criticality of infrastructure, potential for resilience, budget, and function.

An important conclusion of the regional climate assessment is that NOAA's revised *Intermediate* rate is recommended for planning and design purposes in Hawai'i. The *Intermediate* rate projects that sea level in Hawai'i will rise 4.2 feet by 2100. Given the recent upwardly revised projections and the potential for future revisions, consideration may also be given to the *Intermediate-High* rate for planning and design purposes, which projects that sea level in Hawai'i will rise 6.3 feet by 2100.

Sea level rise has the potential to impact beaches and shorelines in Hawai'i. Impacts may include beach narrowing and beach loss, loss of land due to erosion, and infrastructure damage due to inundation and flooding. The impacts from anomalous sea level events (e.g., king tides, mesoscale eddies, storm surge) are also likely to increase. A 2015 study found that, due to increasing sea level rise, average shoreline recession (erosion) in Hawai'i is expected to be nearly twice the historical extrapolation by 2050, and nearly 2.5 times the historical extrapolation by 2100 (Anderson et al., 2015).

The State of Hawaiʻi recently published the *Sea Level Rise Vulnerability and Adaptation Report for Hawaiʻi* (Hawaiʻi Vulnerability Report), which discusses the anticipated impacts of projected future sea level rise on coastal hazards, and the potential physical, economic, social, environmental, and cultural impacts of sea level rise in Hawaiʻi (Hawaiʻi Climate Change Mitigation and Adaptation Commission, 2017). The report identifies 3,130 acres on Maui that would be subject to chronic flooding due to 3.2 feet (0.97 m) of sea level rise. The study describes the socio-economic impact of sea level rise that would include the displacement of 1,600 individuals, the loss of 760 structures, and the flooding of 11.2 miles of roadway on Maui (Tetra Tech and DLNR Office of Conservation and Coastal Lands 2017). The University of Hawaiʻi conducted numerical modeling to estimate the potential impacts from sea level rises of 0.5 feet, 1.1 feet, 2.0 feet, and 3.2 feet on coastal hazards including passive flooding, annual high wave flooding, and coastal erosion. These sea level elevations were identified using the predictions associated with the United Nations Intergovernmental Panel on Climate Change's 2014 reports for time marks at 2030, 2050, 2075, and 2100, respectively. These same elevations are correlated to the more recent and comprehensive scientific predictions made in the 2017 NOAA report, using the *Intermediate* rate, for time marks at 2025, 2043, 2064, and 2085, respectively. In summary, the 2017 NOAA Report provides state-of-the-science predictions for rates of sea-level rise, while the Hawaiʻi Vulnerability Report estimates projected coastal impacts at key sea level elevations in Hawaiʻi.

The projected increase in sea level rise has the potential to increase risk of storm surge-related flooding along the coast, expand areas at risk of coastal flooding, increase vulnerability of energy facilities located in coastal areas, flood transportation and telecommunication facilities, and cause saltwater intrusion into some freshwater supplies near the coast. Sea level rise will lead to more frequent and extensive coastal flooding.

East Maui

SE & MRC (2019) used the Pacific Islands Ocean Observing System (PacIOOS) data viewer to present the State sea level rise predictions for passive flooding impacts in East Maui.[9] Presented below (Figure 4-21 through Figure 4-26) are the areas predicted to be passively flooded by a sea level rise of +3.2 ft. This sea level equates to the 2085 *Intermediate* rate sea level prediction by the 2017 NOAA report. Passive flooding assumes there are no changes to the existing surface of the land and sea floor, and elevated water levels are projected across existing elevations. The blue areas indicate existing dry land that would become submerged under +3.2 ft of sea level rise.

Additional impacts to the East Maui area from sea level rise include increased inundation from wave flooding and typically increased rates of coastal erosion, as discussed above. The State sea level rise vulnerability report did not assess impacts to the License Area related to wave inundation or coastal erosion. However, several results can be predicted for the region around the License Area based on existing conditions and empirical littoral response to progressively elevated water levels.

[9] Regarding the coastline below the License Area, the State only selected passive flooding for assessment, thus the only impacts identified, mapped, and presented in the report by the State of Hawaiʻi for East Maui are those associated with passive flooding.

Figure 4-21. PacIOOS +3.2 ft sea level rise passive flooding projection Oopuola Stream

Sea Engineering, Inc. & Marine Research Consultants, Inc provided map that depicts sea level rise within portions of East Maui.

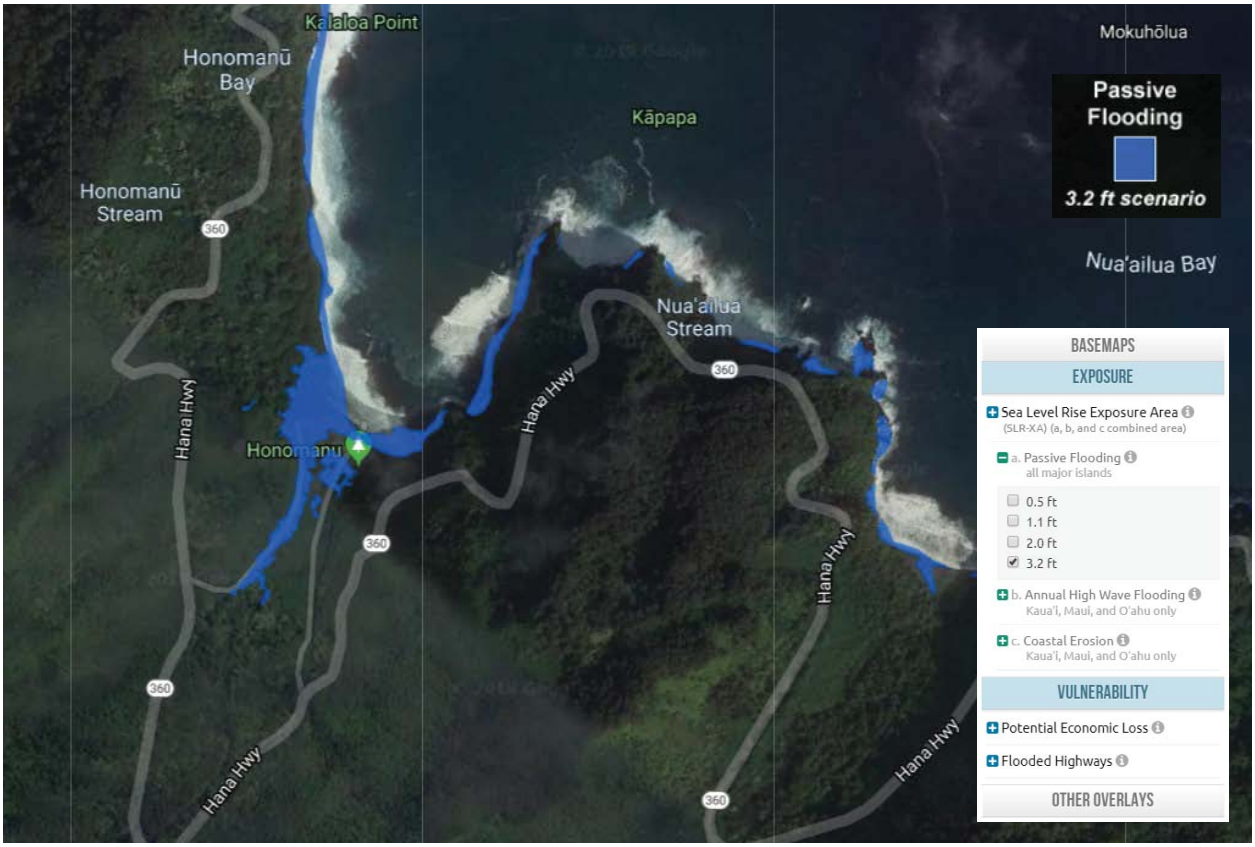


Figure 4-22. PacIOOS +3.2 ft sea level rise passive flooding projection Honomanu Stream

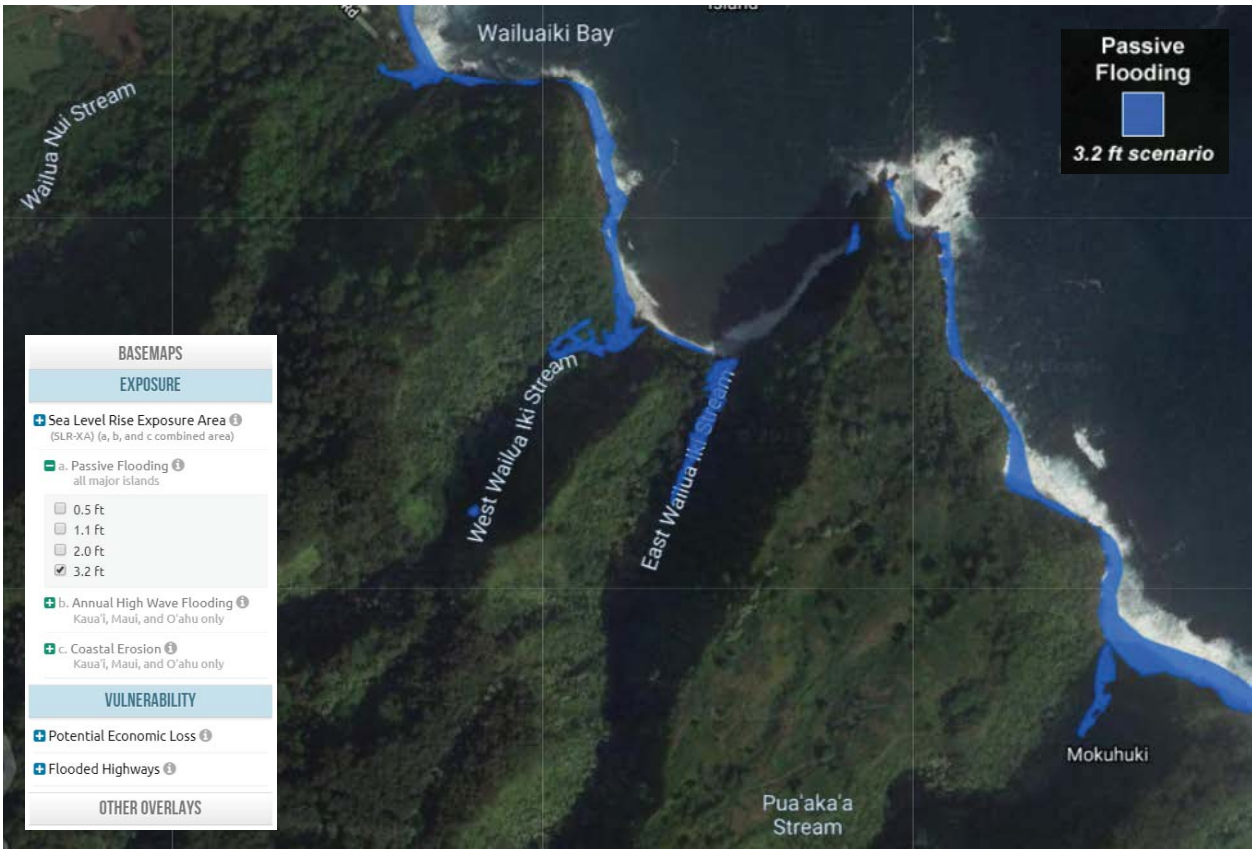


Figure 4-23. PacIOOS +3.2 ft sea level rise passive flooding projection East and West Wailua Iki streams

Sea Engineering, Inc. & Marine Research Consultants, Inc provided map that depicts sea level rise within portions of East Maui.

Figure 4-24. PacIOOS +3.2 ft sea level rise passive flooding projection Kopiliula Stream

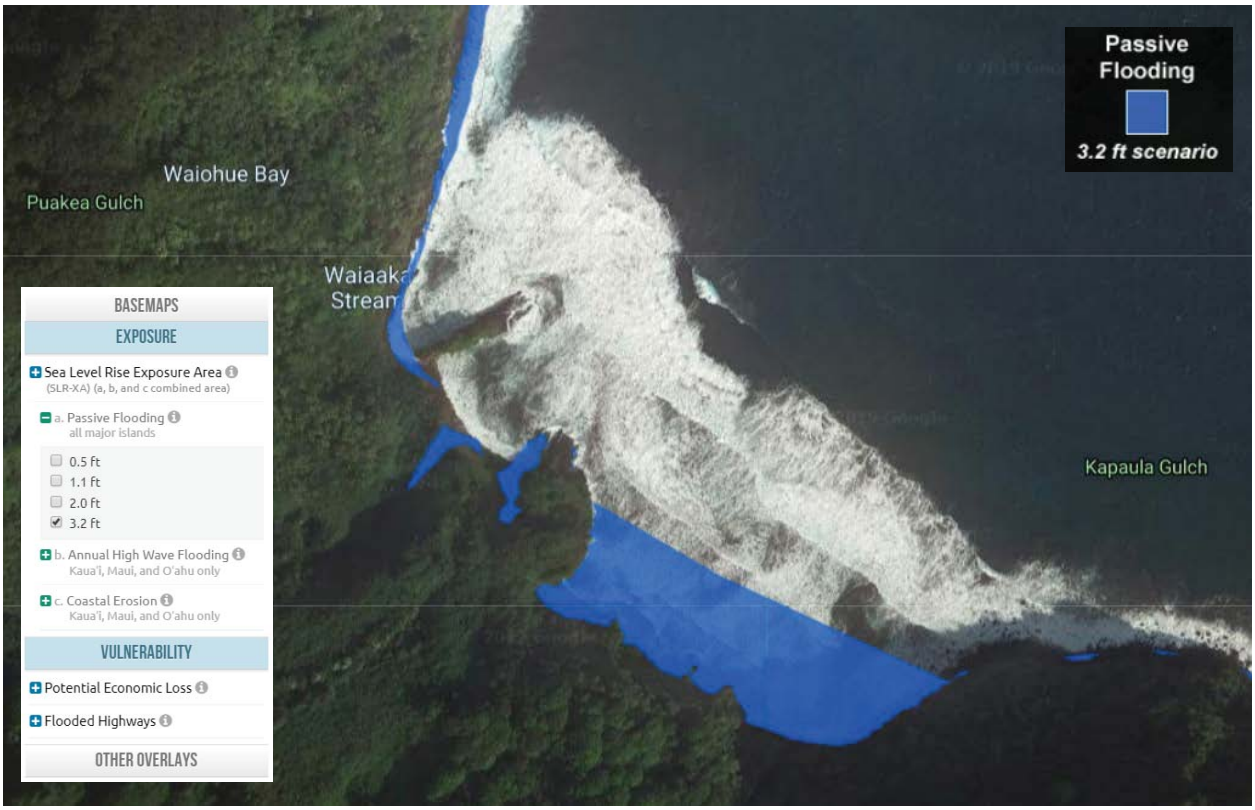


Figure 4-25. PacIOOS +3.2 ft sea level rise passive flooding projection Waiaaka Stream

Sea Engineering, Inc. & Marine Research Consultants, Inc provided map that depicts sea level rise within portions of East Maui.

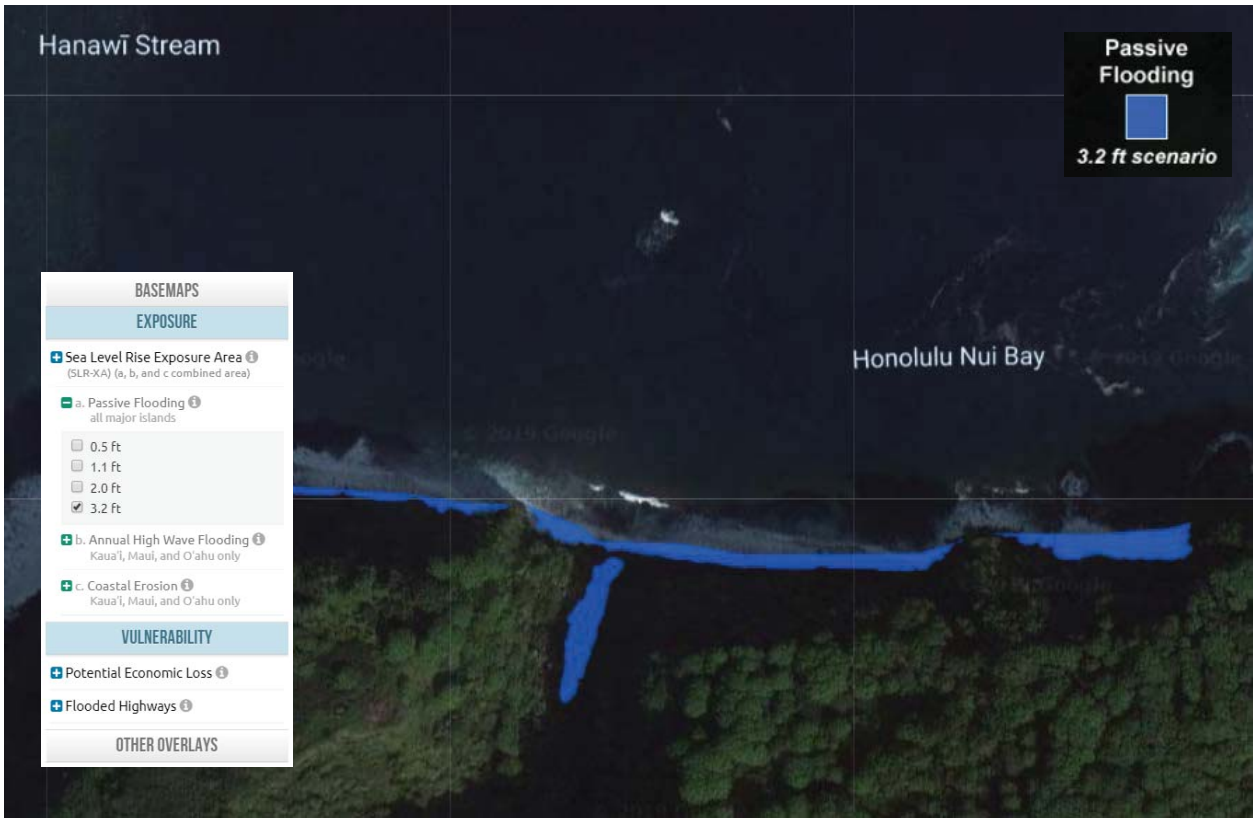


Figure 4-26. PacIOOS +3.2 ft sea level rise passive flooding projection Hanawi Stream

Sea Engineering, Inc. & Marine Research Consultants, Inc provided map that depicts sea level rise within portions of East Maui.

Typically, dynamic sediment coastlines, such as the cobble beaches and deltas at the East Maui stream mouths, respond to changes in water level, sediment supply, and wave energy in short time periods. Erosion or accretion along the shoreline becomes a function of the balance between these three primary factors. Rising seas, if all other factors are static, will typically result in the coastal landform rising up and moving landward, as the makai portions of the active profile are eroded to provide the volume required to elevate the entire landform. Storm and seasonally high waves provide the energy required to reshape the landform, carrying sediment higher on the profile.

Rising seas will likely result in the deltaic beaches, bars, and storm berms at the East Maui streams to rise in elevation, while also migrating landward. Storm and seasonal waves, which are typically depth limited by their interaction with the seafloor near the stream mouths, will also likely increase in size and possibly frequency as sea level rises and climate changes. Storm and seasonal wave inundation will migrate inland with the dynamic landforms. The predicted increase in frequency of heavier rain events and flooding may counter the landward migration of these features to some degree, as additional sediment is provided to the deltaic features during flood events.

The net change to the License Area stream mouths, beaches, bars, and storm berms, resulting from the estimated +3.2 ft of sea level rise is expected to be a landward regression of the landforms combined with an increase in elevation (SE & MRC, 2019).

As discussed by Tetra Tech and DLNR Office of Conservation and Coastal Lands (2017), the low-lying traditional landscape of the Ke'anae Peninsula in East Maui is particularly vulnerable to sea level rise. Potential impacts could include inundation of near coastal lo'i and historic structures or indirect impacts to water quality in pond fields with the introduction of increased salinity levels.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts from sea level rise in East Maui are anticipated as a result of the Proposed Action.

Upcountry Maui

Upcountry Maui is roughly located between the 1,000 to 4,000 foot elevation and is bounded in the west by the agricultural fields in Central Maui and extends out to Kēōkea in the south ~~South~~. There are no coastal waters located within the Upcountry Maui area. The service area for the MDWS Upcountry Maui Water System, however, extends to the coast at the community of Ha'ikū. But, the system itself does not extend to the shoreline so it will not be directly impacted by sea level rise.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant sea level rise impacts in Upcountry Maui are anticipated.

Central Maui

The PacIOOS viewer shows areas predicted to be passively flooded by a sea level rise of +3.2 ft (See Figure 4-27). This sea level equates to the 2085 *Intermediate* rate sea level prediction by the 2017 NOAA report. Passive flooding assumes there are no changes to the existing surface of the land and sea floor, and elevated water levels are projected across existing elevations. The blue areas indicate existing dry land that would become submerged under +3.2 ft of sea level rise. The agricultural fields in Central Maui appear to not be impacted by sea level rise.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts from sea level rise in Central Maui are anticipated.

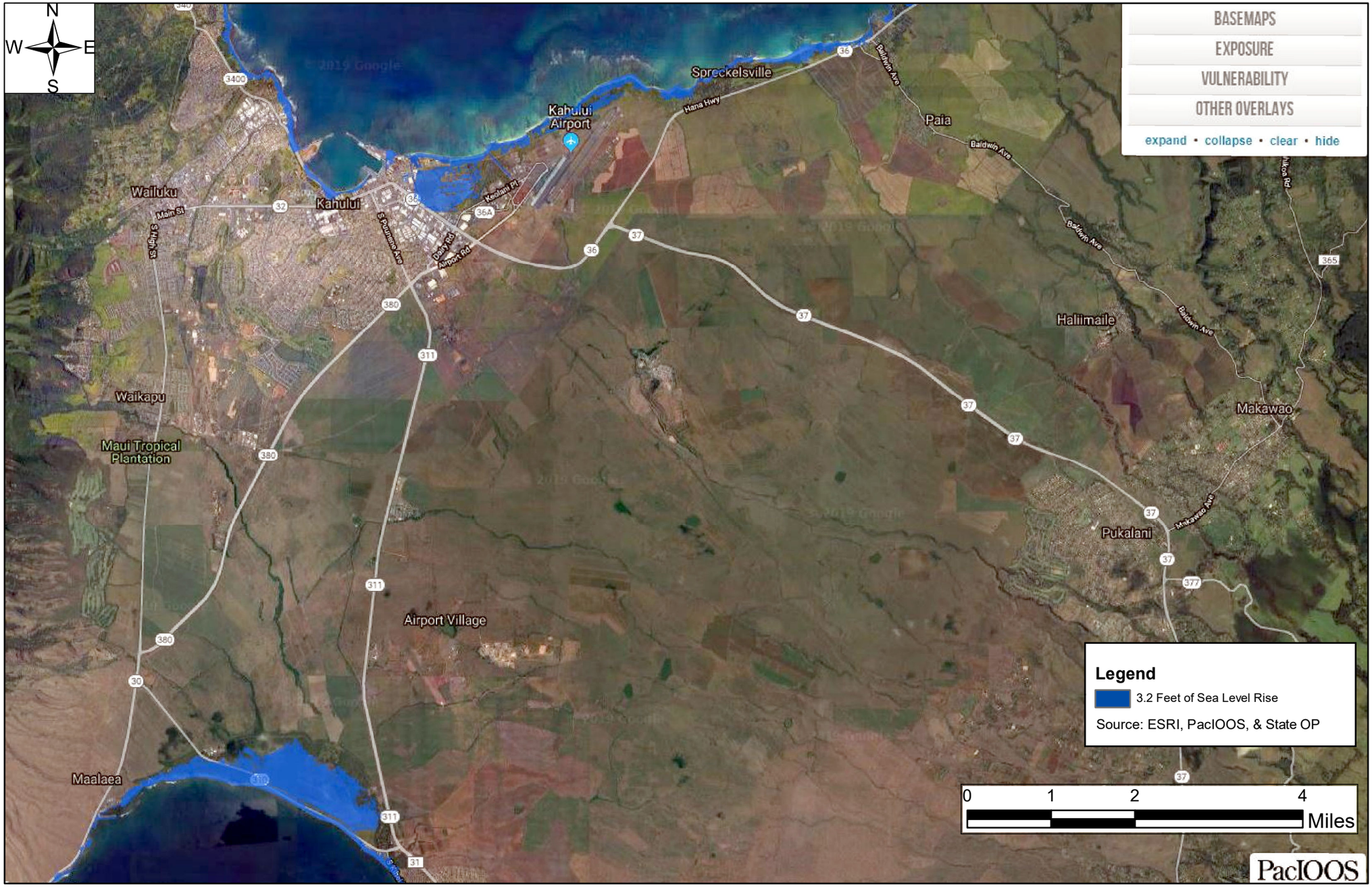
4.3.3 Flood and Tsunami Hazard

Floods are caused by heavy rainfall associated with tropical rain storms. In Hawai'i, streams originate in steep mountains and flow relatively quickly to the ocean, often triggering flash floods in coastal areas. Coastal plains and stream flood plains in the vicinity of the License Area are susceptible to flooding, which can be exacerbated where development impedes or prevents infiltration of the water into the ground.

Tsunami are a series of very long waves triggered by a water-displacing disturbance of the seafloor, either resulting from an earthquake, volcanic eruption, or underwater landslide. These waves travel rapidly and can cause significant damage to coastal areas. Tsunami have such enormous energy that waves can reach far inland with great force.

East Maui

According to the FEMA Flood Insurance Rate Maps (FIRM), the License Area is predominantly designated as Zone "X", "Areas determined to be outside the 0.2% annual chance floodplain." (See Figure 4-28)

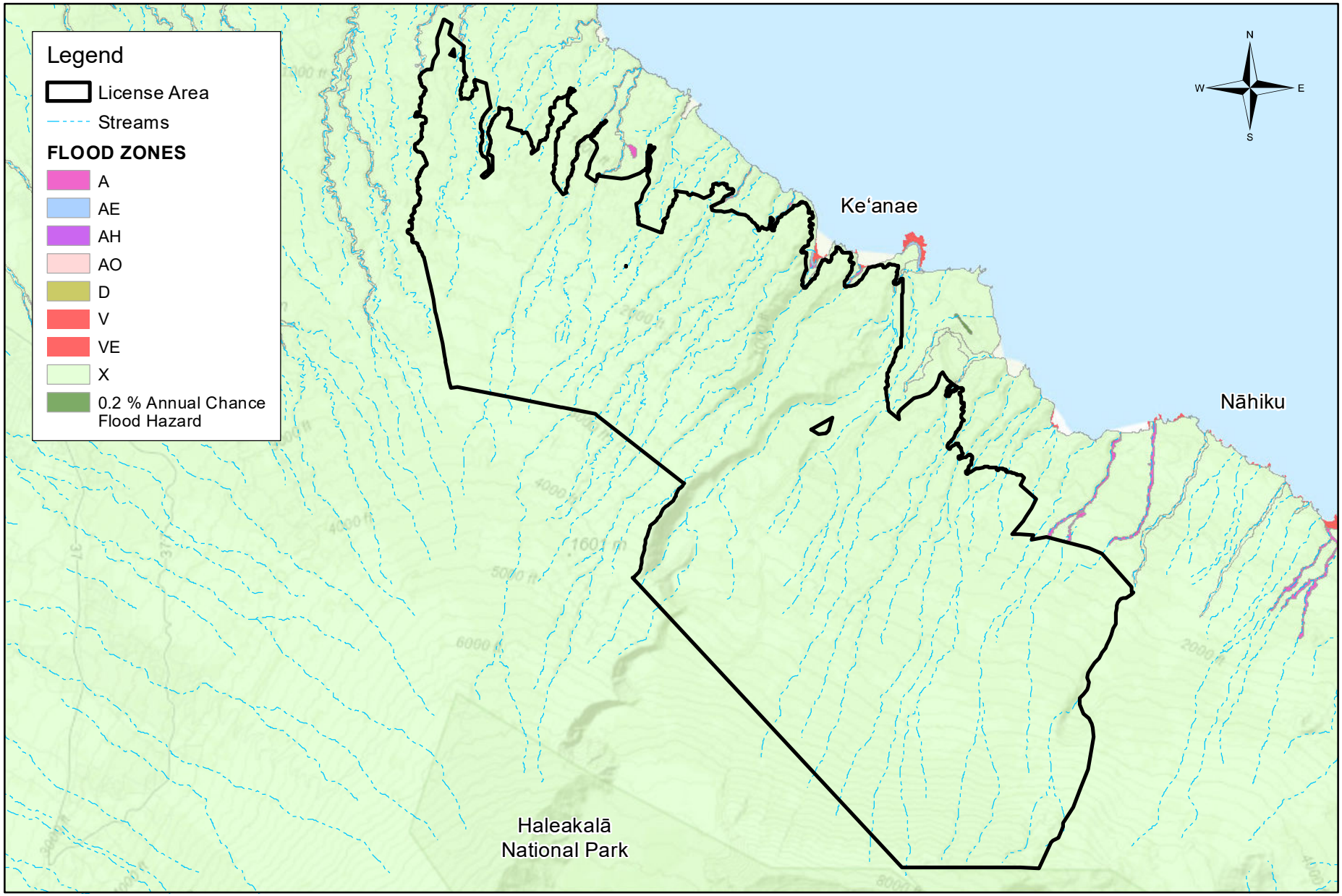


WILSON OKAMOTO CORPORATION

FIGURE 4-27

CENTRAL MAUI 3.2 FEET OF SEA LEVEL RISE MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS



WILSON OKAMOTO CORPORATION

0 5,000 10,000 20,000 Feet

0 0.5 1 2 3 Miles

1 inch = 11,000 feet

Source: ESRI, State OP, & Akinaka

FIGURE 4-28

EAST MAUI FLOOD INSURANCE RATE MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

A number of adjacent parcels along the makai edge of the License Area lie in areas designated as Zone "A", "Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies." However, flooding in East Maui generally caused by freshets.

According the Tsunami Evacuation Zone maps for Maui, the entire License Area is outside of the tsunami evacuation zones (See Figure 4-29). There are area below the Ke'anae and Honomanū portions of the License Area that are within the tsunami evacuation and extreme tsunami evacuation zone.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System.

According the Tsunami Evacuation Zone maps for Maui, the entire License Area is outside of the tsunami evacuation zones (See Figure 4-29). There are area below the Ke'anae and Honomanū portions of the License Area that are within the tsunami evacuation and extreme tsunami evacuation zone.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System.

In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on flooding or tsunami in East Maui are anticipated.

Upcountry Maui

According to the FEMA FIRM, Upcountry Maui is predominantly designated as Zone "X", "Areas determined to be outside the 0.2% annual chance floodplain." (See Figure 4-30). Moreover, according the Tsunami Evacuation Zone maps for Maui, Upcountry Maui is entirely outside of the tsunami evacuation zones (See Figure 4-31). A small portion of Māliko ~~Maliko~~ Bay within the MDWS Upcountry Maui Water System service area lies within the Tsunami Evacuation Zone.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century.

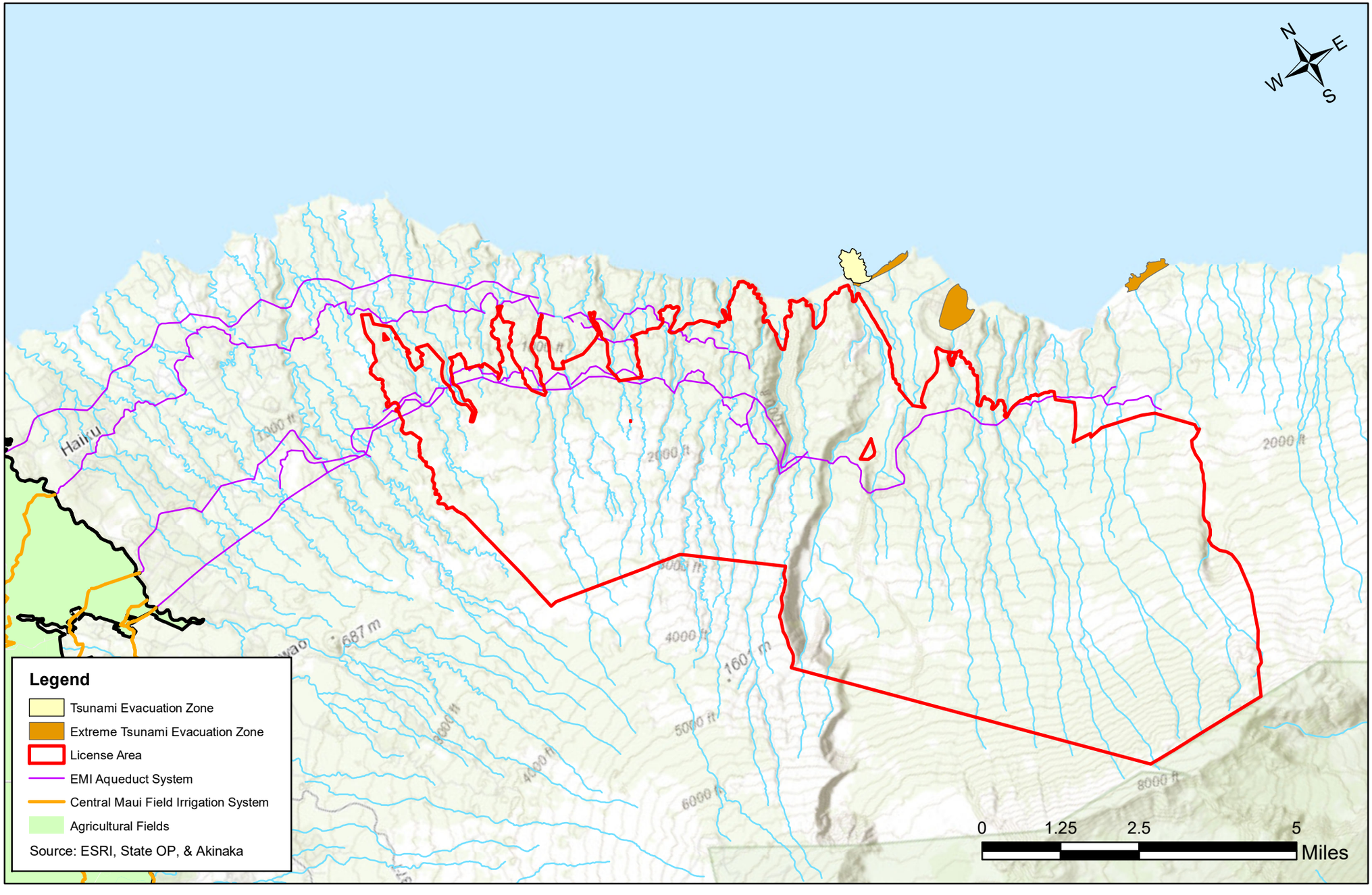
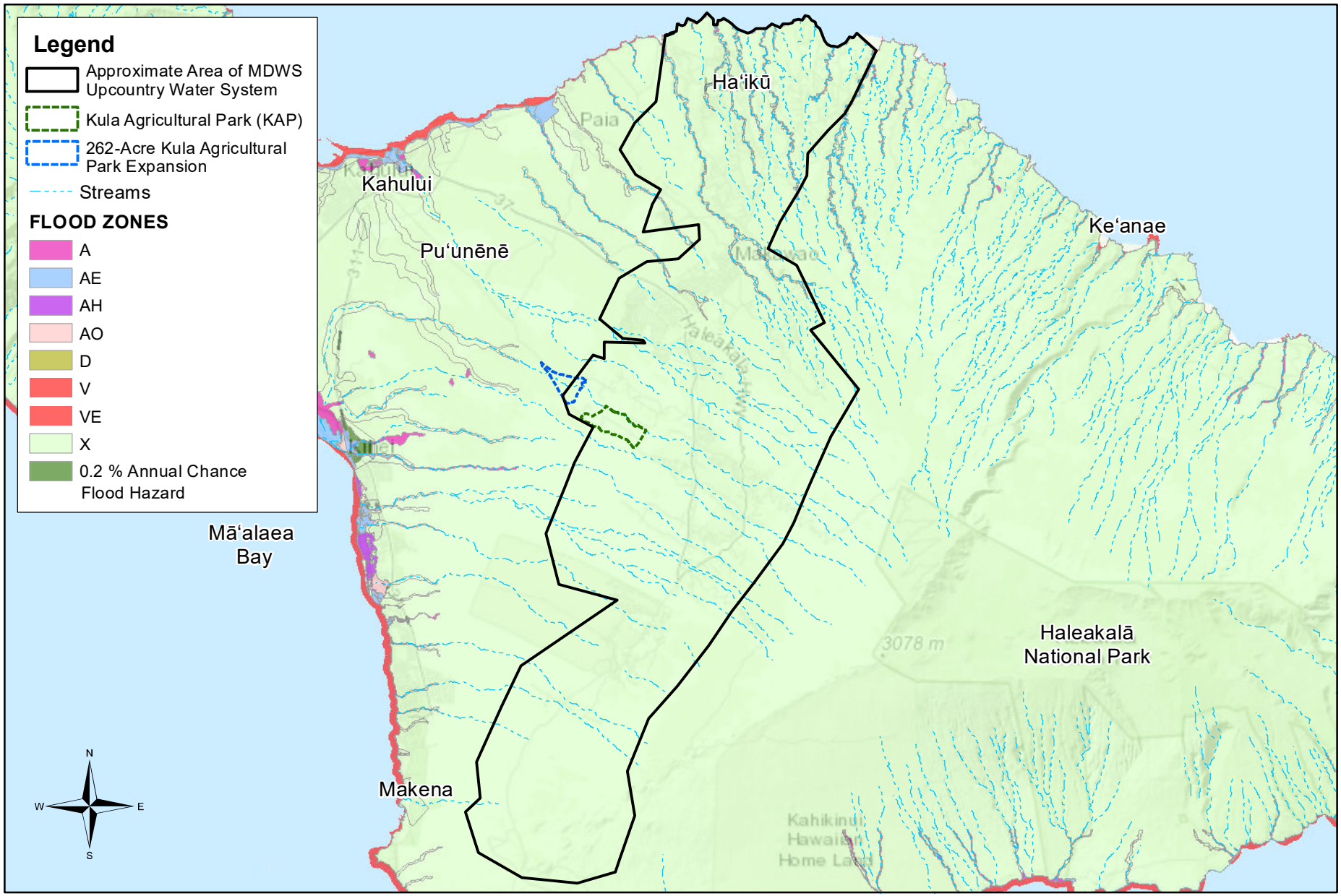


FIGURE 4-29

EAST MAUI TSUNAMI EVACUATION MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION



0 10,000 20,000 40,000 Feet

0 1 2 4 6 Miles

1 inch = 20,000 feet

Source: ESRI, State OP, & Akinaka

WILSON OKAMOTO CORPORATION

FIGURE 4-30

UPCOUNTRY MAUI FLOOD INSURANCE RATE MAP

Proposed Lease for Nāhiku, Keʻanae, Honomanū and Huelo License Areas

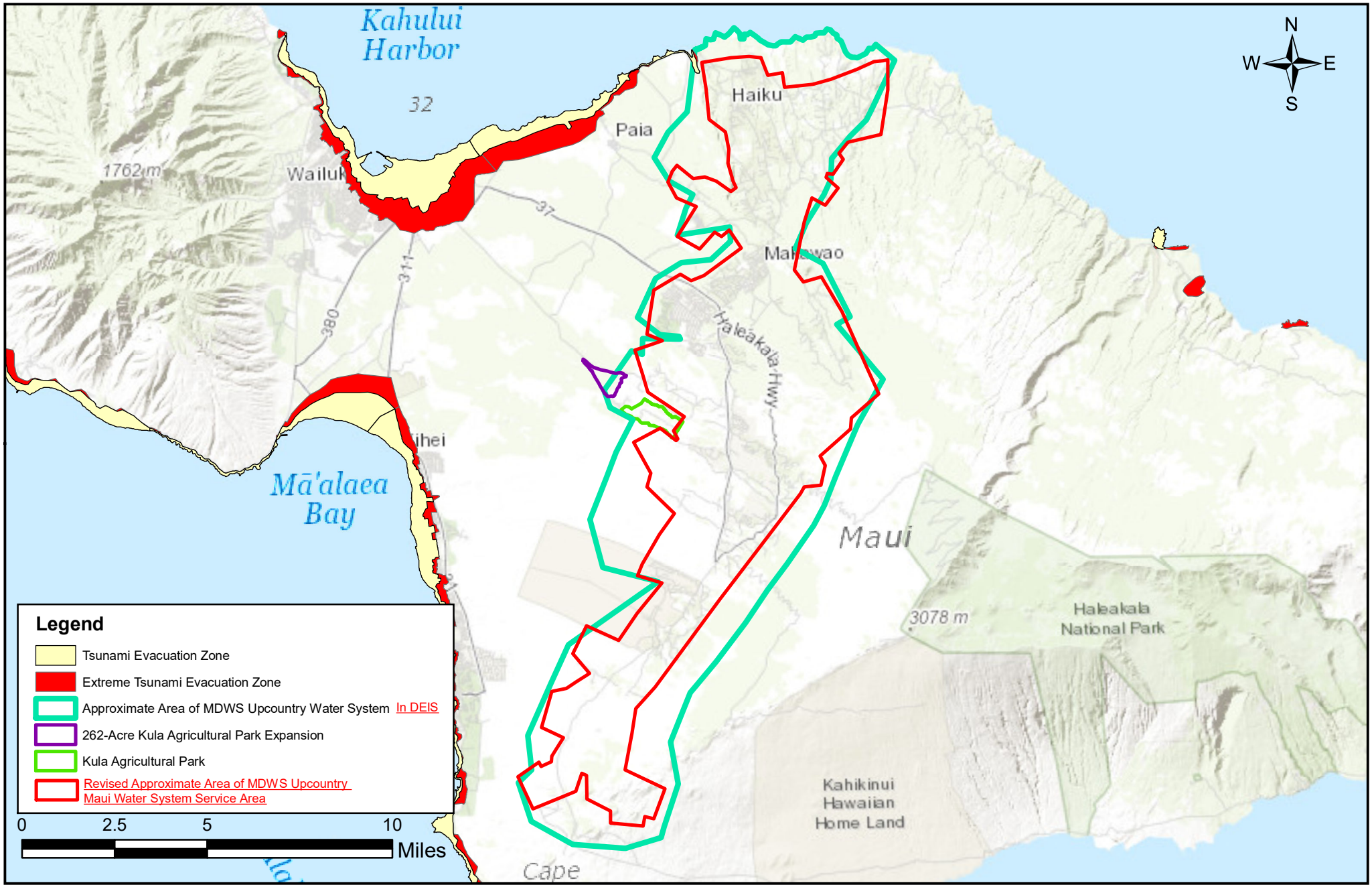


FIGURE 4-31

UPCOUNTRY MAUI TSUNAMI EVACUATION MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on flooding or tsunami in Upcountry Maui are anticipated.

Central Maui

According to the FEMA FIRM, Central Maui is predominantly designated as Zone "X", "Areas determined to be outside the 0.2% annual chance floodplain." (See Figure 4-32) A number of adjacent parcels along the makai edge of Central Maui lie in areas designated as Zone "AE", "Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies," and Zone "VE", "Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action."

According the Tsunami Evacuation Zone maps for Maui, the majority of the agricultural fields in Central Maui are outside of the tsunami evacuation zone. However, there are portions of the agricultural fields in the vicinity of Kihei, Pā'ia and Kahului that are within the tsunami evacuation zone (See Figure 4-33).

Impacts and Mitigation Measures

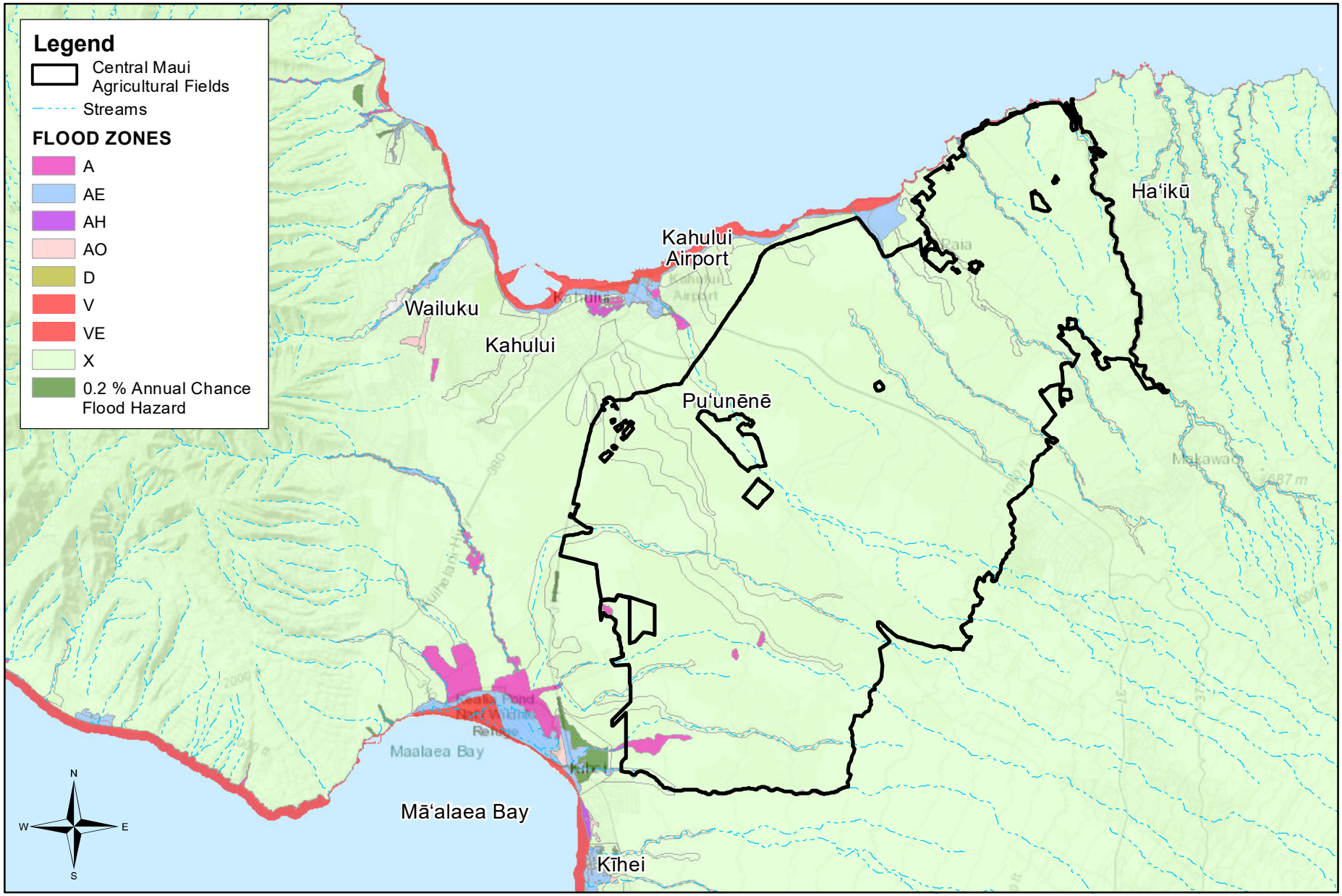
The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on flooding or tsunami in Central Maui are anticipated.

4.3.4 Hurricanes and Wind Hazard

The island of Maui is exposed to hurricanes as result of its unique, varied topographic features and orientation. According to the *State of Hawai'i Hazard Mitigation Plan* (2018), eight hurricanes have affected the Hawaiian Islands and 12 others have posed a threat, since 1950.

About 90% of the deaths that occur along coastlines as a result of hurricanes are caused not by wind, but by storm surge. Storm surge flooding is water that is pushed up onto otherwise dry land by onshore winds. Friction between the water and the moving air creates drag that, depending upon the distance of water (fetch) and velocity of the wind, can pile water up to depths greater than 20 feet (6.1 m) from the shoreline inland. The storm surge is the most dangerous part of a hurricane as pounding waves create very hazardous flood currents. Worst-case scenarios occur when the storm surge occurs concurrently with high tide.

As a hurricane nears land, the surge of water, topped by battering waves, can move ashore along an area of the coastline into low lying coastal areas. Stream flooding is much worse inland during the storm surge because of backwater effects.



WILSON OKAMOTO CORPORATION

FIGURE 4-32

CENTRAL MAUI FLOOD INSURANCE RATE MAP

Proposed Lease for Nāhiku, Ke'anae, Honomanū and Huelo License Areas

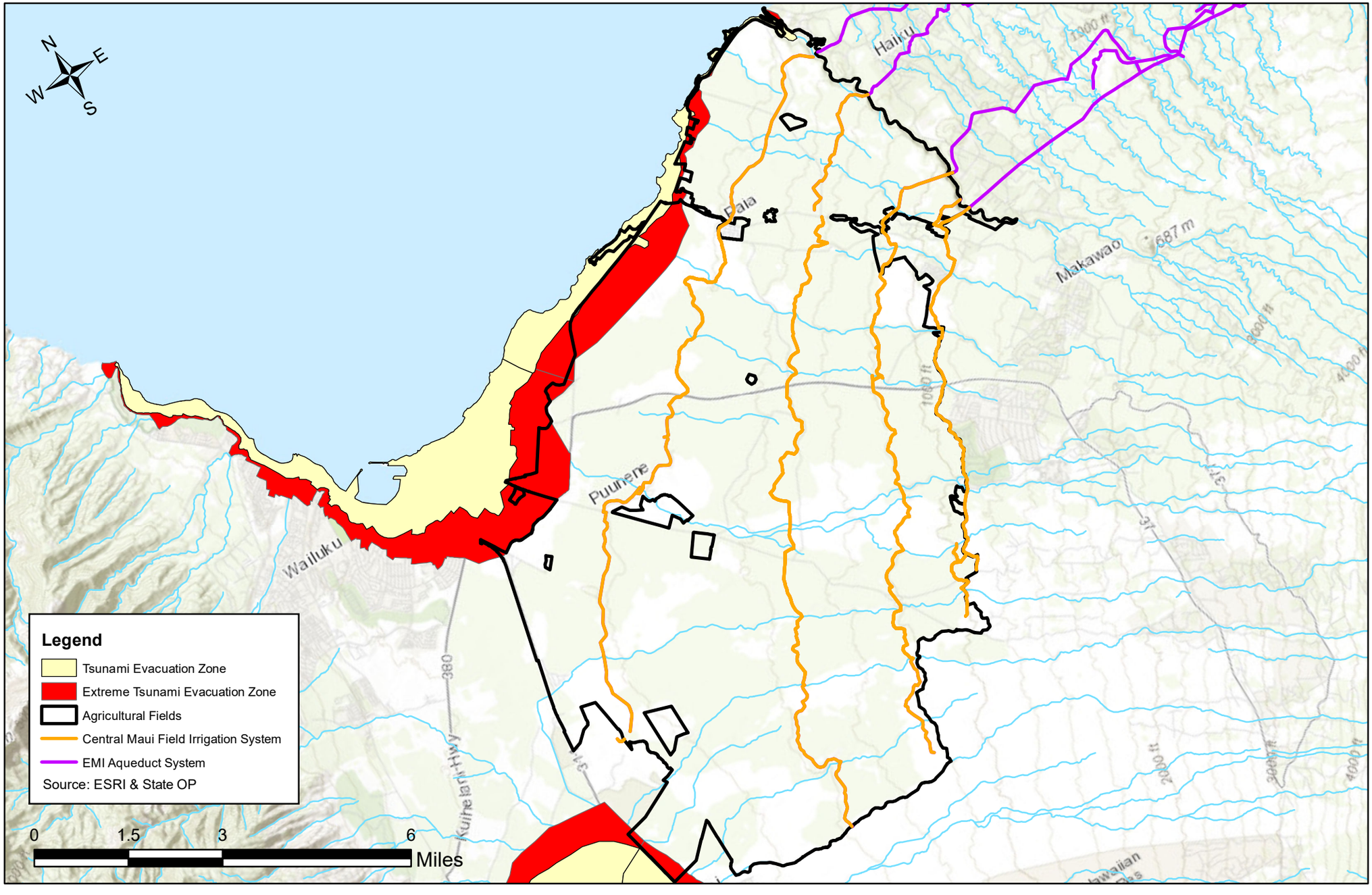


FIGURE 4-33

CENTRAL MAUI TSUNAMI EVACUATION MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

Due to differences in atmospheric pressure, tidal stage, coastal topography, and location relative to the eye of the hurricane it is difficult to predict how hurricane-induced storm surge may impact a specific location.

Not all of identified hurricane and strong wind storm threats make landfall in Hawai'i, and actual hurricane strikes in Hawai'i are relatively rare in modern record. More commonly, near misses that generate large swell and moderately high winds causing varying degrees of damage are the hallmark of hurricanes passing close to the islands.

A tropical storm's strong winds and intense low pressure can generate storm surge along coastal communities. While not all tropical storms will have devastating impacts or create significant levels of storm surge, the surge index record shows a significant positive trend between warmer years and extreme events. Surge levels will vary because of situational factors, and projected changes in hurricane surge levels above the mean sea level in Hawai'i are more likely to increase than decrease with global warming (i.e., results range from a 10 percent reduction to 50 percent increase with a 2.8 degree Celsius temperature increase). In addition, Hawai'i is expected to see an additional increase from warmer temperatures, as the storm track may shift north toward the Central North Pacific. Warming ocean waters raise sea level though thermal expansion and have the potential to strengthen the most powerful tropical cyclones.

East Maui

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts from hurricanes and wind hazards are expected. The EMI Aqueduct System has been in place for nearly 100 years and has withstood wind impacts.

Upcountry Maui

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. The Proposed Action does not include any construction in Upcountry Maui that would be at risk in the event of hurricanes and wind hazards.

Central Maui

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. In Central Maui the Proposed Action largely entails diversified agriculture, which will not present a risk in the event of hurricanes or wind hazards. Construction related to the Mahi Pono farm plan (e.g. solar farms, agricultural processing facilities) is limited, and will be built to all appropriate standards to address risks related to hurricanes and wind hazards.

4.3.5 Seismic Hazard

Earthquakes in the Hawaiian Islands are associated with volcanic eruptions or tectonic movements. Volcanic hazards in the area are considered minimal due to the extinct status of former volcanoes.

Seismic hazards are those related to ground shaking. Landslides, ground cracks, rock falls and tsunamis are all seismic hazards. Engineers and other professionals have created a system of classifying seismic hazards on the basis of the expected strength of ground shaking and the probability of the shaking actually occurring within a specified time. The results are included in the Uniform Building Code (UBC) seismic provisions.

The UBC seismic provisions contain six seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10% chance of severe shaking in a 50-year interval). The entire County of Maui is located within Zone 2B.

Volcanic hazards are not a concern on the island of Maui due to the dormant status of Haleakalā. In Hawai'i most earthquakes are linked to volcanic activity, unlike other areas where a shift in tectonic plates is the cause of an earthquake. Each year, thousands of earthquakes occur in Hawai'i, the vast majority of them so small they are detectable only with highly sensitive instruments. However, moderate and disastrous earthquakes have also occurred.

The 1938 Maui Earthquake, with a magnitude of 6.7-6.9 on the Richter scale and an epicenter six (6) miles north of Maui, created landslides and forced the closure of the road to Hāna.

Damaged water pipes and ground fractures also were reported in Lāhainā. More recently, on October 16, 2006, a 6.7 magnitude earthquake struck on the underwater segment of the major rift zone of the Hualalai volcano on the northwest side of the Island of Hawai'i. The earthquake caused rockslides and some damage to roadways on Maui.

East Maui, Upcountry Maui, and Central Maui

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation, and the continued conveyance of water to the MDWS. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. For Upcountry Maui, the Proposed Action does not entail any new construction, and therefore maintains status quo with respect to seismic hazards. ~~In Central Maui, the 30,000 acres of fields will be used for farming, as it has been for over a century, and the Proposed Action is not anticipated to present any new risks with respect to seismic hazards~~. In Central Maui the Proposed Action largely entails diversified agriculture, which will not present a risk in the event of seismic hazards. Construction related to the Mahi Pono farm plan (e.g. solar farms, agricultural processing facilities) is limited, and will be built to all appropriate standards to address risks related to seismic hazards.

4.4 Natural Environment

4.4.1 Flora

A terrestrial flora and fauna biological survey was prepared by SWCA Environmental Consultants (SWCA) in 2019 and updated in June 2020 in response to comments on the DEIS, which is included as Appendix C. In general, ~~Flora~~ flora and fauna surveys were conducted by a combination of ground-truthing (automotive and pedestrian) in accessible places and aerial (helicopter) surveys to determine the accuracy of whether vegetation types and species previously listed in past surveys and mapping efforts are still present within the License Area and the agricultural fields in Central Maui. The intent of the survey was not to inventory the entire License Area or the agricultural fields in Central Maui but to verify that an existing description (Gon et al. 2006) remained valid. The flora and fauna surveys were conducted from November 28, 2017, to December 1, 2017 (ground surveys) and on January 5, 2018 (aerial survey). Below is a summary of the report pertaining to the East Maui and Central Maui regions.

East Maui

The License Area encompasses a major portion of the Koʻolau Forest Reserve. A transect of the forested region from Pōhaku Palaha at the upper boundary of the License Area at the 8,105 foot elevation to the Hāna Highway near Kailua would identify the following plant communities: high elevation grassland; mesic native shrubs; mesic ʻōhiʻa forest; wet ʻōhiʻa forest with native shrubs; tree ferns and matted ferns; wet sedge-rush-native shrubs with scattered ʻōhiʻa ~~ohia~~ and other native trees; and mesic exotic trees with scattered planted stands of eucalyptus and paper bark (DLNR, 1986). The steeper valley slopes within the region are dominated by wet habitat matted ferns as well as native and exotic shrubs and scattered ʻōhiʻa. Koa-ʻōhiʻa forests are found in two widely separated, mid-elevation locales, one above Honopou Stream, and the other adjacent to Hanawī Stream. A 7,500 acre area ~~portion of the~~ in the Nāhiku portion of the License Area is part of the State of Hawaiʻi NAR ~~Natural Area Reserve~~ System. This area does

not encompass any portion of the EMI Aqueduct System. The U.S. Fish and Wildlife Service (USFWS) has identified 21 endangered or threatened plants with final designated Critical Habitat within or near the vicinity of the License Area (See Figure 4-34). None of these species were observed during ground or aerial surveys; however, it is very likely, given the size and range of vegetation cover types that occur in the License Area, that many of these species could or do exist in the area, particularly in higher elevations on steep cliffs and gulches inaccessible to grazing ungulates were observed during the field surveys. Moreover, it should be noted that three of the 21 species identified by the USFWS—*Peucedanum sandwicense*, *Ischaemum byrone*, and *Cyperus pennatiformis*—are coastal species whose designated critical habitat units are located outside of the License Area.

The USFWS identified 43 listed plants that may occur or have final designated critical habitat within or near the vicinity of the License Area. Of those, it was determined that ~~The~~ 18 species with designated critical habitat ~~that~~ fall within the License Area. These species are: *Bidens campylotheca* spp. *waihoiensis* (koʻokoʻolau, koʻolau, Endangered); *Clermontia samuelii* (ʻōhā wai, ʻōhā, hāhā, Endangered); *Cyanea asplenifolia*, *Cyanea copelandii* spp. *haleakalaensis*, *Cyanea hamatiflora* spp. *hamatiflora*, *Cyanea kunthiana*, *Cyanea maritae*, *Cyanea mceldowneyi* (hāhā, Endangered); *Melicope balloui*, *Melicope ovalis* (alani, Alani kuahiwi, Endangered); *Huperzia mannii* (no Hawaiian name, Endangered) *Cyanea duvalliorum*, *Phyllostegia pilosa* (no Hawaiian name, Endangered); *Melicope balloui* (alani, alani kuahiwi, Endangered); *Cyanea horrida*, *Geranium hanaense*, *Geranium multiflorum* (nohoanu, hinahina, Endangered);*Wikstroemia villosa* (ʻākia, kauhi, Endangered). Table 4-9 below lists endangered or threatened plant species with critical habitat in the License Area. Please note that Table 4-9 below was included in Appendix C of the DEIS but, was not included in the DEIS text itself. However, for the purposes of clarity, it is being included in the FEIS text.

Table 4-9: Endangered or Threatened Plant Species with Critical Habitat Within the License Area

HIGAP Vegetation Classes Found in Critical Habitat Unit	Species found in Critical Habitat Unit (Hawaiian Name, Status)*
Lowland Wet 01	
Alien Forest	*Bidens campylotheca* spp. *waihoiensis* (koʻokoʻolau, koʻolau, Endangered); *Clermontia samuelii* (ʻōhā wai, ʻōhā, hāhā, Endangered); *Cyanea asplenifolia*, *Cyanea copelandii* spp. *haleakalaensis*, *Cyanea hamatiflora* spp. *hamatiflora*, *Cyanea kunthiana*, *Cyanea maritae*, *Cyanea mceldowneyi* (hāhā, Endangered); *Melicope balloui*, *Melicope ovalis* (alani, alani kuahiwi, Endangered); *Huperzia mannii* (no Hawaiian name, Endangered)
Alien Grassland	
Closed Koa-ʻŌhiʻa Forest (native shrubs)	
Closed Koa-ʻŌhiʻa Forest (uluhe)	
Closed ʻŌhiʻa Forest (native shrubs)	
Closed ʻŌhiʻa Forest (uluhe)	
Low Intensity Developed	
Native Wet Cliff Vegetation	
Open ʻŌhiʻa Forest (uluhe)	
Uluhe Shrubland	
Uncharacterized Forest	
Uncharacterized Open-Sparse Vegetation	
Uncharacterized Shrubland	

HIGAP Vegetation Classes Found in Critical Habitat Unit	Species found in Critical Habitat Unit (Hawaiian Name, Status)*
Montane Mesic 01	
Closed Ohia Forest (native shrubs)	*Argyroxiphium sandwicense* ssp. *Macrocephalum* (Ahinahina, Threatened), *Asplenium dielerectum* (no Hawaiian name, Endangered), *Asplenium peruvianum* var. *insulare* (no Hawaiian name, Endangered), *Clermontia lindseyana* (oha wai, Endangered), *Cyanea horrida* (haha nui, Endangered), *Cyanea obtuse* (haha, Endangered), *Cyrtandra ferripilosa* (haiwale, Endangered), *Cyrtandra oxybapha* (haiwale, Endangered), *Diplazium molokaiense* (no Hawaiian name, Endangered), *Geranium arboretum* (no Hawaiian name, Endangered), *Geranium multiflorum* (nohoanu, Endangered), *Huperzia mannii* (wawaeiole, Endangered), *Melicope adscendens* (alani, Endangered), and *Neraudia sericea* (no Hawaiian name, Endangered)
Closed Ohia Forest (uluhe)	
Deschampsia Grassland	
Native Shrubland (alien grasses)	
Native Shrubland / Sparse Ohia (native shrubs)	
Open Ohia Forest (uluhe)	
Uncharacterized Open-Sparse Vegetation	
Montane Wet 01	
Alien Forest	*Cyanea duvalliorum*, *Cyanea maritae*, *Cyanea mceldowneyi* (hāhā, Endangered); *Phyllostegia pilosa* (no Hawaiian name, Endangered); *Melicope balloui* (alani, alani kuahiwi, Endangered); *Huperzia mannii* (no Hawaiian name, Endangered)
Alien Grassland	
Closed ʻŌhiʻa Forest (native shrubs)	
Native Wet Cliff Vegetation	
Open ʻŌhiʻa Forest (uluhe)	
Uluhe Shrubland	
Uncharacterized Forest	
Uncharacterized Open-Sparse Vegetation	

HIGAP Vegetation Classes Found in Critical Habitat Unit	Species found in Critical Habitat Unit (Hawaiian Name, Status)*
Montane Wet 02	
Alien Forest	*Bidens campylotheca* spp. *pentamera* (koʻokoʻolau, koʻolau, Endangered); *Clermontia samuelii* (ʻōhā wai, ʻōhā, hāhā, Endangered); *Cyanea copelandii* spp. *haleakalaensis*, *Cyanea duvalliorum*, *Cyanea hamatiflora* spp. *hamatiflora*, *Cyanea horrida*, *Cyanea kunthiana*, *Cyanea mceldowneyi* (hāhā, Endangered); *Geranium hanaense*, *Geranium multiflorum* (nohoanu, hinahina, Endangered); *Wikstroemia villosa* (ʻākia, kauhi, Endangered)
Alien Grassland	
Closed Koa-ʻŌhiʻa Forest (native shrubs)	
Closed Koa-ʻŌhiʻa Forest (uluhe)	
Closed ʻŌhiʻa Forest (native shrubs)	
Closed ʻŌhiʻa Forest (uluhe)	
Native Wet Cliff Vegetation	
Open ʻŌhiʻa Forest (native shrubs)	
Open ʻŌhiʻa Forest (uluhe)	
Uluhe Shrubland	
Uncharacterized Forest	
Uncharacterized Open-Sparse Vegetation	
Uncharacterized Shrubland	
Very Sparse Vegetation to Unvegetated	
Subalpine 02	
Closed Ohia Forest (native shrubs)	*Argyroxiphium sandwicense* ssp. *macrocephalum*, (ahinahina, Threatened) *Geranium multiflorum* (nohoanu, Endangered), and *Schiedea haleakalensis* (no Hawaiian name, Endangered)
Deschampsia Grassland	
Native Shrubland (alien grasses)	
Native Shrubland / Sparse Ohia (native shrubs)	
Wet Cliff 01	
Alien Forest	None
Closed Ohia Forest (native shrubs)	
Native Wet Cliff Vegetation	
Open Ohia Forest (uluhe)	
Uluhe Shrubland	
Uncharacterized Forest	
Uncharacterized Open-Sparse Vegetation	

* Additional species are not currently present but have potential to establish in each critical habitat unit

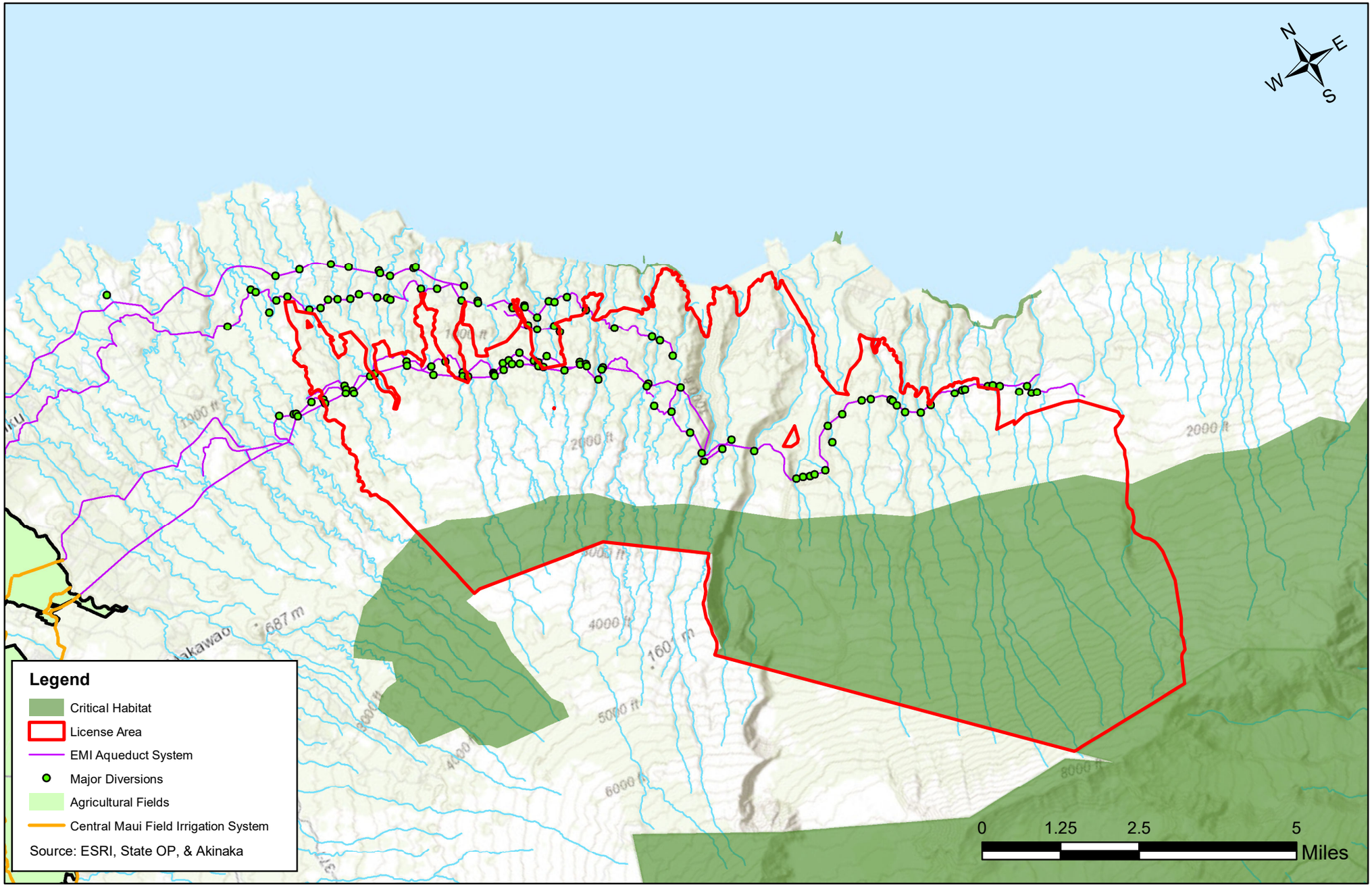


FIGURE 4-34

CRITICAL HABITAT MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

In response to comments on the DEIS, the Terrestrial Flora and Fauna Technical Report (Appendix C), was updated to expand on information that was addressed in the report included with the DEIS. The updated report notes that threatened and endangered species have higher potential to occur in higher elevation landcover types, as evidenced by the presence of designated critical habitat in the high-elevation portions of the License Area. For example, the Lowland Wet 01 Critical Habitat Ecosystem Unit ranges between 1,800 feet and 3,240 feet and is the lowest reaching critical habitat in the License Area. All vegetation, including stream-adjacent vegetation in higher elevations (i.e., above 1,800 feet) is more likely to be composed of a diversity of native and unique plant species. Many of the streams channelize into deep gulches, eroding the surrounding land and creating steep cliff faces.

In general, listed and other native species are more likely to occur in areas that pigs and goats cannot access, such as cliff faces and other steep topography. Areas with fencing and other ungulate management, such as the Hanawī NAR, have the greatest potential to contain a high diversity of unique species.

As discussed in the Terrestrial Flora and Fauna Technical Report (Appendix C) attached to the DEIS, results of SWCA's pedestrian and aerial surveys, and desktop analysis found that the License Area comprises primarily open and closed 'ōhi'a (*Metrosideros polymorpha*) forest. This type of vegetation accounts for over 60% of the vegetation in the surveyed areas of East Maui. Open 'ōhi'a forests tended to have native species such as 'ōhi'a, pāpala kēpau (*Pisonia grandis*), and lapalapa (*Cheirodendron trigynum*) co-dominating with invasive species such as African tulip tree (*Spathodea campanulata*) and Formosa koa (*Acacia confusa*). The midstory was often a co-dominant mixture of native and non-native as well, with natives such as hāpu'u fern (*Cibotium* sp.) and koa (*Acacia koa*) blending with invasive species such as shoebutton ardisia, mule's foot fern (*Angiopteris invecta*), and strawberry guava. The understory frequently consisted of uluhe with a mixture of non-native herbaceous species along the margins, including glorybush (*Tibouchina herbacea*), white ginger (*Hedychium coronarium*), Koster's curse, Spanish needle, and Job's tears.

Results of SWCA's pedestrian and aerial surveys, and desktop analysis confirmed that ~~Non-native~~ non-native (Alien) Forest accounts for 23% of the vegetation in the License Area and includes *Eucalyptus*, *Casuarine*, *Falcataria*, *Araucaria*, *Fraxinus*, *Melaleuca*, *Psidium*, and *Grevillea* spp. Paperbark (*Melaleuca quinquenervia*) and eucalyptus (*Eucalyptus* spp.), likely introduced as forestry species, were found during the ground surveys to be the predominant overstory species in this vegetation type. This landcover type is largely around the EMI Aqueduct System and its access roads and trails. This landcover type is typified by a suite of common invasive forest and grassland species. These common invasive forest and grassland species typically form monocultures that outcompete native plants, causing further disturbance and decreasing the potential for native and unique species to occur. Shoe button ardisia (*Ardisia elliptica*) and strawberry guava (*Psidium cattleianum*) were common throughout the midstory, and understory species included a variety of non-native grass species such as basket grass (*Oplismenus hirtellus* spp. *Hirtellus*), Job's tears (*Coix lachrymal-jobi*), and bristly foxtail (*Setaria verticillata*), in addition to herbaceous species such as Koster's curse (*Clidemia hirta*), Spanish needle (*Bidens pilosa*), and tick trefoil (*Desmodium triflorum*). 'Ie'ie (*Freycinetia arborea*), a native liana, and laua'e haole (*Phlebodium aureum*), a non-native epiphytic fern, can occasionally be seen twining through the midstory in this vegetation type.

For the most part, low-elevation waterways in the License Area consist of channelized concrete ditches. In these areas, the stream-adjacent vegetation is primarily composed of disturbance-adapted invasive species such as non-native stream-adapted ferns and Job's tears (*Coix lacryma-jobi*). These species have broad habitat requirements and are expected to be able to adapt to a wide range of water availability and other environmental conditions.

Uluhe-dominated slopes were seen on ground surveys occurring adjacent to 'ōhi'a forest on relatively steep slopes up and downhill from access roads. These areas were characterized by a generally monotypic understory layer of uluhe with the sporadic presence of native shrubs and trees, including 'ōhi'a, pāpala, kēpau, and lapalapa, but also the less commonly seen native species 'ōhā wai nui (*Clermontia arborescens* spp. *waihiae*).

Wet cliff areas are less likely to be impacted by feral pigs are human activities due to their steepness, and thus are more likely to contain threatened or endangered plant species. However, no threatened, endangered, or candidate plants were seen in these areas during the ground surveys, but some less-commonly seen species were noted, including a *Cyrtandra* species (likely *Cyrtandra grayi*), and 'ōhā wai nui. Fern species tend to dominate these areas, most notably *Cyclosorus parasiticus*. *Machaerina*, a native sedge, was also frequently seen.

SWCA mapped a total of 34 watersheds in the License Area. The area of each vegetation cover type is listed in Table 4; Figure A-3 in Appendix C. This analysis by watershed is intended to provide a finer-grain description of the flora resource of the License Area. Table 4-10 below indicates the area of designated critical habitat by watershed. The presence of designated critical habitat in a watershed indicates the potential for threatened and endangered species to occur (Figure A-5 in Appendix C). As indicated in Table 4-10, apart from the Lowland Wet 01 unit, more listed plant species or their habitat may occur in the portion of the License Area east of Pi'ina'au Stream because critical habitat units overlap watersheds that occur east of Pi'ina'au Stream.

Table 4-10: Area (acres) of Botanical Critical Habitat Present in the License Area by Watershed

Watershed*	Lowland Wet 01	Montane Mesic 01	Montane Wet 01	Montane Wet 02	Subalpine 02	Wet Cliff 01	Total
Makapipi	368.4			139.0			507.4
Hanawī	573.2	290.1		1,501.1	8.2		2,372.6
Kapā'ula	43.9						43.9
Pa'akea	188.8			91.5			280.2
Kopili'ula	356.5	273.0		1,324.7	38.8		1,993.1
East Wailuāiki	401.1	7.6		1,000.0			1,408.8
West Wailuāiki	378.4			920.3			1,298.7
Wailuānui	144.7			259.8			404.5
Waiokamilo	210.1			393.5			603.6
Pi'ina'au	2,088.6		78.0	774.9		289.0	3,230.6
Honomanū	352.8						352.8

Watershed*	Lowland Wet 01	Montane Mesic 01	Montane Wet 01	Montane Wet 02	Subalpine 02	Wet Cliff 01	Total
Ha'ipua'ena	119.0						119.0
Puohokamoa	349.1						349.1
Waikamoi	127.5						127.5
Ka'aiea	105.1						105.1
Nā'ili'ilihaele	370.7						370.7
Kailua	576.0						576.0
Ho'olawa	190.0						190.0
Total	**6,943.9**	**570.8**	**78.0**	**6,404.7**	**47.0**	**289.0**	**14,333.5**

Impacts and Mitigation Measures

In general, no impacts to flora resources in East Maui are anticipated from the Proposed Action. The Proposed Action does not require vegetation removal except for routine maintenance purposes, therefore the amount of each vegetation cover type currently present would remain substantially the same. The Proposed Action allows for the diversion of water by the existing EMI Aqueduct System for water delivery purposes, and this action in and of itself would have no impact on terrestrial flora or fauna resources. Below the diversions, reducing the amount of water in the stream could lead to the die-off of some obligate wetland flora species. These species would be replaced by less water-dependent species, such as grasses. Overall, vegetation would continue to line the stream banks, but the species composition would change. It is important to note that the flora species in the low elevation areas where this impact would take place have been impacted by human presence and already consist of common invasive species. For this reason, a reduction in stream flow would be very unlikely to decrease habitat for special-status or native species. Conversely, increasing the stream's baseline flows, could change the composition of the stream-adjacent vegetation to include more non-native wetland obligate or facultative species. It is unlikely many native species would recolonize with higher stream flows because the history of use and management has likely depleted the native seed bank. However, the presence of the EMI Aqueduct System and associated access roads increases fragmentation in otherwise continuous habitat patches, but because the Proposed Action involves the use of roads and a system that has been in place for over 90 years, no habitat fragmentation is expected from the Proposed Action.

The current floristic conditions in License Area are a result of more than 100 years of impacts from use and management of the EMI Aqueduct System and access roads and trails. As a result, these areas are already heavily invaded by non-native plant species. As discussed in Section 2.1.4 in more detail, as of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd. Under the Proposed Action, approximately 87.95 mgd is planned to be diverted from the License Area streams, which is near half of the historic average draw of approximately 165 mgd up until 1986, as discussed in Section 2.1.2. Any changes to plant species composition that may occur due to future repair and maintenance activities associated with the Proposed Action would be expected to be insignificant, compared with the conversion from native

to invaded forest that occurred over the course of over a century or more. Therefore, the Proposed Action would not be expected to significantly impact the flora of the License Area. However, it should be noted that the native forest habitat becomes progressively more extensive and of higher ecological integrity as one moves towards the eastern portions of the License Area. The native species richness in the stream communities follows a similar west-to-east progression. Thus, more stringent mitigation measures should be followed in these areas of the License Area.

Generally, EMI's anticipated activities within the License Area in connection with the proposed Water Lease will be limited, and take place within the same areas that EMI has been accessing for decades. However, to the extent that maintenance activities are undertaken within the License Area in pristine areas, such as on cliffsides, nears waterfalls, or in other native species dominated areas, the following avoidance and minimization measures are recommended:

- A qualified biological monitor should be on site to ensure that no listed or candidate species are impacted.

- The monitor should have familiarity with the plants of the area, including special-status species, familiarity with natural communities of the area, including special-status natural communities, experience conducting floristic field surveys, and experience with analyzing impacts of development on native plant species and natural communities

- To avoid the introduction or transport of new invasive plant species into more pristine portions of the License Area during EMI Aqueduct System maintenance activities, all equipment and vehicles arriving from outside the License Area should be washed and inspected prior to any maintenance activities on cliff sides, near waterfalls, and in other native species–dominated areas in the License Area. Such washing and inspecting should be done at a designated location.

    - As recommended by the USFWS in its DEIS comments, base yards and staging areas should be inspected at least weekly for invasive species and any found invasive removed immediately. Pay particular attention to where vehicles are parked overnight, keeping areas within 10-meters of vehicles free of debris. Parking on pavement and not under trees, while not always practical is best. Project vehicles or equipment stored outside of a base yard or staging area, such as a private residence, should be kept in a pest free area.

- All cutting tools should be sanitized to prevent the Rapid 'Ohi'a Death (ROD) fungus as recommended by the USFWS.

    - Avoid wounding 'ohi'a trees and roots with mowers, chainsaws, weed eaters, and other tools. Cut only the minimum amount of trees and branches as approved for the project.

- All cutting tools, including machetes, chainsaws, and loppers must be sanitized to remove visible dirt and other contaminants prior to entry into natural areas or areas with native habitat, and when moving to a new project area within the native habitat area. Tools may be sanitized using a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution. One minute after sanitizing, you may apply an oil based lubricant to chainsaw chains or other metallic parts to prevent corrosion.

- Only dedicated tools and chainsaws should be used to sample known or suspected ROD infected trees.

- Before going into the field, EMI staff should visually inspect and clean their clothes, boots, pack, radio harness, tools and other personal gear and equipment, for seeds, soil, plant parts, insects, and other debris. A small brush is handy for cleaning boots, equipment and gear. Soles of shoes should be sanitized using a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution.

- Immediately before leaving the field, EMI staff should visually inspect and clean their clothes, boots, pack, radio harness, tools, and other personnel gear and equipment, for seeds, soil, plant parts, insects, and other debris. Soles of shoes should be sanitized using a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution.

- Construction materials arriving from outside Maui should also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles, and insects). When possible, any raw materials used in maintenance activities should be purchased from a local supplier on Maui to avoid introducing non-native species not present on the island. Inspection and cleaning activities should be conducted at a designated location. The inspector must be a qualified botanist/entomologist able to identify invasive species that are of concern relevant to the point of origin of the equipment, vehicle, or material.

- ʻŌhiʻa firewood, ʻōhiʻa logs, and ʻohiʻa parts should not be transported as recommended by the USFWS in its DEIS comments.

EMI has worked closely with the Maui Invasive Species Committee (MISC) to assist in mitigating non-native weeds along with the EMI Aqueduct System and access roads. Typical procedures involve EMI staff notifying MISC of sightings and locations of non-native weeds, and then facilitating access by MISC to these identified areas to conduct appropriate treatment methods. EMI has committed to continuing to work with MISC in order to institute more stringent protocols for equipment sanitization and protection of the License Area.

Native forests in east Maui are largely dominated by one tree species, ʻōhiʻa, which is under threat from two fungal pathogens, *Ceratocystis lukuohia* and *Ceratocystis huliohia*. Both pathogens ultimately kill ʻōhiʻa trees and are easily spread on shoes, gear, tools, and equipment. For this reason, it is very important that all maintenance work in this region employ

the following cleaning procedures. When working around or cutting ʻōhiʻa, all tools and gear should be cleaned before and after use, especially when used on infected ʻōhiʻa. To clean, all soil should be brushed off tools and gear and sprayed with a solution of 70 percent rubbing alcohol. Shoes and clothes should also be cleaned before and after entering forests with hot water and soap. Tires and the undercarriage of the vehicles should be washed with a high-pressure water source to remove all soil or mud, especially after traveling from an area with Rapid ʻŌhiʻa Death and/or after traveling off-road.

Upcountry Maui

The areas in Upcountry Maui that are served by the MDWS using water obtained through the EMI Aqueduct System were not assessed by SWCA. These areas are highly altered urban and agricultural environments maintained by imported water. Any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant and are not within the scope of the proposed Water Lease.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on flora in the Upcountry Maui region are anticipated as a result of the Proposed Action.

Central Maui

The vegetation located in Central Maui consists almost exclusively of the Agricultural vegetation type, with Alien Forest and Alien Grassland along the margins and Water features (with hydrophytic vegetation at their margins) spread throughout. No special-status plant species were found during ground surveys of Central Maui.

Agricultural vegetation type makes up 83% of the Central Maui area and consists almost entirely of fallow sugarcane (*Saccarum officinarum*) fields, some with sugarcane remaining and some where the sugarcane had been harvested at the time of SWCA's survey. Corn (*Zea mays*) and Sunn hemp (*Crotalaria juncea*) were also being cultivated in some fields. Weedy plants seen within the fields included castor bean (*Ricinus communis*), Mexican poppy (*Argemone mexicana*), *Sida rhombifolia*, cheeseweed (*Malva parviflora*) and golden crown-beard (*Verbesina encelioides*). The non-native ruderal vines little bell (*Ipomoea triloba*), bitter melon (*Momordica charantia*), and *Macroptilium atropurpureum* can be seen twining throughout.

Non-native grasses such as swollen fingergrass (*Chloris barbata*), Guinea grass, and pitted beardgrass (*Bothriochloa pertusa*) were found on the margins of most agricultural fields in Central Maui. Mixed in with these grasses was a variety of ruderal herbaceous species, similar to those found within the agricultural fields.

Non-native species of Alien Forest vegetation include *Pittosporum pentandrum*, Koa haole (*Leucaena leucocephala*), Christmas berry (*Schinus terebinthifolius*), and kiawe (*Prosopis pallida*). This suite of species can be found in the Service Area around abandoned buildings, on the margins of fallow fields, and occasionally along ditches and other water features.

Holding ponds and irrigation ditches are found sporadically throughout the agricultural portions of Central Maui and provide habitat for a number of non-native hydrophytic plant species, including sourbush (*Pluchea carolinensis*), primrose willow (*Ludwigia octovalvis*), and California grass (*Urochloa mutica*). Koa haole, *Pittosporum pentandrum*, Christmas berry, Java plum (*Syzygium cumini*), and common ironwood (*Casuarina equisetifolia*) can be found on uphill slopes near these water features, with maunaloa vine (*Canavalia cathartica*) occasionally twining in the under- and mid-story.

The gulches in the Central Maui agricultural fields are composed of mostly non-native and/or invasive species. Along with the surrounding area, the gulches have been heavily impacted by prior and current land uses, such as residential and agricultural developments.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. Some beneficial impacts on flora in the Central Maui region are anticipated. Central Maui had been in sugarcane production for many years. Production of a single crop over a large area, such as sugarcane, provides a monoculture environment for flora, leading to population increases of certain, often weedy and generalist, species. Increasing the diversity of crops, as is proposed with the Mahi Pono farm plan, increases the niches in which flora can establish and would therefore be beneficial to some flora because the agricultural lands would provide an increased diversity of foraging, breeding, and nesting resources. In general, increased diversity in croplands could lead to an increased diversity of flora.

Agricultural activities, including but not limited to clearing, grading, and grubbing, related to the implementation of the Mahi Pono farm plan will not have an adverse impact on the existing flora in the Central Maui agricultural fields.

4.4.2 Fauna and Invertebrates

Ground and aerial surveys were done by SWCA between November 2017 and January 2018, as set forth in the Terrestrial Flora and Fauna Technical Report prepared by SWCA (See Appendix C). Fauna surveys consisted of both ground and aerial surveys and consisted of visual observations (aided by 10 × 42–millimeter (mm) binoculars) and auditory vocalization identifications. All birds, mammals, reptiles, amphibians, fish, and invertebrate species seen or heard and any sign (scat or tracks) were noted. In the report, the term fauna, or wildlife,

applies to any mammals, birds, reptiles, or amphibians with the potential to occur in the vicinity. Below is a summary of the report.

East Maui

The vast majority of the License Area is in the Forest wildlife habitat type (approximately 29,626 acres), with 2,770 acres in the Shrubland wildlife habitat type, with smaller areas being in the Grassland, Cliff, Rocky, Developed/Agricultural (1 acre), or Stream habitat types.

Introduced mammals observed include cow (*Bos taurus*), feral pig (*Sus scrofa*), and feral cat (*Felis catus*). No other mammals were observed during the ground surveys, although rat (*Rattus* spp.), mongoose (*Herpestes javanicus*), and mouse (*Mus musculus*) could be expected to occur.

No terrestrial reptiles or amphibians are native to Hawai'i. No terrestrial reptiles or amphibians were detected during the ground surveys.

The birds observed in the License Area are species commonly found in low- to mid-elevation mesic and wet forest areas on the northern slope of Haleakalā Volcano. In all, nine bird species were documented, six of which are protected by the Migratory Bird Treaty Act (MBTA). Of these, three species—'apapane (*Himatione sanguinea*), Hawai'i 'amakihi (*Chlorodrepanis virens wilsoni*), and 'i'iwi (*Drepanis coccinea*)—are endemic to Hawai'i; one is a migratory shorebird and two are non-native introductions. The 'i'iwi is the only ~~federally~~ Federally and ~~state-listed~~ State-listed bird that was detected during ground surveys and was identified by vocalizations. In addition to 'i'iwi, the ~~federally~~ Federally and ~~state-listed~~ State-listed Maui parrotbill (*Pseudonestor xanthophrys*) and crested honeycreeper (*Palmeria dolei*) are known to occur in mesic and wet forest above approximately 3,937 feet (1,200 meters [m]).

Twelve invertebrates were observed during the surveys, consisting of the Blackburn's damselfly (*Megalagrion blackburni*), Hawaiian upland damselfly (*Megalagrion hawaiiense*), citrus swallowtail butterfly (*Papilio xuthus*), Monarch butterfly (*Danaus plexippus*), housefly (*Musca domestica*), smaller lantana butterfly (*Strymon bazochii*), mud dauber (*Sceliphron caementarium*), wandering glider (*Pantala flavescens*), green darner (*Anax junius*), Aedes mosquito (*Aedes* sp.), walking stick (*Sipyloidea sipylus*), and witch moth (*Ascalapha odorata*). All these invertebrates are common in East Maui. As discussed above, in response to comments on the DEIS requesting additional information on the potential for mosquito habitat under the Proposed Action, the Terrestrial Flora and Fauna Technical Report (Appendix C) was updated. It should be noted that the southern house mosquito (*Culex quinquefasciatus*) was not observed during the survey. However, this species is nocturnal and known to occur in Hawai'i from sea level to approximately 4,921 feet above sea level during the winter months to up to or just over 6,000 feet during the warmer summer months (Ahumada et al. 2004; Freed et al. 2005; Samuel et al. 2015). Above these elevations, it is too cold for the larvae to morph into adults. A study by Aruch et al. (2007) reported that the southern house mosquito larvae were found only in rock holes along intermittent tributaries of the two largest streams in Kīpahulu valley but not in standing surface water, pig wallows, ground pools, tree cavities, and tree fern cavities. These rock pools contained stagnant water and organic debris. Mosquito egg laying and larval development habitat is currently present in all Maui streams (Trutta, 2020). The southern house mosquito can disperse up to 1.9 miles from its larval habitat through forested areas (Lapointe 2008). This mosquito species is important because it carries and

transmits avian malaria (*Plasmodium relictum*), a disease that kills Hawaiian honeycreepers including the crested honeycreeper and Maui parrottbill.

Mosquitos cannot expand into high-elevation habitat because it is too cold (less than 55.76 degrees Fahrenheit) for the larvae to morph into adults. This "thermal barrier" occurs above 4,921 feet above sea level in the winter months and 6,234 feet in the summer months (Ahumada et al. 2004; Freed et al. 2005; Samuel et al. 2015). Currently, Hawaiian honeycreepers are already impacted by avian malaria below this thermal barrier to the degree that they are rarely found at lower elevations (USFWS 2006, Warner 1968). In other words, this disease and the presence of disease-carrying mosquitoes, has already nearly extirpated low-elevation populations of these birds.

Thirteen special-status species could occur in the License Area based on habitat: crested honeycreeper, Maui parrotbill, 'i'iwi, Hawaiian duck (*Anas wyvilliana*), Hawaiian goose (*Branta sandvicensis*), Hawaiian petrel (*Pterodroma sandwichensis*), Newell's shearwater (*Puffinus auricularis newelli*), band-rumped storm-petrel (*Oceanodroma castro*), Hawaiian hoary bat (*Lasiurus cinereus semotus*), Blackburn's sphinx moth (*Manduca blackburni*), flying earwig Hawaiian damselfly (*Megalagrion nesiotes*), Pacific Hawaiian damselfly (*Megalagrion pacificum*), and orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*). In total, the species observed in the License Area, and the species that the USFWS lists as potentially occurring, and their status, are listed in Table 4-11 ~~4-5~~.

Table 4-11 ~~4-5~~ East Maui Special Status Species

Species	Status	Observed / Potential for Occurrence
Birds		
'Apapane (*Himatione sanguinea*)	Endemic Protected under MBTA	Observed in the License Area
Hawai'i 'amakihi (*Chlorodrepanis virens wilsoni*)	Endemic Protected under MBTA	Observed in the License Area
Chestnut munia (*Lonchura atricapilla*)	Non native	Observed in the License Area
'I'iwi (*Drepanis coccinea*)	Federally threatened State threatened Protected under MBTA	Observed in the License Area
Japanese white-eye (*Zosterops japonicas*)	Non native	Observed in the License Area
Melodious laughing thrush (*Garrulax canorus*)	Non native	Observed in the License Area
House finch (*Haemorhous mexicanus*)	Non native Protected under MBTA	Observed in the License Area
Northern cardinal (*Cardinalis cardinalis*)	Non native Protected under MBTA	Observed in the License Area
Pacific golden-plover (*Pluvialis fulva*)	Migrant Protected under MBTA	Observed in the License Area
Crested honeycreeper / Akohekohe (*Palmeria dolei*)	Endangered	Known to occur in the License Area.

Maui parrotbill / Kiwikiu (*Pseudonestor xanthophrys*)	Endangered	Known to occur in the License Area.
Hawaiian duck (*Anas wyvilliana*)	Endangered	May occur in License Area
Hawaiian goose or nēnē (*Branta sandvicensis*)	Endangered	Known to occur in License Area
Hawaiian petrel (*Pterodroma sandwichensis*)	Endangered	May occur in License Area
Newell's shearwater (*Puffinus auricularis newelli*)	Threatened	May occur in License Area
Band-rumped storm petrel (*Oceanodroma castro*)	Proposed endangered	May occur in License Area
Mammals		
Hawaiian hoary bat (*Lasiurus cinereus semotus)*	Endangered	Likely to occur in License Area
Reptiles		
Green sea turtle (*Chelonia mydas*)	Threatened	Unlikely to occur In License Area
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered	Unlikely to occur In License Area
Invertebrates		
Flying earwig Hawaiian damselfly (*Megalagrion nesiotes*)	Endangered	Known to occur in License Area
Orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*)	Endangered	May occur in License Area
Pacific Hawaiian damselfly (*Megalagrion pacificum*)	Endangered	Known to occur in License Area
Yellow-faced bee (*Hylaeus anthracinus*)	Endangered	Unlikely to occur in License Area
Yellow-faced bee (*H. assimulans*)	Endangered	Unlikely to occur in License Area
Yellow-faced bee (*H. longiceps*)	Endangered	Unlikely to occur in License Area
Blackburn's sphinx moth (*Manduca blackburni*) [10]	Endangered	May occur in License Area

[10] In response the DEIS, USFWS provided a list of species that may occur in the License Area, which included the Blackburn's sphinx moth.

Impacts and Mitigation Measures

SPECIAL-STATUS FAUNA

The Proposed Action is not anticipated to have a significant impact on special-status fauna ~~or invertebrate species~~ in the License Area. No activities other than some degree of maintenance of the EMI Aqueduct System or access roads, is planned for the area in connection with the proposed Water Lease, and it is anticipated that maintenance activities would only take place as needed ~~sporadically~~. Therefore, while the presence of vehicles and humans for maintenance activities could disrupt the normal behavior of wildlife and temporarily displace individuals from roadside habitat, due to the very occasional maintenance activities, it is expected that wildlife would resume normal behavior shortly after the passage of the vehicle or completion of the maintenance activity. The Proposed Action would not increase human noise and activity above current levels. The presence of human noise and activity would have a negligible effect on wildlife in the East Maui License Area. However, it should be noted that the native forest habitat becomes progressively more extensive and of higher ecological integrity as one moves towards the eastern portions of the License Area. The native species richness in the stream communities follows a similar west-to-east progression. Thus, more stringent mitigation measures should be followed in these areas of the License Area.

Nevertheless, to minimize potential impacts to fauna, the following measures should be implemented:

- Regular on-site staff should be trained to identify special-status species with the potential to occur on-site and should know the appropriate measures to be taken if they are present.
- If a downed tree must be removed from a road, trail, or other passageway, it will be inspected for the presence of active bird nests, specifically the nest of an MBTA-protected species that may have been present prior to the tree falling. If an active nest is found, it should be protected in place until the chicks fledge.
- If tree trimming occurs in the ʻiʻiwi, Maui parrotbill and crested honeycreeper range (as defined in Section 5.2.5) from November to June, a qualified biologist should survey the trees for active nests of these species.
- If a Hawaiian goose is observed in the area during EMI maintenance and repair ~~construction~~ activities, all activities within 100 feet (30 m) of the species should cease, and work should not continue until the species leaves the area on its own accord.
- If a Hawaiian goose nest is discovered, all activities within 150 feet (46 m) of the nest should cease, and the USFWS should be contacted. Work should not resume until directed by the USFWS.
- As recommended by the USFWS in its comments on the DEIS, with regards to little fire ants, all work vehicles, machinery, and equipment should be inspected for invasive ants prior to entering the natural areas or native habitat.

- ~~If tree removal occurs during the bat breeding season (June 1 to September 15), direct impacts could occur to juvenile bats that are too small to fly but too large to be carried by a parent. To minimize this impact, no trees taller than 15 feet (4.6 m) should be trimmed or removed between June 1 and September 15.~~[11*]
- ~~The use of barbless top-strand wire is recommended for all fence construction to avoid entanglement of Hawaiian hoary bat.~~[11*]
- ~~A qualified biologist should work closely with the USFWS and monitor Endangered Species Act-listed damselflies to ensure activities do not have a negative impact.~~[12*]

INVERTEBRATES AND SPECIAL-STATUS SPECIES

No significant, direct, adverse impacts to invertebrate species (flying earwig Hawaiian damselfly, Pacific Hawaiian damselfly, and orange black Hawaiian damselfly (collectively Hawaiian damselflies)) are anticipated within the License Area under the Proposed Action. The Proposed Action involves use of surface water in compliance with the CWRM D&O. Under the Proposed Action ~~CWRM D&O~~, habitat for Hawaiian damselflies would increase in 19 streams and decrease in three streams (SWCA, Updated 2020). An anticipated indirect effect, however, is that the restoration of flows in those streams will also improve habitat conditions for a number of introduced predator and competitor species of the Hawaiian damselflies, and therefore the population of Hawaiian damselflies may not increase under the Proposed Action (or any alternative that involves an increases in stream flows as required under the CWRM D&O).

Under the Proposed Action, habitat for the southern house mosquito (*Culex quinquefasiatus* [mosquito]) should decrease overall because increased streamflow will reduce standing water that provides breeding habitat for the species based on historical diversion rates. A reduction in mosquito habitat is expected to be beneficial to the Hawaiian honeycreeper (*Passeriformes drepanididae*) because of a reduction in the likelihood, abundance, and potential for transmission of avian malaria, which is a vector-borne disease. However, as discussed in Section 2.1.4, as of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd. Hence, under the Proposed Action, more surface water would be diverted by the EMI Aqueduct System as discussed in Section 2.1.2. Increasing mosquito egg laying and larval habitat (i.e., standing water) due to stream drawdowns would not increase survival of adult mosquitoes or the transmission of avian malaria above the thermal barrier because mosquitoes are not limited by available habitat; they are limited by cold temperatures. Adult survival would not increase with an increase in egg and larval habitat. Therefore, the rate of avian malaria transmission to special-status Hawaiian honeycreepers would remain unchanged under the Proposed Action. Because there would not be an

[11] Mitigation measures eliminated from the recommendations in this FEIS as not applicable to the License Area in East Maui because the Proposed Action does not include the removal of trees and there will not be any fence construction, as noted by the DLNR in its DEIS comment letter.

[12] Mitigation was included here in error. It has been deleted here and retained in the Invertebrates subsection.

increase in avian malaria transmission, no impacts are expected to occur to special-status Hawaiian honeycreepers.

Nevertheless, to minimize potential impacts to invertebrate species, the following measures should be implemented:

- A survey for potential larval host plants for Blackburn's sphinx moth (particularly tree tobacco) should be conducted by biologists before construction/vegetation clearing. Results of the survey should be provided to the USFWS.
- If host plants are found, surveys for Blackburn's sphinx moth should be performed according to the most recent USFWS guidance, and preferably during the wet season (January to April), roughly 4 to 8 weeks following a significant rainfall event. Results of the survey should be provided to the USFWS. Any necessary follow-up actions should be coordinated with the USFWS.
- A qualified biologist should work closely with the USFWS and monitor Endangered Species Act-listed damselflies to ensure activities do not have a negative impact.

Upcountry Maui

The areas in Upcountry Maui that are served by the MDWS using water obtained through the EMI Aqueduct System were not assessed in the biological report by SWCA. These areas are highly altered urban and agricultural environments and the Proposed Action would continue the ability for MDWS to receive surface water from the EMI Aqueduct System.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on fauna and invertebrate species in Upcountry Maui are anticipated.

Central Maui

The birds observed in Central Maui are species commonly found in disturbed, low-elevation areas. 24 birds were documented, 13 of which are protected by the MBTA, three of which are also ~~federally~~ Federally and ~~state~~ State-listed, two are endemic; two are migrant waterfowl; one is a migrant shorebird; one is an indigenous waterbird, and four are non-native introductions.

Mammals detected in Central Maui during the surveys include feral pig (*Sus scrofa*), and feral cat (*Felis catus*). No other mammals were observed during the ground surveys, although rat (*Rattus* spp.), mongoose (*Herpestes javanicus*), and mouse (*Mus musculus*) could be expected to occur.

Twelve invertebrates were observed during the surveys, consisting of the Blackburn's damselfly (*Megalagrion blackburni*), citrus swallowtail butterfly (*Papilio xuthus*), Monarch butterfly (*Danaus plexippus*), housefly (*Musca domestica*), smaller lantana butterfly (*Strymon bazochii*), mud dauber (*Sceliphron caementarium*), wandering glider (*Pantala flavescens*), green darner (*Anax junius*), Aedes mosquito (*Aedes* sp.), walking stick (*Sipyloidea sipylus*), and witch moth (*Ascalapha odorata*). All these invertebrates are common in Central Maui.

In total, the species observed in Central Maui, or that the USFWS lists as potentially occurring, is provided in Table 4-12 ~~4-6~~.

Table 4-12 ~~4-6~~ Central Maui Special Status Species

Species	Status	Observed / Potential for Occurrence
Birds		
Black-crowned night-heron (*Nycticorax*)	Indigenous Protected under MBTA	Observed in Central Maui
Cattle egret (*Bubulcus ibis*)	Non native Protected under MBTA	Observed in Central Maui
Chestnut munia (*Lonchura atricapilla*)	Non native	Observed in Central Maui
Chicken (*Gallus domesticus*)	Non native	Observed in Central Maui
Common myna (*Acridotheres tristis*)	Non native	Observed in Central Maui
Green-winged teal (*Anas crecca*)	Migrant Protected under MBTA	Observed in Central Maui
Grey francolin (*Francolinus pondicerianus*)	Non native	Observed in Central Maui
Japanese white-eye (*Zosterops japonicas*)	Non native	Observed in Central Maui
Mallard (*Anas platyrhynchos*)	Migrant Protected under MBTA	Observed in Central Maui
Mourning dove (*Zenaida macroura*)	Non native Protected under the MBTA	Observed in Central Maui
Hawaiian coot (*Fulica alai*)	Endangered Protected under MBTA	Observed in Central Maui
Hawaiian stilt (*Himantopus mexicanus knudseni*)	Endangered Protected under MBTA	Observed in Central Maui
House finch (*Haemorhous mexicanus knudseni*)	Non native Protected under MBTA	Observed in Central Maui
House sparrow (*Passer domesticus*)	Non native	Observed in Central Maui
Java sparrow (*Lonchura oryzivora*)	Non native	Observed in Central Maui
Pacific golden-plover (*Pluvialis fulva*)	Migrant	Observed in Central Maui
Red-crested cardinal (*Paroaria coronate*)	Non native	Observed in Central Maui

Spotted dove (*Streptopelia chinensis*)	Non native	Observed in Central Maui
Zebra dove (*Geopelia striata*)	Non native	Observed in Central Maui
Hawaiian duck (*Anas wyvilliana*)	Endangered	May occur in Central Maui
Hawaiian goose or nēnē (*Branta sandvicensis*)	Endangered	Known to occur in Central Maui
Hawaiian petrel (*Pterodroma sandwichensis*)	Endangered	May fly over Central Maui at night. Not likely to land or nest in Central Maui
Newell's shearwater (*Puffinus auricularis newelli*)	Threatened	May fly over Central Maui at night. Not likely to land or nest in Central Maui
Band-rumped storm petrel (*Oceanodroma castro*)	Proposed endangered	May fly over Central Maui at night. Not likely to land or nest in Central Maui
Mammals		
Hawaiian hoary bat (*Lasiurus cinereus semotus)*	Endangered	Likely to occur in Central Maui
Reptiles		
Green sea turtle (*Chelonia mydas*)	Threatened	Not likely to occur
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered	Not likely to occur
Invertebrates		
Blackburn's sphinx moth (*Manduca blackburni*)	Endangered	May occur in Central Maui
Yellow-faced bee (*Hylaeus anthracinus*)	Endangered	Not likely to occur
Yellow-faced bee (*H. assimulans*)	Endangered	Not likely to occur
Yellow-faced bee (*H. longiceps*)	Endangered	Not likely to occur

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on fauna in the region are anticipated.

However, associated with the Proposed Action is the use of the surface water to supply the agricultural fields in Central Maui. For over a century the Central Maui fields largely produced a single crop (sugarcane) over a large area, providing a monoculture environment for flora and fauna, leading to population increases of certain, often weedy and generalist, species. Increasing the diversity of crops increases the niches in which fauna can establish and would be beneficial to some fauna because the agricultural lands would provide an increased diversity of foraging, breeding, and nesting resources. In general, increased diversity in croplands could lead to an increased diversity of ~~and~~ fauna (SWCA, Updated 2020 ~~2019~~).

The extent of "development" that could impact fauna resources within Central Maui under the Proposed Action is largely limited to the planting of new crops and other farming activities. Under the Proposed Action, the Mahi Pono farm plan would require converting former sugarcane lands to about 15,950 acres of cropland, 4,700 acres of irrigated pasture, and 9,100 acres of unirrigated pasture. The conversion would require removing remaining sugarcane plants, adding amendments to enrich the soil, planting windbreaks around fields, modifying field irrigation systems, installing fencing, and planting crops. The farm plan also requires an estimated 319,000 square feet of building space related to its agricultural operations such as washing and packing areas, storage, and related uses accessory to agriculture. ~~In addition, 37.5 mW solar farm within approximately 250 acres is planned~~. As discussed in Section 2.1.4, approximately 250 acres within the Central Maui agricultural fields are planned for solar farm development. In response to comments on the DEIS, SWCA updated its study to expand on the potential impacts to the Hawaiian hoary bat. The redevelopment of the agricultural fields into orchards may create breeding habitat for the endangered Hawaiian hoary bat, which is known be attracted to orchards, mac-nut farms, and similar tree-based agriculture for foraging and roosting. The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they forage. To minimize potential impacts to fauna, the following measures should be implemented:

- Regular on-site staff should be trained to identify special-status species with the potential to occur on-site and should know the appropriate measures to be taken if they are present.
- If a downed tree must be removed from a road, trail, or other passageway, it will be inspected for the presence of active bird nests, specifically the nest of an MBTA-protected species that may have been present prior to the tree falling. If an active nest is found, it should be protected in place until the chicks fledge.
- If a Hawaiian stilt or Hawaiian coot is observed in the area during construction activities, all activities within 100 feet (30 m) of the species should cease, and work should not continue until the species leaves the area on its own accord.
- If a Hawaiian goose nest is discovered, all activities within 150 feet (46 m) of the nest should cease, and the USFWS should be contacted. Work should not resume until directed by the USFWS.
- If felling of standing trees occurs during the bat breeding season, direct impacts could occur to juvenile bats that are too small to fly but too large to be carried by a

parent. To minimize this impact, no trees taller than 15 feet (4.6 m) should be trimmed or removed between June 1 and September 15.

- The use of barbless top-strand wire is recommended for all fence construction to avoid entanglement of Hawaiian hoary bat.
    - It is noted that Mahi Pono has used barbed wire strand as a deterrent to deer, which, if unchecked, could destroy crops. However, Mahi Pono has indicated that it will work with the State Division of Fish and Wildlife (DOFAW) and the Department of Agriculture to determine whether the existing fences are a danger to the Hawaiian hoary bats and if so, whether an effective alternative can be implemented to deter deer from entering on to the farm land.
- A survey for potential larval host plants for Blackburn's sphinx moth (particularly tree tobacco) should be conducted by biologists before construction/vegetation clearing. Results of the survey should be provided to the USFWS. If host plants are found, surveys for Blackburn's sphinx moth should be performed according to the most recent USFWS guidance, and preferably during the wet season (January to April), roughly 4 to 8 weeks following a significant rainfall event. Results of the survey should be provided to the USFWS. Any necessary follow-up actions should be coordinated with the USFWS.

To minimize potential impacts to seabirds, the following measures should be followed:

- Construction activity should be restricted to daylight hours as much as practicable during the seabird peak fallout period (September 15 to December 15) to avoid the use of nighttime lighting that could attract seabirds.
- All outdoor lights should be shielded to prevent upward radiation. This has been shown to reduce the potential for seabird attraction. A selection of acceptable, seabird-friendly lights can be found online at the Kauai Seabird Habitat Conservation Program website: http://www.kauai-seabirdhcp.info/lighting-homes-businesses/
- Outside lights not needed for security and safety should be turned off from dusk through dawn during the fledgling fallout period (September 15 to December 15).
- As recommended by the USFWS, installed lights should have automatic motion sensor switches and controls on all outdoor lights or tum off lights when human activity is not occurring in the lighted area

4.5 Historic and Archaeological Resources

East Maui

An HRS ~~Section~~ § 6E-7 and ~~Section~~ § 6E-42 historic preservation review letter dated January 25, 2017 (Log No. 2017.00026; Doc. No. 1701GC08) sent from the State Historic Preservation Division (SHPD) to the DLNR Land Division requested that, pursuant to HAR § 13-284-5(b)(5)(A) and (C), an archaeological inventory survey (AIS), as well as an architectural inventory survey, be required prior to the issuance of the Water Lease and that these surveys also be proceeded by inventory plans.

In response to those letters, additional information regarding the proposed Water Lease was provided to the SHPD with the understanding that the proposed Water Lease will not involve any construction or significant ground disturbance within undisturbed areas, and that the potential impact of flooding from the removal or modification of select diversions will not be greater than periodic naturally occurring flooding events due to freshets. A subsequent HRS § 6E-8 historic preservation review letter (Log No. 2017.00026; Doc. No. 1706MBF11) sent from the SHPD to the DLNR Land Division on October 6, 2017 updated the prior correspondence to no longer request the completion of an AIS plan or an AIS in the License Area in conjunction with the proposed Water Lease. Copies of these letters are included with the archaeological literature review and field inspection (LRFI) report (Appendix E) prepared by Cultural Surveys Hawai'i, Inc. (CSH).

Mason Architects prepared a Historic Structure Assessment (HSA) in support of the EIS (See Appendix D). The objective of the HSA is to make an evaluation, and assist SHPD in making a determination on the potential impact to historic properties. Due to the immense size of the EMI Aqueduct System, the HSA only documents 20 aqueduct features, which includes 19 stream diversions that collect water, and one ditch water throw-out get that discharges water out of the ditch system. Within these features, there were also 31 individual sluice gates documented during the field survey.

The EMI Aqueduct System is comprised of approximately~~,~~ 388 separate intakes, 24 miles of ditches, 50 miles of tunnels, various flumes, weirs, aqueducts, small dams, and stream diversion intakes. The aqueduct system was developed by Samuel T. Alexander and Henry P. Baldwin beginning in 1876, and started operating in 1878 with 17 miles of open ditch, transporting water to four plantations in Central Maui. The ditch continued to expand in the late 1800s into what it is currently, however, the ditch system has not significantly expanded since 1923.

Mason Architects documented 20 EMI Aqueduct System features during their May 2018 field survey and 31 sluice gate examples. Of these features, 19 were stream diversions, the most common of which (i.e., 14 of the 19 stream diversions surveyed) was "Type A Stream Diversion." The "Type A Stream Diversion" operates by using a dam across the stream bed equipped with a sluice gate to impound water. When the sluice gate is closed, water is impounded behind the dam, such that it can flow out of the impounded pool, and into the ditch system through the intake. When the sluice gate is open, water is able to flow through the dam and is not impounded to a level to reach the intake for the ditch system. A variation (Type A Variation Stream Diversion) of this feature was also documented in Mason Architects field study. This diversion operates with a stilling wall that separates the impounded pool from the intake. When the sluice gate is closed, water will flow overtop the stilling wall and into the intake of the ditch system. Some of the stilling walls have perforations to allow for water to flow through the walls as well. Another variation is a sluice gate at the intake, and when the sluice gate is open, water can flow through the intake into the ditch system.

"Type B Stream Diversion", accounted for three (3) out of the 19 stream diversion features. "Type B Stream Diversion" operates by using a weir across the stream bed to impound water to a level that will reach the intake. There are sluice gates at the intake, and when they are open, water is able to flow into the intake into the ditch system. When the sluice gates are closed, water is prevented from entering the intake, and flows over the weir, and continues

downstream. There was an instance where the intake channel had an additional throw-out gate for the discharge of excess water that would make its way back into the stream.

"Type C Stream Diversion" accounted for two (2) out of the 19 stream diversion features documented. "Type C Stream Diversion" operates by using a weir across the stream bed to impound water that feeds into the intake. The feature does not have a sluice gate, and is always open for water to flow into the intake. The intake channel has a throw-out sluice gate to control how much water is entering the ditch, and when it is open, water returns back to the stream.

Mason Architects also documented a throw-out sluice gate ("Type D Ditch Water Throw-out") located in the ditch system that would discharge water into a gulch.

During the field survey, there were also various types of sluice gates documented such as ratchet, geared, threaded-shaft, and a board adjusted sluice gates. A sluice gate is a panel of metal, wood boards, or plastic boards that slides vertically in grooves that are set in the sides of the waterway channel. Four types of sluice gates were noted during the field work. Three types use various mechanisms, such as a ratchet, a gear, or a threaded shaft, to move a solid panel vertically in slots set in the channel, and one type is defined by a series of horizontal boards that are slid up and down vertically in slots in the channel. These are explained in more detail in the study (See Appendix D).

The main purpose of the HSA ~~this study~~ was to determine the historical significance of the EMI Aqueduct System. It was determined that the EMI Aqueduct System ~~system~~ is eligible to be placed on the National Register of Historic Places (NRHP) under National Register Criterion A, for its role in supporting the development of the sugar industry on Maui, and Criterion C, as an extensive engineering design that exemplifies the characteristics, technology, and pattern of features common to irrigation ditch systems in Hawai'i. Because of their overall size, large, linear resources such as irrigation ditches like the EMI Aqueduct System are susceptible to cumulative impacts on integrity, such as those brought about by numerous repair modifications. Therefore, the EMI Aqueduct System's integrity was not assessed. However, analysis of the sluice gates, demonstrated that they tend to maintain their historic integrity. For example, they retain their original location in a natural and agricultural setting, and they also retain much of their historic materials (concrete and stone). Their overall original design and workmanship appear intact. Integrity of feeling and association are likewise retained. Some show weathering and corrosion from the wet conditions, while some show minor repairs made.

CSH prepared an archaeological literature review and field inspection (LRFI) report in December 2018 and updated in May 2020 (See Appendix E). The LRFI was designed to determine the likelihood that historic properties (any building, structure, object, district, area, or site over 50 years old) may be affected by the Proposed Action and, based on findings, consider cultural resource management recommendations. As explained in the LRFI, it is intended to facilitate the Proposed Action's planning and support the environmental review required for the Proposed Action. The LRFI provides analysis of the natural and built environment of the License Area, a comprehensive review of traditional and historic background information of the region, a review of previous archaeological studies and findings in the region, and a field inspection of the License Area focused on inspecting the areas nearest to the EMI Aqueduct System infrastructure and access roads. The investigation did

not include an inventory of all historic properties that may be present within the License Area (and SHPD determined no such inventory was warranted) but has provided cultural resource management recommendations based on the extensive research of over 150 cited resources and analysis conducted during the study.

CSH archaeologists completed a combined pedestrian and vehicular inspection of portions of the License Area between May 15 and May 18 of 2018. Fieldwork also included the inspection of License Area's access road network by four-wheel drive vehicle followed by the pedestrian inspection of various ditch trails and the locations surrounding 21 sluice gates throughout the EMI Aqueduct System. The inspection was guided by EMI personnel who provided access through locked gates and navigation of the EMI Aqueduct System.

In addition to the work done by CSH related to the preparation of the DEIS, in response to public comments received after publication of the DEIS, CSH archaeologist Angela Yates, B.S. completed a pedestrian inspection of the Wahinepe'e area on 16 February 2020 in an effort to locate the legendary pōhaku in Wahinepe'e that was mentioned in some of the DEIS comment letters, none of which identified a specific location for the pōhaku. However, the pōhaku was not located. The CSH field work required approximately 17 person-days to complete.

Documentation of the fieldwork for the DEIS and the additional fieldwork included descriptions and photographs of any potential findings as well as descriptions of the natural and built environment observed throughout the License Area. CSH inspected portions of the License Area along access roads, ditch trails, and within upland stream valleys. Access to many of these remote areas included a combination of four-wheel drive roads leading from Hāna Highway to the EMI Aqueduct System followed by narrow ditch trails and drainages nearest the sluice gates and intakes. The field inspection provided an opportunity to inspect some of the upland areas of the License Area within steep-sided valleys that have not been formally surveyed by archaeologists. No previous historic properties have been recorded in the License Area ~~this area~~ and no potential historic properties, apart from infrastructure related to the EMI Aqueduct System, were observed during the field inspection.

For the alleged legendary pōhaku in Wahinepe'e, raised in public comments on the DEIS, the field inspection began with a pedestrian / vehicular inspection on the grounds of the Garden of Eden Arboretum, followed by a pedestrian inspection of areas along Wahinepe'e Forest Reserve Road. A synthesis of Native Hawaiian language translations, traditional accounts, and historic maps suggest that the legendary pōhaku in Wahinepe'e could be located in the vicinity of the house lots plotted near the government road(s) crossing Wahinepe'e on the historic maps. Overlays of these maps on recent aerial images of the region indicate this location as either within the Garden of Eden Arboretum or the immediate vicinity. Background research suggests that the pōhaku could be near the path of the old government road to Hāna, which is mauka *of* the current Hāna Highway in this area. During the field inspection, the property owner and other employees of the Garden of Eden Arboretum discussed the property and had no knowledge of a legendary pōhaku in the area. Hence, CSH could not identify the legendary pōhaku.

While the legendary pōhaku at Wahinepe'e was not located during the field inspection, CSH's inspection did identify potential historic properties located outside (makai) of the License Area. These potential historic properties are located approximately 400 meters or more downslope

from the nearest irrigation ditch and outside of any active stream channel. CSH concluded that these potential historic properties will not be impacted by the proposed Water Lease.

The LRFI also includes traditional background research including a review of place names, legendary accounts, and documentation of pre-Contact land use with Hāmākua Loa Moku and Ko'olau Moku. Over 150 place names were documented and indicate an abundance of resources in the region and associations with past cultural practices and land use. Additional documentation of the traditional background of the area included details of a legendary shore visit to Hāmākua Loa from the gods Kāne and Kanaloa, the special significance of the deep valleys and inland forests of the region, the history of the construction of the alahele and alaloa, a summary of the 39 recorded heiau in the region, and testimony describing the abundance of agriculture and other resources that supported a thriving pre-Contact population in East Maui. The background research included a review of previous archaeological studies on file with SHPD; review of documents at Hamilton Library at the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum; study of historic maps at the Survey Office of the DLNR; and study of online historic newspaper databases. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona 'Aina (2000) database.

The following is a brief discussion and summary of the CSH LRFI report and the archaeology-focused research within the context of the traditional background and history of the License Area in East Maui.

Traditional Background of the East Maui Region

The License Area includes multiple ahupua'a (land division usually extending from mountain to sea) in the modern judicial districts of Makawao and Hāna, and the traditional moku (district) of Hāmākua Loa and Ko'olau (See Figure 4-35).

According to Mary Pukui et. al (1974), the literal translation Hāmākua Loa is "very long corner." Within Hāmākua Loa, there are several place names in the various ahupua'a that make up the moku that are recorded by Pukui et. al (1974). Majority of the historical and traditional information, however, is related to the adjacent moku of Ko'olau. A literal translation of Ko'olau is "windward" (Pukui et. al, 1974). The name Ko'olau was applied to the districts located on the windward side of many of the Hawaiian Islands.

Prior to the unification of the Hawaiian archipelago, Maui and Hawai'i were often engaged in warfare and there are storied accounts of the actions of passing armies in their disputes over control of the resources and region of East Maui. Even the neighboring ahupua'a in the region were warring over resources until Kiha-a-pi'ilani united the island with the help of 'Umi-a-līloa from Hawai'i Island.

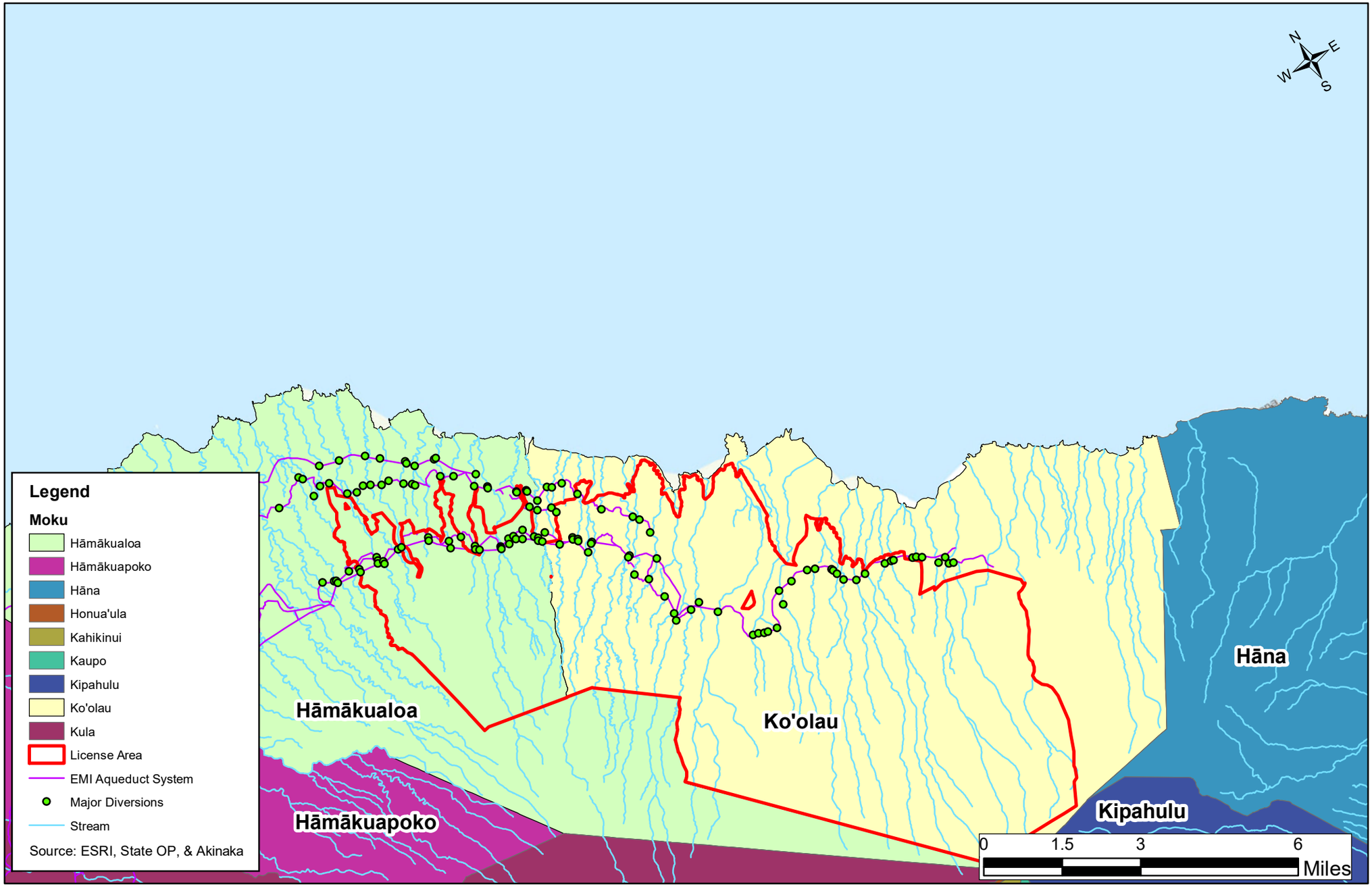


FIGURE 4-35

TRADITIONAL MOKU MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

There are legends of the gods Kāne and Kanaloa visiting the region causing fresh water to spring up, leaving their mark on the area. There is the myth of Kana, who is the son of the goddess Hina, who is said to have resided in East Maui. Kana along with his brother, Niheu, saved their mother Hina from Hāʻupu, after she was abducted from Kapepeʻekauila.

There is the story of ʻAiʻai receiving his fishing powers from his father, Kūʻula, and setting up new fishing grounds around the Hawaiians Islands, including the East Maui region. The demigod Maui made the Koʻolau region of Maui Island famous as this was the part of the island where Maui chose to ascend to the top of Haleakalā to snare the sun so that his mother Hina could dry her kapa (tapa). Many of the natural resources and natural phenomena, such as the flora and fauna, rain and lighting, were believed to be kinolau (physical manifestations) of gods, goddesses, and nature spirits of Hawaiian antiquity creating unique cultural landscapes. The famous shark god of Koʻolau, Hiʻu, is said to reside in a cave near Keʻanae wharf.

Over 150 place names were documented throughout the East Maui region. The place names indicate the intimate relationship that Native Hawaiians had with the natural environment. The place names found throughout East Maui indicate that the lands were widely used for multiple purposes relevant to Native Hawaiian subsistence, habitation, and history. The land bears names associated with agriculture, domestic, and recreational uses of the local streams and pools. Sometimes these place names are references to the actions of historic individuals, and at other times to the deeds of legendary or mythological figure, but often are rich with symbolic associations to the point of encompassing a comprehensive history of a place that can combine all these elements. Tables within CSH's report contain the documented place names of Hāmākua Loa and Koʻolau Moku (See Appendix E).

As described in the LRFI (December 2018 and Updated May 2020), many heiau (shrine/ceremonial structure, literally "place of worship") were built upon the island of Maui along its northeastern shore, a route routinely used by both Hawaiʻi and Maui Island armies in their long struggle to gain control of the wet Hāna region of East Maui, one of the wettest and most productive regions between the two islands. In this respect, heiau were a necessary institution to legitimize the rule of any reigning or conquering chief. However, heiau were not only intended for the use of chiefs and kings in establishing their legitimacy. "Heiaus were not all alike; they were made of different kinds according to the purpose for which they were made." Kamakau, cited in Kirch (2012:213). Among these alternate types are the smaller coastal enclosures serving as koʻa (shrine) for fishermen, the heiau hoʻoʻuluʻai located further inland for assuring crop fertility, and longer and later-built double court heiau which were usually much larger constructions with an elongated terrace overlooking a second lower-level terrace.

In the East Maui region, 39 heiau ~~(shrine/ceremonial structure)~~ were recorded by Walker (1931) in the vicinity of the License Area (Walker sites 64-102) (See Figure 4-36). However, only 20 of the 39 were able to be identified by Walker, while the remaining 19 were presumably destroyed by the time Walker surveyed the area. Of the 39 documented heiau in the region, only one (Puʻu o Koholā) was reported as being within the License Area (within the Honomanū portion of the License Area). However, according to Walker (1931), this site was not observed during his survey of Maui Island, thus not much can be said regarding its structure, size, or ceremonial purpose (Sterling 1998:109). The heiau structure itself was an architectural feature as well as social institution of Hawaiian society, and like many social institutions has served several functions over time.

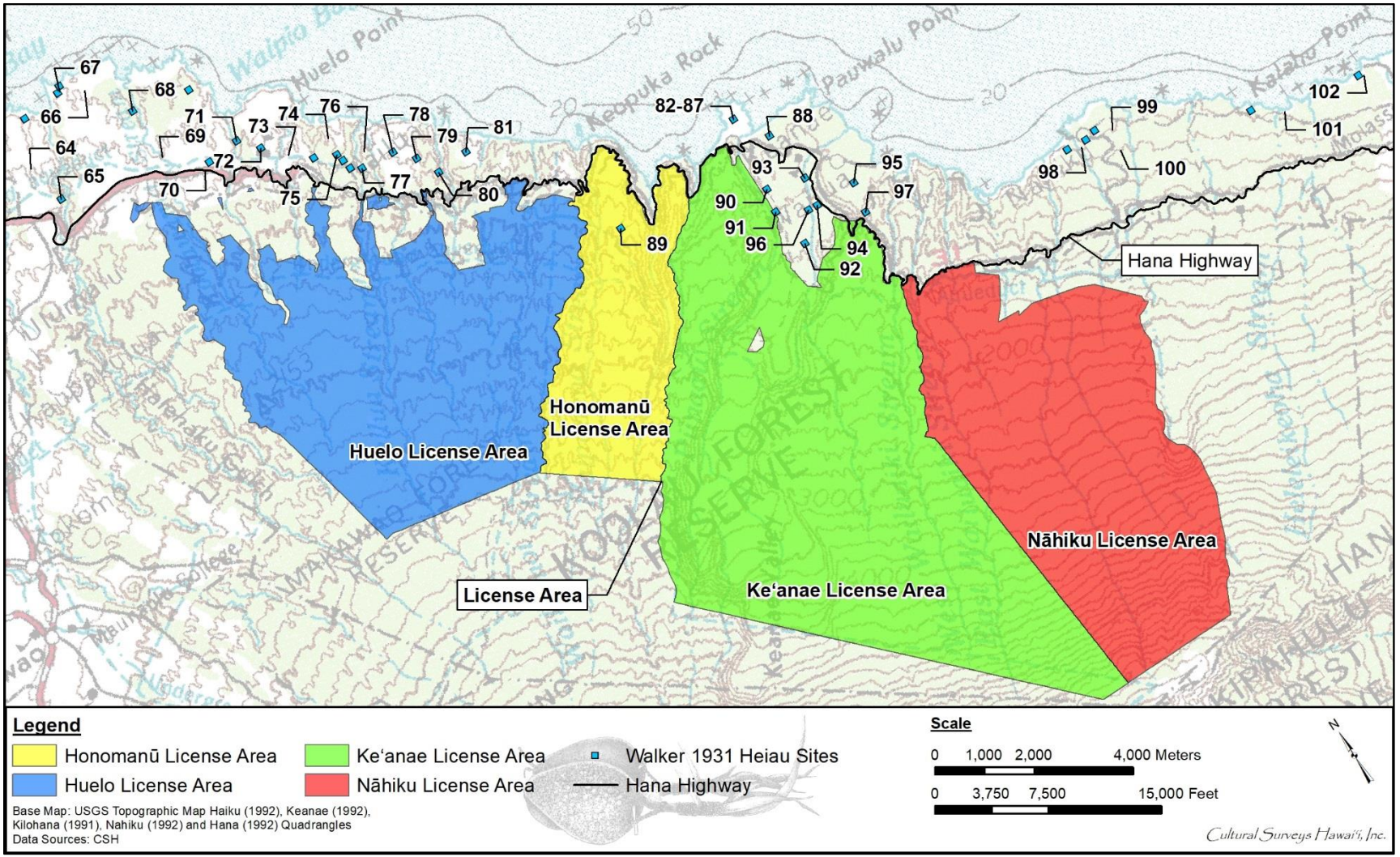


Figure 4-36 Portions of the 1992a Haiku, 1992c Keanae, 1991 Kilohana, 1992d Nahiku, and 1992b Hana U.S. Geological Surey 7.5-minute topographic quadrangle series showing Walker *heiau* sites 64 through 102 with overlay of project License Areas (U.S. Geological Survey 1991, 1992a, b, c, d)

Cultural Surveys Hawai'i, Inc provided map that depicts Walker's 1931 Heiau Sites in the vicinity and within the License Area.

How heiau were used depended largely on the communities they served, the times during which they were actively built and used, and the types of subsistence practiced by the Native Hawaiians who used them. Today, within the modern Makawao District, containing the traditional moku of Hāmākua Loa, 10 heiau were identified. Six of the ten identified structures (Walker Sites 64, 67,68,74,77, and 78) were observed to be largely intact, and generally larger in size compared to those located east towards Hāna.

Within the modern district of Hāna, containing the traditional moku of Hāna and Ko'olau, five ~~(5)~~ of the 11 heiau were observed and largely still intact. The most renowned heiau of the 39 in East Maui may be Pi'ilanihale, built by Kiha-a-pi'ilani. The heiau was the tallest in the Hawaiian Islands and built to house the royal Pi'ilani bloodline. As previously noted, none of these heiau are, or were, within the License Area.

Historical Agricultural Land Use

Evidence from the abundance of land divisions, place names, and heiau are suggestive that the period of habitation in East Maui between initial establishment and western contact was extensive. Evidence suggests that there were not many taro terraces throughout the region as the geography is not favorable due to the gulches and not many flats. However, where possible, especially in Ke'anae, taro terraces were cultivated. There is evidence that many of the stream beds were lined with stream taro well into the uplands and dry agriculture was utilized above the coastal area. Cultivation in this region was not entirely dependent on perennial water and further utilized dry-zone agriculture on the slopes of Haleakalā above the coast. The East Maui region is extremely fertile, and with an abundance of water resources, it was productive and supported a large population. However, by looking at the spatial associations of cultivation, habitation and access to sites of significance to traditional Hawaiians (i.e., access trails, fishponds, and heiau) a clear pattern of intensive, predominately coastal, occupation is seen throughout the lands of Hāmākua Loa and Ko'olau Moku.

In an attempt to estimate the amount of intensive agriculture land (farmland) that was traditionally and historically in use within this region of East Maui in response to comments provided on the DEIS, CSH completed a geographic analysis of kuleana land claims, historic maps, and relevant studies (See Figure 4-37).

Kuleana land claims that make reference to agricultural land use (predominately lo'i kalo) in the vicinity of the License Area were tabulated and mapped in order to provide an estimate of land acreage in intensive agricultural use in the 1850s, prior to the construction of the EMI Aqueduct System and water diversion (a detailed discussion of LCAs is presented in Section 2.4.2 of Appendix E). It is important to note that for this analysis, the acreage estimate includes the entire surface area of each land claim that references agricultural use and does not account for portions of the claim, like house lot locations, that were not utilized for agriculture. Given this overestimation, CSH identified approximately 447.6 acres of documented agricultural use in East Maui circa 1850. The majority of the kuleana claims in East Maui are located in coastal environments, especially in and around stream mouths and lowland areas. No kuleana parcels are located with the License Area.

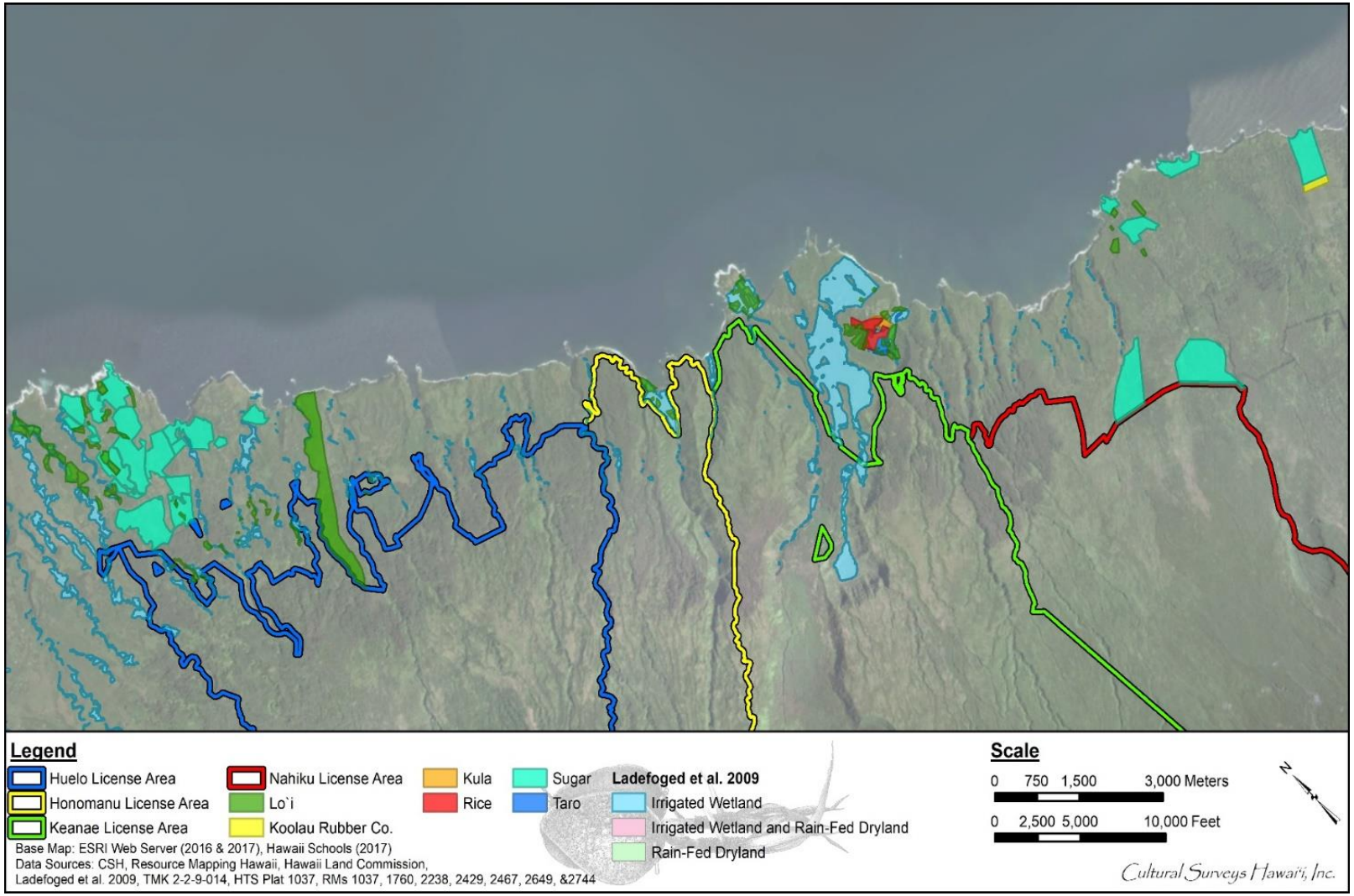


Figure 4-37. Aerial Photograph Depicting the Composite Acreage of Documented and Potential Intensive Agriculture Areas within and Adjacent to the License Area

Cultural Surveys Hawai‘i, Inc provided the map above that depicts potential intensive agriculture are

Historic maps dating between 1869 and 1922 were analyzed for the locations of farm plots and commercial agricultural ventures, which were quantified by type. Historic maps (1869-1922) document 1,126.3 acres of sugarcane, 38.1 acres of rice, 15.6 acres of taro, 14.7 acres of rubber (Ko'olau Rubber Company), and 13.3 acres of kula (fields, open pasture) in East Maui. Historic maps document an estimated total of 1,208 acres of farmland, including approximately 28.9 acres in use for traditional native Hawaiian agricultural practices (lo'i kalo and kula land). As with kuleana lands, the historic farmlands in East Maui were located near the coast in areas that could be accessed by trail or by ship.

A study that developed quantitative models for the distribution of intensive agricultural systems in the Hawaiian archipelago (Ladefoged et al. 2009) suggests that the most productive areas for intensive wetland agriculture are located below the 300 m (approximately 1,000 ft) elevation, and that an intensive rain-fed system would not exceed 900 m (approximately 3,000 ft) above sea level (See Figure 4-38). A slope threshold of less than or equal to 10 degrees was established for pond field development based on previous archaeological studies and the need to maintain continual water flow within lo'i kalo.

Ladefoged et al. (2009:2376) note that "Hawaiians also created pond fields by cut-and-fill stone-faced terracing on steeper slopes, such as the colluvial slopes that are found in many windward valleys, but the area of these was more limited." The authors also state the following:

> *Intensive irrigated pondfields can only be constructed in a limited number of geomorphic settings. Soils must be malleable enough to be formed into pondfields and located in areas suitable for water manipulation and diversion. A series of Soil Survey Geographic (SSURGO) database layers were downloaded from the US Department of Agriculture website and combined. The coding in these layers specifies 36 categories for the variable "geomdesc" (geomorphic description). Seventeen of these categories were classified as being suitable for intensive irrigated agriculture, including "alluvial fans", "flood plains", "alluvial flats", "alluvial plains", "gulches", "valleys", and "streams". The primary categories that we excluded were "mountains", "mountain slopes", and "uplands". (Ladefoged et al. 2009:2376)*

The models provided by Ladefoged et al. (2009) identify a total 1,153.1 acres of potential irrigated wetland in this portion of East Maui. This estimate is significantly more than the 447.6 acres represented by kuleana claims. However, of the 1,153.1 acres of potential irrigated wetland, only 152.1 acres are located within the License Area. This acreage is limited to narrow margins of valleys along the following streams: Honopou, Ho'olawa (specifically Ho'olawa Nui tributary), Hoalua, Kailua, Nā'ili'ilihaele, Ka'aiea, Kōlea, Waikamoi (Alo Tributary), Puohokamoa, Ha'ipua'ena, Punala'u, Honomanū, Nua'ailua, Pi'ina'au, and Waiokamilo.

Maly and Maly (2006) provide the following summary of their six-year study of land use in the upland regions of East Maui:

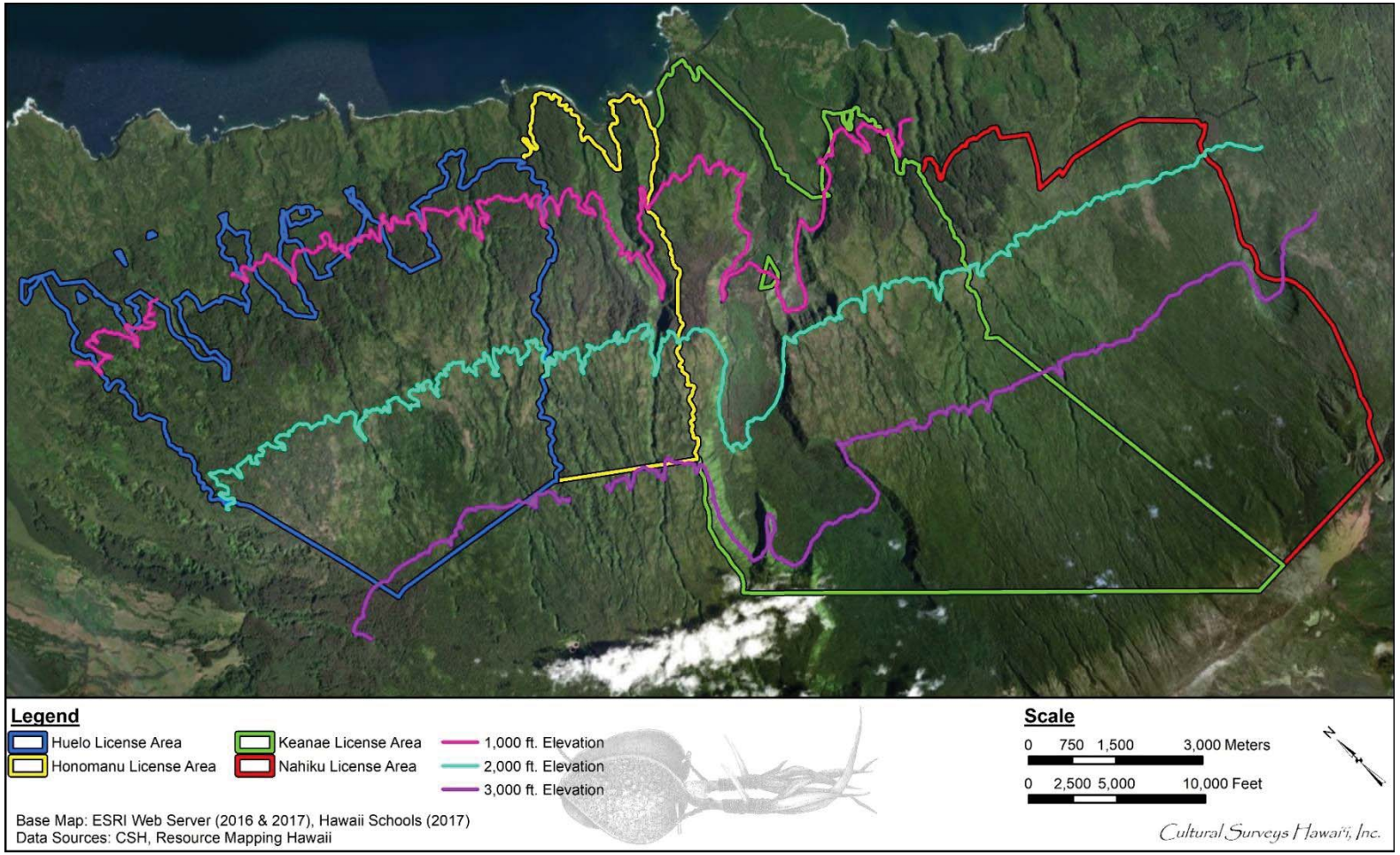


Figure 4-38. Aerial Photograph Depicting the 1,000 Ft, 2,000 Ft, and 3,000 Ft Elevation Contours in Relationship to the License Area Cultural Surveys Hawai‘i, Inc provided the map above depicting the elevation contours

> *Native traditions and historical accounts cited in this study document that no regular habitation, cultivation or intensive land use occurred in the upland region of which the Waikamoi Preserve is a part. Most significant areas of traditional habitation and agricultural uses occurred from the near-shore lands to around 2,000 foot elevation. Native traditions do, however, provide readers with specific descriptions of travel through the lands which make up and adjoin the Waikamoi Preserve. Practices such as trapping birds and collecting feathers, or the hunting other species of birds for food; and travel to the summit region of Haleakalā to inter remains and deify family members, have been recorded. (Maly and Maly 2006:ii)*

The study found no traditions or accounts of regular habitation, cultivation, or intensive land use in the uplands of East Maui generally above 2,000 ft elevation (Maly and Maly 2006) (See Figure 4-37). The portion of the License Area that is located above the 2,000-ft elevation contour includes approximately 19,640 acres. This upland land area accounts for approximately 60% of the 33,000-acre License Area and there is no documentation of traditional habitation or intensive agriculture.

In summary, numerous historic accounts provide documentation of habitation and intensive agriculture in the coastal region of East Maui. Kuleana claims, located near the coast, may have included up to 447.6 acres of intensive agriculture land. Historic maps documented continued use of the coastal region for intensive agriculture into the 20th Century with 1,208 acres of mapped farmland located downslope of the License Area. A quantitative assessment of intensive agricultural throughout the Hawaiian Archipelago suggests the potential for 1,153.1 acres of irrigated wetland agriculture in this portion of East Maui, however only 152.1 acres are located within the License Area (or 0.5% of the 33,000-acre area).

The analysis indicates that archaeological evidence of traditional intensive agriculture, such as terrace complexes, are unlikely to be identified within the License Area. As noted above, the only portions of the License Area that were identified as suitable for intensive agriculture are the narrow margins along the valleys of the Honopou, Hoʻolawa (specifically Hoʻolawa Nui tributary), Hoalua, Kailua, Nāʻiliʻilihaele, Kaʻaiea, Kōlea, Waikamoi (Alo Tributary), Puohokamoa, Haʻipuaʻena, Punalaʻu, Honomanū, Nuaʻailua, Piʻinaʻau, and Waiokamio streams. Less intensive agriculture occurred in the uplands of East Maui wherever people were camping, gathering, or traveling through the region. However, such low intensity agriculture, such as plantings within forests or along the margins of streams is less likely to have left an archaeological footprint.

Transportation and Access

The initial occupation of East Maui first occurred along the coastal region about AD 1200 (Haun et al. 2004). Of great importance to the reign of Piʻilani, and to his subjects, was thecreation of a network of roads extending throughout Maui. Each road was laboriously constructed of hand-fitted, adze-trimmed, basalt blocks laid in a mosaic to form paths four to six feet wide. One of these roads extended approximately 60 miles and connected Wailuku with Hāna. Around AD 1480, Piʻilani's son, Kiha-a-Piʻilani, had the road extended beyond Hāna: through the Kaupō Gap and across the Haleakalā Crater (Duensing 2005). Maly and Maly (2001:398) further note that in addition to alahele (trails) and alaloa (regional thoroughfares) that extend generally parallel to the shoreline, there were also trails that connected the near shore areas with the

uplands in each ahupuaʻa. While the majority of this trail network was never mapped, portions of trails were undoubtedly re-used and expanded historically into roads, including portions of Hāna Highway. In this fashion the ahupuaʻa and moku were connected to each other, while also containing roads that enabled access to the ʻili, lele, and other constituent small-scale land divisions within the individual ahupuaʻa.

In response to comments received on the DEIS regarding questions about roads and trails within the License Area, and in an effort to identify vehicular and pedestrian access points, CSH completed a geographic analysis of trails and roads that appear on maps of the License Area (See Figure 4-39). The analysis is limited to trails and roads that extend within the License Area and are depicted on maps between 1869 and 1992 and available to the public domain.

Presently, the majority of roads and trails within the License Area are associated with access to the EMI Aqueduct System. Access points include Lupi Road in the Huelo portion of the License Area and Piʻinaʻau Road in the Keʻanae portion of the License Area along with other unnamed 4WD roads that connect to Hāna Highway. Trails extend across slope from the roads to access various components of the EMI Aqueduct System. These roads and "ditch trails" are likely contemporary with the construction of the EMI Aqueduct System at these locations.

Modern hiking trails, such as the Waikamoi Ridge trail and the Keʻanae Arboretum Walk extend into the License Area from Hāna Highway (discussed further in Section 4.8). Access to the upper portions of the License Area appears limited with only one mapped trail section documented in the upper reaches of the Huelo portion of the License Area.

Post-Contact History of East Maui

Early historic background research within the report presented a regional perspective of the earliest Western accounts recorded in the East Maui region including Captain James Cook's brief stop in Hāna in 1778, the arrival of the British ship, the Iphigenia at Hāna in 1788, the role of East Maui in the 1790 Kaua o Kawaʻanui (Battle of Great Canoes), and the arrival of the first missionaries to East Maui in the early 1800s. One of the earliest impacts of European contact on the Native Hawaiians was the spread of Old World diseases into island populations. With the arrival of Captain Cook in the late 1770s came the initial introduction of venereal disease and possibly respiratory ailments (Kirch, 2012). The number of rampant diseases was to increase steadily alongside the number of traders, merchants, and visitors arriving from distant shores. Although there is serious debate about the Native Hawaiian population at first contact with Europeans, making an exact figure for the depopulation of Native Hawaiians by disease is difficult to grasp, the known effects of the introduction of foreign disease make a population reduction from 500,000 in 1779 to 130,000 fifty years later seem feasible (Kirch, 2012). There were several outbreaks of small pox, leprosy, tuberculosis, influenza, and cholera documented that ravaged the Native Hawaiian population, as well as the foreign population that was settling Hawaiʻi.

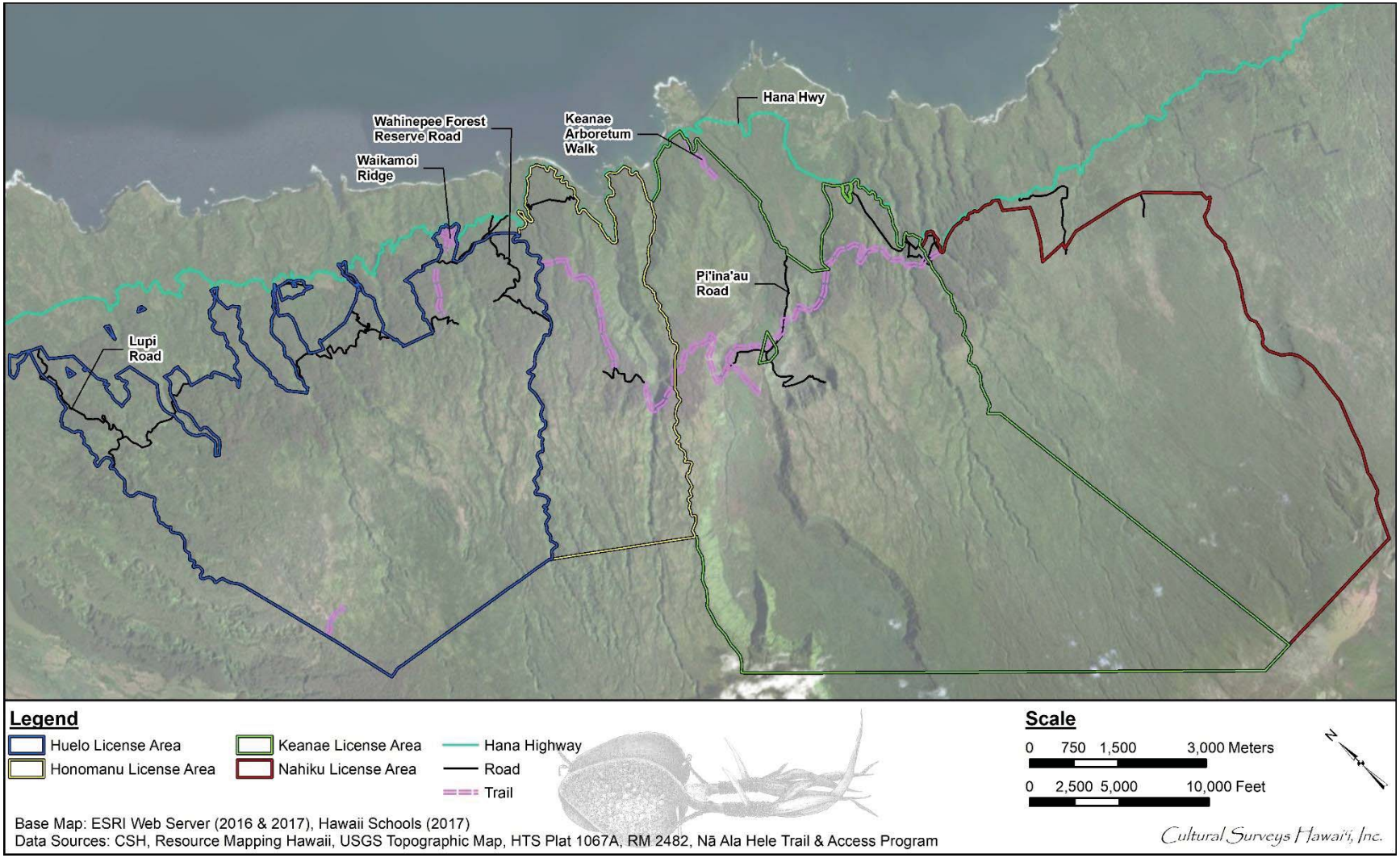


Figure 4-39. Aerial photograph Depicting Mapped Roads and Trails within the License Area

Cultural Surveys Hawai‘i, Inc provided the map above depicting the mapped roads and trails within the License Area

The most significant change in land-use in the Hawaiian Islands came with the Māhele of 1848 which changed the communal land system to one of private ownership. The foundation for private land ownership set by the Māhele of 1848 began a marked pace of development across the entire island chain, and Maui was no exception to the age of Western development. The Māhele enabled many foreigners and foreign nationals to acquire land for the establishment of ranching and plantation operations, including the infrastructure projects that were aimed at supporting these land-intensive industries (aqueducts, roads, etc.). Within the Māhele records for the License Area there are over 85 claims for terrestrial agricultural features such as loʻi (irrigated taro terraces), pākanu (garden, planting enclosure), ʻauwai (artificial irrigation canals, used to feed loʻi), kula (fields, open pasture), pali (cliff, precipice, or steep hill suitable for cultivation of select plants), kīhāpai (small cultivated patch or orchard), moʻo (ridge for similar purpose as pali), and pōʻalima (small agricultural patches tended in traditional times solely for chiefly tribute) (Pukui and Elbert 1986). There are also kuleana claimed for their naturally occurring vegetation and the right of tenants to collect these resources, such as ʻie (aerial roots of the ʻieʻie vine, used in plaiting, basketry, and wicker weaving), olonā (shrub with fibrous bark used in fishnets, baskets, and to construct tī leaf raincoats and capes), wauke (paper mulberry used in making tapa cloth), hala (pandanus tree) and wildly occurring kalo (taro) and sweet potato (Pukui and Elbert 1986:50,94,256,286). Lastly are the kuleana claims over aquatic resources such as off-shore fisheries (documented as “sea” in LCA awards) and muliwai (river mouth, freshwater pool behind a shoreline sand bar) that are naturally occurring and not man made (Pukui and Elbert 1986). The Māhele also marked a turning point in Hawaiʻi’s history as Western commercial interests and travelers began their influence on the remote region of East Maui and elsewhere.

By 1850, lands belonging to Hawaiian aliʻi were sold to help pay commutation fees owed by their awardees and for simple cash profits from selling so-called unused land. Makaʻāinana (commoners) that had historically lived on and cultivated these lands were inadvertently dispossessed of their homes and arable plots that lied within the sold portions of land. In acknowledgement of this dispossession, the Board of Commissioners passed resolutions authored by the Privy Council through the legislature in 1850 that aided in the protection of the rights of tenant farmers whose homes and plots were essentially owned by overarching ~~Land Commission Award (~~LCA~~)~~ awardees.

The earliest records of Western industry in East Maui included L. L. Torbert’s potato plantation at Honuaʻula and the beginning of the construction of ditches, tunnels, and siphons to transport the waters of East Maui to the central isthmus for commercial sugarcane agriculture. The Hawaiian Islands attracted a new generation of managers, professionals, and entrepreneurs who would reshape the landscape for western enterprises and pursuits. Samuel T. Alexander and Henry P. Baldwin were prominent in this movement. With the ratification of the Treaty of Reciprocity with the United States in 1876, the future success of sugar in the Hawaiian Islands seemed assured. At that time, several small plantations in the districts east of Wailuku and Kahului and north of Makawao developed new plans to expand the growing of sugar. On September 30, 1876, the government of Hawaiʻi gave permission to the plantations of Maui to take water from the principal six streams of the region (Kailua, Hoalua, Huelo, Hoʻolawa, and Honopou streams on its way to the terminus at Nāʻiliʻilihaele Stream) and convey the water by ditch to its ~~their~~ fields, for an annual rental of $100 (Kuykendall, 1967:64). The project of bringing ~~the system by which~~ mountain water ~~was brought~~ from East Maui was completed on schedule and, in July 1877, the first water began flowing through the ditch to the Haʻikū

Plantation. The transfer of water sparked the rise of the commercial sugar industry on Maui and prompted the expansion of the aqueduct system to include a present-day EMI Aqueduct System ~~estimate of 50 miles of tunnels, 24 miles of ditches, 13 inverted siphons, approximately 400 388 intakes, eight reservoirs, 62 miles of private roads, and a solar-powered radio telemetry system to monitor ditch flows (ASCE, 2001)~~.

Rubber plantations in portions of East Maui soon followed sugar with the start of the Nāhiku Rubber Company, Koʻolau Rubber Company, American-Hawaiian Rubber Company, and the planting of rubber by the Nāhiku Sugar Company throughout the early 1900s. As discussed in the LRFI included with the DEIS, rubber planting was welcomed into the Nāhiku community by the residents as an avenue to bring income to the region after the closure of the nearby sugar plantation. With the local Nāhiku Sugar Company's difficulties in growing commercial sugar in the area, the Nāhiku region fell into a state of "innocuous desuetude…so the district has lain idle and the residents there have grown poorer and poorer until many families were on the verge of starvation" (Hawaiian Gazette 1906:6). When taken together, the combined plantings of the four major companies were more than 280,000 individual rubber trees, with the fields being tended by Japanese, Portuguese, and Hawaiian laborers living in the region as homesteaders or in plantation labor camps. Growing rubber was a difficult business to start in Nāhiku considering that the average maturity rate for a rubber tree is between three and five years, resulting in the first 'experimental' tapping of these crops in 1910 to determine quality, and not emerging onto the national market until a sizable crop could be harvested in 1911. However, attempting commercial agricultural operations in a region as isolated as Nāhiku in the early 1900s proved to be an insurmountably difficult undertaking for the growing rubber enterprise on East Maui. Ultimately a decline in the price of rubber doomed the Maui rubber industry.

Additional research into the history of East Maui included a summary of the development of the community of Keʻanae, the construction of the Hāna Belt Road and subsequent designation of the corridor as an historic district, and a review of modern land use in the region focused on the activities of the more than 700,000 tourists that travel annually throughout this region.

The LRFI included with the DEIS also noted that studies of the history of land use in Keʻanae indicate that the lands have been used intensively for wetland taro cultivation, or loʻi agriculture, historically and during pre-Contact times (Group 70 International et al. 1995:70; Handy et al. 1991). As Native Hawaiian populations of the islands declined with the arrival of western disease, so too did the need for taro, resulting in unattended loʻi in the Keʻanae area. In the second half of the nineteenth century, the market for rice grew significantly with increasing demand from Chinese laborers on sugar plantations in Hāna. After successfully completing labor contracts, Chinese immigrants looking for independent pursuits took advantage of an opportunity to grow their own staple, rice (Wright 1974b). With a pond field irrigation system already in place in Keʻanae, the region was ripe for conversion from taro cultivation to rice. Chinese entrepreneurs commonly leased former loʻi lands from Hawaiian owners for rice cultivation (Group 70 International et al. 1995). Tax records for 1890 indicate that the rice lands in Keʻanae and Wailuānui comprised approximately 67.84 acres out of a total of 163.322 acres in pond-field agriculture. Two years later, this number rose to 75 acres in Keʻanae and Wailuanui while other lands on Maui (Honokowai, Waikapu, Wailuku, Waiehu, and Waiheʻe) registered a combined acreage of 175 (Group 70 International et al. 1995; Linnekin 1985). Rice farming declined sharply following 1910, and by 1935 ceased entirely (Group 70

International et al. 1995). Around 1920 many Hawaiians returned and began commercially cultivating taro on Ke'anae Homesteads. Due to its important cultural and historical significance, the Ke'anae Peninsula taro complex has been designated SIHP # 50-50-07-3933.

The Hāna Highway Historic District (SIHP # 50-50-va-1638), which includes 48 miles of roadway beginning at 0.2 miles west of Mile Marker 3 on State Route 360 (Hāna Highway) and ending at Kalepa Gulch on County Route 31 (Pi'ilani Highway), includes 78 contributing feature components. The Hāna Highway was also recognized as a Millennium Legacy Trail in 2000, and in 2001 was nominated to the NRHP. The Hāna Belt Road was completed and opened to the public in 1926 and effectively ended Hāna District's centuries of geographic isolation from the rest of the island. Recent improvements to the bridges and roads now allow over 700,000 visitors yearly to tour East Maui (Wood 2003).

Previous archaeological research included a summary of approximately 45 archaeological studies conducted in the vicinity of the current License Area including early island-wide surveys, studies specific to the Hāna Highway, and studies conducted in the vicinity of each portion of the License Area ~~license area~~. In general, these studies document the rich archaeological landscape along the coast of the region and extending upward into many of the stream valleys. Findings include agricultural complexes, habitation areas, heiau, trails, walls, historic structures and remnants, WWII-era structures, and other associated artifacts and deposits. Few of these previous studies are within or overlap with the CSH's LRFI. CSH did not observe any potential archaeological sites during their field inspections of the License Area.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the continued operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. Specifically, maintenance and repair activities involve keeping the waterways clear of trees, weeds, rocks, dirt and anything that will potentially impede the flow of water. This includes not only in ditches, but in tunnels and flumes as well. Some activities are performed by hand and other activities require small tractors and or specialized equipment. It should be noted that EMI continually maintains the EMI Aqueduct System. It evaluates areas of the EMI Aqueduct System regularly to identify where maintenance / repair activities are necessary and adds them to a list of maintenance projects. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL.

No significant impacts on historic and archeological resources in the region are anticipated as the Proposed Action does not involve any significant new ground disturbance. The Proposed Action does not entail partial or total destruction or alteration of any historic properties, or detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, nor does it propose increasing public access within the License Area, which could bring about resulting damage to the EMI Aqueduct System. Nor does the Proposed Action involve the deterioration or destruction of the EMI Aqueduct System or changes in water flow

greater than periodic natural stream freshets. As such, the Proposed Action will have no impact to archeological historic properties.

However, due to the CWRM D&O, some of the sluice gates must be removed from the stream diversion of particular streams, regardless of whether the Water Lease is issued or not. The effect of the removal of the sluice gates is minimal, as they do not drastically alter the overall physical appearance of the historic EMI Aqueduct System. Documentation of the sluice gates with photos and location sketch plans conforming to the Historic American Engineering Survey (HAER) standards where sluice gates are to be removed or altered is proposed. Many of the sluice gates are unique to a particular stream, and documentation will ensure that nothing is lost over time.

If future implementation of the Proposed Action results in ground disturbance subject to County, State, and/or Federal permits required, then CSH recommends consultation with the SHPD to determine historic preservation requirements at that time. It is recommended that any persons who are required to enter the License Area as part of the Proposed Action be made aware of the potential for discovery of undocumented surface historic properties such as walls, trails, terraces, mounds, and/or caves. These structures should be avoided, protected, and reported to the SHPD. The SHPD will determine if additional mitigation is required. In addition, should human skeletal remains be identified within the License Area as part of the Proposed Action, any work in the immediate vicinity of the remains should be stopped and the discovery should be immediately reported to the SHPD (during regular business hours) or to the Division of Conservation and Resources Enforcement (DOCARE) (outside of regular business hours) and to the Maui Police Department (to include notification to the medical examiner) in accordance with HAR § 13-300-40. Similarly, should a historic property other than a burial be discovered within the License Area as part of the Proposed Action, any work in the immediate area should be halted and the SHPD should be notified as soon as possible in accordance with HAR § 13-280-3. The SHPD shall gather sufficient information to evaluate the significance of the historic property. These recommendations are in line with recommendations that were made for the Waikamoi Preserve during a cultural-historical study of East Maui (Maly and Maly, 2006).

Other recommended mitigation measures arise under the alternatives to the Proposed Action, as presented in Chapter 3. However, with respect to the Proposed Action being authorized together with a scenario that allows for greater public access within the License Area, in addition to the mitigation measures noted above, CSH notes that increased public access has the potential to pose impacts to historic properties, especially if public access is unmanaged. In order to increase public awareness of human impacts in the License Area, CSH recommends the installation of signage at common public access points to the License Area along Hāna Highway that describes the access policy, cautions potential entrants on impacts to the environment and historic properties (with reference to penalties per HRS § 6E-11), and provides the contact information of the lease-holder, DLNR, the SHPD, and DOCARE. The signs could also include a cultural/historical interpretive component in consultation with the community and subject to the review of the SHPD.

Upcountry Maui

The CSH LRFI only surveyed and analyzed portions of the License Area within East Maui and the Central Maui agricultural fields in its updated report. The EMI Aqueduct System conveys water to Upcountry Maui to the MDWS to meet domestic and agricultural water demands. Upcountry Maui is a highly altered urban environment and the Proposed Action does not propose any new actions in Upcountry Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on historic and archeological resources in Upcountry Maui are anticipated as the Proposed Action does not involve any construction or any ground disturbance in Upcountry Maui, and any activities that may take place are outside of the control or scope of the applicant.

Central Maui

Central Maui has been in agricultural production well over 100 years. The EMI Aqueduct System conveys water to the agricultural fields in ~~to~~ Central Maui and has done so for over 100 years to support agricultural operations. In response to comments received on the DEIS regarding Papanene Heiau which certain commenters indicated may be located within the Central Maui agricultural fields, CSH conducted an additional literature review and inspection. However, CSH archaeologists were unable to locate Papanene Heiau within the License Area during a field inspection (Yucha and Hammatt 2020). Out of respect for privacy and potential confidentiality of precise locations of cultural sites and practices, CSH did not probe community interview participants during the consultation period. Moreover, based upon a review of the available documentation, CSH determined that the most likely location for Papanene Heiau (which has reportedly been destroyed since prior to 1931) is in Spreckelsville, which is several miles from the Central Maui agricultural fields associated with the proposed Water Lease, and therefore would not be affected by the Proposed Action.

An article that was published in an 1865 issue of *Ka Nupepa Kuaokoa*, which was translated by Cori-Ann Lorenzo (Lee-Greig et al. 2012:36-38), Kaawa (1865) lists several heiau known to him, including "Papanene in Kapukaulua." From October 1928 to August 1929, Winslow M. Walker (1931), archaeologist for Bernice Pauahi Bishop Museum, conducted a systematic island-wide survey focused on identifying and confirming traditional Hawaiian ceremonial structures (i.e., heiau and ko'a) based on earlier research conducted by the Bernice Pauahi Bishop Museum (Stokes 1916; Thrum 1908, 1916, 1917, 1918). He includes "Papanene at Kapukaulau, Puunene" in a list of "[h]eiau [s]ites destroyed on the northeast coast of east Maui" (Walker 1931:151).

Later, from 1960 to 1970, Elspeth P. Sterling (1998) further expanded research for Bernice Pauahi Bishop Museum regarding archaeological sites on Maui. Sterling (1998:64) provides

the same description as Walker (1931:151) for Papanene Heiau, documenting Papanene Heiau as being destroyed.

Kapukaulua is the name of a street in Spreckelsville, which is on the north coast of Maui. The street name refers to a traditional land section of Maui by the same name (Budnick 1991:81). This area includes a cinder cone known as Puʻu Nene, indicating that the "Puunene" location described by Walker (1931:151) refers to the Puʻu Nene landform, not the town. Given these details, as noted above, the most likely location for Papanene Heiau is in Spreckelsville. Therefore, the location of this heiau, which has reportedly been destroyed since prior to 1931, will not be affected by the Proposed Action.

Previous archaeological surveys throughout the County of Maui have documented numerous historic properties within gulches that extend through current and former agricultural fields (Davis 1977; E. M. Fredericksen and D. L. Fredericksen 2003; Ketner et al. 2007; Lee-Greig et al. 2014; Yucha and Hammatt 2020) and have identified historic properties, including human burials, beneath agricultural plow zones (Yucha and Yucha 2018 Draft; Yucha et al. 2017).

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on historic and archeological in Central Maui are anticipated as the agricultural fields in Central Maui have been subject to agricultural activities for over a century. Current and future activities will be kept within existing agricultural fields that, prior to the end of sugar production in 2016, were continuously plowed for more than a century. Additional plowing within an established agricultural plow zone will not pose a new or increased impact to historic properties any more so than past agricultural plowing. However, there may be a potential to impact historic properties if ground disturbance occurs outside of the established agricultural fields or significantly deeper than the established agricultural plow zone. Consultation with the SHPD is recommended in the event that agricultural use in Central Maui is proposed for areas outside of established agricultural zones or for projects that would involve ground disturbance beneath the agricultural plow zone.

4.6 Cultural Resources and Practices

East Maui

CSH also prepared a Cultural Impact Assessment (CIA) for the Proposed Action dated June 2019 and updated October 2020 based on comments received in response to the DEIS (See Appendix F). The CIA was prepared in conjunction with CSH's LRFI discussed in Section 4.5.[13] The purpose of the CIA is to comply with the State of Hawaiʻi's environmental review process

[13] Information and discussions presented from CSH's LRFI in Section 4.5 was not repeated in this discussion to avoid repetition.

under HRS Chapter 343, which requires consideration of the Proposed Action's potential effect on cultural beliefs, practices and resources. The CIA also aids in supporting the Proposed Action's historic preservation review under HRS Chapter 6E and HAR Title 13, Chapters 275 and 284. As discussed in the CIA included with the DEIS, the CIA is intended to provide information to State and County agencies when making decisions that may impact cultural, historical, or natural resources or native Hawaiian traditional and customary practices. Consistent with the framework set forth in the Hawaii Supreme Court's decision, *Ka Pa'akai O Ka 'Āina v. Land Use Commission*, the CIA includes information to assist agency decisionmaking related to the proposed Water Lease, including: "(1) the identity and scope of valued cultural, historical, or natural resources in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area; (2) the extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and, (3) the feasible action, if any, to be taken by the [agency] to reasonably protect native Hawaiian rights if they are found to exist." *Ka Pa'akai O Ka 'Āina v. Land Use Comm'n*, 94 Hawai'i 31, 47, 7 P.3d 1068, 1084 (2000).

The CIA included examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources, accessing religious sites, or agricultural pursuits as may be indicated in the historic record. The CIA is a regional analysis that also reviewed previous archaeological work ~~at~~ within and near the License Area that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the License Area ~~parcel~~, including all License Area streams diverted and previously diverted by the EMI Aqueduct System (i.e., the 12 non-petitioned streams not subject to the 2018 CWRM D&O and the petitioned streams). Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or in the vicinity of the License Area; present and past uses of the License Area; and/or other practices, uses, or traditions associated with the License Area and environs were also undertaken. CSH conducted two separate rounds of community consultation for the CIA. The first round of community consultation was conducted during the preparation of the DEIS. Following public review of and comment on the DEIS, CSH conducted a second round of consultation. This consultation was targeted to those who had provided comments on the DEIS and raised specific issues related to potential impacts on traditional or cultural practices or resources.

Cultural documents, primary and secondary cultural and historical sources, previous archaeological reports, historic maps, and photographs were reviewed for information pertaining to the License Area ~~study area~~. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawai'i State Archives, the Bishop Museum archives, the University of Hawai'i at Mānoa's Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau.org 2004), the SHPD library, the State of Hawai'i Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via the Waihona 'Aina (2000) Māhele database, the Office of Hawaiian Affairs (OHA) (2015) Papakilo Database, and the Ava Konohiki (2015) Ancestral Visions of 'Āina website.

The CIA follows the Environmental Advisory Council's (formerly the Environmental Council)[14] *Guidelines for Assessing Cultural Impacts,* including the following protocol: 1) identification of and consultation with individuals and organizations with expertise in the resources, practices and beliefs found within the broad geographical area or ahupuaʻa; 2) identification of and consultation with those of knowledge of the potentially affected area; 3) gathering information and conducting interviews with those of knowledge of the potentially affected area; 4) conducting historical and other culturally related documentary research; 5) identifying and describing the cultural resources, practices, and beliefs connected to the potentially affected area; and, 6) assessing the impact, alternatives, and measures to mitigate the proposed action on the cultural resources, practices and beliefs identified through this process. CSH's consultation efforts utilized previous contact lists, in-house database of kūpuna (elders), kamaʻāina (native born), cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHO; includes Hawaiian Civic Clubs and those listed on the Department of Interior's NHO list), and community groups. CSH also contacted agencies such as SHPD, OHA, and the Maui/Lānaʻi ~~appropriate~~ Island Burial Council for their response on the Proposed Action ~~regarding the License Area located for their response~~ and to identify lineal and cultural descendants, individuals, and ~~or~~ NHOs with cultural expertise and / or knowledge of the License Area. CSH also remained open to referrals and new contacts throughout the process.

During the preparation of the DEIS, CSH contacted a total of 136 parties as shown in Table 12 of Appendix F including the County of Maui, other agencies, the DHHL beneficiaries, NHOs such as Aha Moku o Maui, Inc., Kuloloia Lineage-I Ke Kai o Kulolia, Waiehu Kou Phase 3 Association and knowledgeable community members. NHOs consulted included: Aha Moku o Maui, Inc. (Keʻeaumoku Kapu and Kyle Nakanelua); Kuloloiʻa Lineage – I Ke Kai o Kuloliʻa (Les Kuloloiʻa); Waiehu Kou Phase 3 Association (Roy Oliveira); Moku o Kaupō (Jade Alohalani Smith); and Aha Moku o Kahikinui (Donna Sterling). Following the DEIS public comment period, CSH reached out to those individuals who had provided comment on the DEIS specific to the CIA included in the DEIS.

During the preparation of the DEIS, ~~Of~~ of the 136 parties consulted, a total of 15 people/agencies responded to the consultation letter. Three people participated in formal interviews. CSH initiated its outreach effort in November 2017 which included letters, phone calls, emails, and in-person interviews. Below is a list of individuals and agencies who shared their manaʻo (thoughts, opinions) and ʻike (knowledge) about the License Area:

1. Dr. Kamanaʻopono Crabbe, Ka Pouhana – OHA
2. Pomaikaʻi Crozier. Conservation Manager – Puʻu Kukui Watershed Preserve
3. Skippy Hau, Kamaʻāina (native born) and Aquatic Biologist – Division of Aquatic Resources – State of Hawaiʻi
4. Garrett Hew, Kamaʻāina, Upcountry Maui farmer, and former East Maui Irrigation (EMI) employee
5. Robert Hobdy, Retired naturalist and forester
6. Roslyn Lightfoot, Director – Alexander & Baldwin Sugar Museum

[14] See Act 152 (July 1, 2021).

7. Kyle Nakanelua, Kamaʻāina, Aha Moku o Maui, and kalo (taro; Colocasia esculenta) farmer
8. Jerry Sakugawa, Upcountry Maui farmer
9. Sandy Takeshita, Upcountry Maui farmer
10. Mahealani Wendt, Member of Nā Moku Aupuni o Koʻolau Hui
11. Mavis Oliveira-Medeiros, Kamaʻāina of Hāna
12. Dawn Lono, Long-time resident of Hāna
13. Shane Sinenci, holds the County Council seat for the East Maui residency area
14. Dorothy "Aunty Dottie/Kumu Kamalu" Kahoʻokele and ʻOhana Kamaʻāina of Nāhiku
15. Moses "Moke Boy" Bergau, Kamaʻāina of Nāhiku

~~In addition, CSH asked permission to use declarations made by members of the community and of Nā Moku Aupuni o Koʻolau that were given to the CWRM in late 2014, a couple of years prior to the issuance of the CWRM D&O, which was issued on June 20, 2018.~~ Due to the low response rate, CSH incorporated numerous declarations that had been made by community members and Nā Moku Aupuni o Koʻolau in 2014, during the extensive CWRM IIFS proceeding, i.e., declarations provided to CWRM before it issued the CWRM D&O in June 2018. Although the declarations are part of the public domain, CSH nevertheless attempted to contact each individual to obtain approval to include these declarations in the CIA. Below is a list of individuals who approved use of their declaration as part of the CIA:

1. Dan Clark
2. Jonah Jacintho
3. Lezley Jacintho
4. Kaui L. Kanakaʻole
5. Pualani Kimokeo
6. Davianna McGregor, Ph.D.
7. Lurlyn Scott
8. Earl Smith, Sr.
9. Ty Kāwika Tengan
10. Edward Wendt
11. Emily Wendt

Ten individuals and organizations who provided comments on the DEIS were contacted following the DEIS comment period. CSH received four responses, including a videoconference and two written follow-up responses, a written questionnaire prepared by two OHA staff members, and one telephone interview. Below is a list of those contacted by CSH following the DEIS commetn period. Those who participated in interviews regarding the DEIS are **bolded**:

1. **Kamakana Ferreira and Wayne Tanaka, OHA**
2. **Lafayette Young, Haʻikū Community Association Board Member**
3. **Lucienne de Naie, Vice-Chair of Sierra Club Hawaiʻi Chapter**
4. **Albert Perez, Executive Director of Maui Tomorrow Foundation**
5. William Aila, Chairman of the Department of Hawaiian Home Lands
6. Daniel Grantham

7. Medeiros ʻOhana
8. Cody Nemet, Kamaʻāina and cultural practitioner
9. Hokuao Pellegrino, Kamaʻāina and kalo farmer
10. James Sagawint, Kamaʻāina

The following is a brief discussion and summary of CSH's CIA report within the context of the License Area in East Maui, including ~~as well as~~ information gathered from the community consultation and declarations, both before and after publication of the DEIS, where participants voiced and framed ~~the following~~ concerns in a cultural context.

In summary, the background research of the CIA yielded the following results, presented in approximate chronological order:

1. The License Area encompass the following ahupuaʻa: Honopou, Mokupapa, Waipiʻoiki, Waipiʻonui, Hanehoi, West Hanawana, East Hanawana, Puʻuomālie, Pāpaʻaʻea, West Makaīwa, East Makaīwa, Honomanū, Keʻanae, Wailuānui, Wailuāiki, Koʻolau, and Paʻakea.

2. Makapipi, Hanawī, and Kapāʻula in the Nāhiku portion of the License Area; Waiaʻaka, Paʻakea (Puakea Tributary), ~~Puakea,~~ Waiohue, Kopiliʻula, Puaʻakaʻa Tributary, East Wailuāiku, West Wailuāiki, Wailuānui (Waikani Waterfall), Kualani (or Hāmau), Waiokamilo, ʻŌhiʻa (or Waianu), Palauhulu (Hauoli Wahine and Kano Tributaries), Piʻinaʻau in the Keʻanae portion of the License Area; Nuaʻailua, Honomanū, Punalaʻu (Kōlea and Ulunui Tributaries), Haʻipuaʻena in the Honomanū portion of the License Area; and Puohokamoa, Wahinepeʻe, Waikamoi (Alo Tributary), Kōlea, Punaluʻu, Kaʻaiea, ʻOʻopuola (Makanali Tributary), Puehu, Nāʻiliʻilihaele, Kailua, Hanahana (Ohanui Tributary or Hanawana or Hanauna), Hoalua, Hanehoi, Huelo (Puolua Tributary), Waipiʻo, Mokupapa, Hoʻolawa (Hoʻolawa ili and Hoʻolawa nui Tributaries), and Honopou (Puniawa Tributary) in the Huelo portion of the License Area.

3. According to moʻolelo, in "The Epic Tale of Hiʻiakaikapoliopele," retold by Hoʻoulumāhiehie, Hiʻiaka and her friend Wahineʻōmaʻo sail to Maui and travel to the windward side of the island. They stop in Wailua Iki Ahupuaʻa where they encounter a group of people celebrating the hula. The hālau was filled with men, women, and children (Hoʻoulumāhiehie 2008:199). Hiʻiaka sees her cousin Kapokūlani (Kapo) in hopes of being invited in to eat and rest. Hiʻiaka offers a chant and this is when Kapo notices her ʻohana. It should be noted that Kapo is a goddess of sorcery on Maui where she acts as an akua noho.

4. One legend with a direct link to the Hāmākualoa District is the legend of Kihapiʻilani and his sweet potato patch. Kihapiʻilani is the son of the aliʻi nui Piʻilani. Kihapiʻilani is known for his lelekawa skills and for building a stone paved road around the island of Maui (Beckwith 1970). According to legend, Kihapiʻilani fled from his brother and took up residence in Makawao but kept his identity a secret. He left Makawao after he was accused of being lazy and stayed in Kalauaʻama in Haʻikū to obtain sweet potato growing skills. During his travels to the lowlands of Haʻikū, he learns how he can take revenge on his older brother. He takes the sweet potato stalks back to Kalaniwai and

plants his famous sweet potato patch, after which he continues to Wailuku to pursue his brother (Fornander 1917:236-242). Fornander's account places the patch in between Makawao and Ha'ikū, on the border of the two Hāmākualoa districts of Maui. He later took his skill set to Kalaniwai and Wailuku.

5. In the legend of Kāne and Kanaloa, the two demi-gods are in search for water to accompany their appetite for 'awa. One of the first places the pair travel to is in the mountains of Ke'anae where Kāne thrusts his kauila wood staff into the ground and a spring appears. According to author, Martha Beckwith, two holes can be seen across from 'Ōhia Gulch (1970:65). From here, they traveled east forming springs and fishponds in Lualaʻilua, Kaupo, Kipahulu, Waiheʻe, and Kahakuloa.

6. 'Ai'ai, son of Ku'ula the Fish God, instructed his friends to venture into the deep waters off of Wailua Nui Ahupua'a and kill the giant he'e that lived there. Canoes were drawn and people came down ready. 'Ai'ai brough the hokeo and leho that his father gave him. The canoes and people sailed out. It was here that Ku'ula and Hina were called upon for their assistance and the hokeo and leho were taken out and lowered into the ocean. The he'e was attracted by the radiance the leho brought out but due to its overwhelming size, scared the people. 'Ai'ai's friend brought a stone with him and at the right time, shoved the stone into the head of the squid. The weight of the stone sunk the he'e and one of the men cut off one of the tentacles of the squid. When the he'e died it turned into stone and a formation resembling a squid can be seen just outside of Wailua Nui (Thrum 1907:234-235).

7. Of the 230 structures that Walker (1931) surveyed on Maui, 39 of the recorded heiau (Walker Sites 64 through 102) were documented in this portion of East Maui. Of the 39 documented heiau sites, only one lies within the License Area. This heiau is named Pu'u o Koholā and was presumed to be located within the current Honomanū License Area. Pu'u o Koholā was listed as "destroyed/not found" by Walker (1931).

8. The Alaloa (Long Road) of Kihapiilani or the Kihapiilani Highway, was constructed during the sixteenth century during the reign of Kihapi'ilani. The chief is credited with completed the paved road from Hāna to Wailuku, which was initiated by his father, Pi'ilani (Fleming 1933). The road provided a means of trade, commerce, and war time protection.

9. Honomanū Valley was once the site of a large Hawaiian community. The residents of this area utilized the bay for canoe fishing and the uplands for agricultural terracing and house sites (Handy and Handy 1978). Another account states that many burials can be found in the upper reaches of the valley (Sterling 1998:109).

10. Ke'anae Peninsula is a lava plain that extends a mile into the ocean from Ke'anae Valley. This area is known for lo'i cultivation and still continues to celebrate a traditional Native Hawaiian lifestyle today (Handy 1940).

11. The earliest estimation of occupation along the coastal region of East Maui is approximately AD 1200.The abundance of traditional land divisions and place names

between Hāmākua Loa and Hāna suggest habitation was extensive after initial establishment.

12. Documentation regarding Native Hawaiian tenancy reveal that ocean resources were just as important as products of the land for sustenance. The preferred method of fishing was open ocean fishing for the people who lived along the coast of East Maui. In waters of ten or more fathoms deep, the favored technique was kākā or kūkaula.

13. It has been noted that there was some rivalry between the ahupua'a of Ke'anae and neighboring Wailua Nui. This rivalry gave way to larger political battles concerning rule of Maui Island between the sons of Pi'ilani (Kamakau 1992:22-29) and later the consolidation of power and unification of the Hawaiian Islands under Kamehameha (Group 70 International Inc. et al. 1995).

14. In 1778, after Captain James Cook's ships returned from their North American explorations, the crew stopped in Hāna and encountered Hawaiians for the first time on board their ships (Cordy 2000:294).

15. Prior to the establishment of the Hāna protestant mission in 1837, missionaries would visit East Maui once or twice a year. Hāna was considered to be "one of the most isolated places in these islands, remote and difficult to access". The journey was made by horseback to Ke'anae then traveled by canoe for the remainder of the trip.

16. Māhele documentation exhibits that occupancy was dense in East Maui, especially in the Honopou, Mokupapa, and Ke'anae regions. According to records, the land was used for traditional crops including lo'i kalo, kula, potato growing, olonā, 'ie, wauke, koa, 'ulu, and 'ōhi'a. In addition, many streams, 'auwai, and loko i'a were claimed as well. A unique trait to this area was that specific areas including the sea shore, pali, government roads, and streams that contained 'ōpae and 'o'opu were also claimed.

17. The Māhele of 1848 set the precedence of private land ownership across the entire Hawaiian Island chain and Maui was no exception to the age of Western development. The Māhele enabled foreigners and foreign nationals to acquire land for the establishment of ranching and plantation operations, including any infrastructure projects that were to support these land intensive industries.

18. With the decline of the whaling industry in the mid- to late-1800s, the Hawaiian Islands attracted a new generation of entrepreneurs. Samuel T. Alexander and Henry Perrine Baldwin were prominent in this movement. Alexander was credited with using irrigation for improving sugarcane and banana yields, while Baldwin's father had been granted 2,675-acres of land in northwest Maui.

19. In 1867, Samuel T. Alexander proposed a massive construction project to bring mountain water from the streams of East Maui to the Central Maui isthmus, where many sugar crops were experiencing drought. This would later be known as the EMI Aqueduct System.

20. The digging of the irrigation ditch from East Maui to Central Maui was a great feat. Hundreds of men were employed at a time with food, shelter, and tools supplied to them. The work required brute strength as heavy timber for flumes would need to be transported from the main road to the upper reaches of the forest (Thrum 1877:39-42). The crew dealt with torrential rains and landslides. Sometimes workers hacked their way through the thick forests and were required to descend sheer cliffs by way of rope.

21. In July of 1877, the first water began to flow through the ditch and reached Haiku Plantation 24 hours later. Approximately 60 million gallons of water per day ran through the ditch system. The system cost $80,000.~~, which was paid for by~~ Castle & Cooke provided funding.

22. The EMI Aqueduct System has been in use for over 134 years and continues to collect water today for private and municipal entities. The EMI Aqueduct System contains 50 miles of tunnels, 24 miles of open ditches, inverted siphons and flumes, approximately 388 intakes, ~~eight~~ six reservoirs, and a solar powered radio telemetry system to monitor ditch flow. The catchment begins at roughly 1,300 ft. elevation and delivers water to Central Maui at an elevation of 1,150 ft., covering 18 miles from its western to eastern extent (ASCE 2001).

CSH conducted two separate rounds of community consultation; one prior to the publication of the June 2019 CIA included in the DEIS, and the second in response to comments received on the DEIS. Consultation identified concerns that are not related to the cultural context, as well as concerns related to the cultural context. In summary, during ~~the information gathered from~~ the intitial community consultation completed for the the DEIS, participants voiced the following concerns not related to the cultural context (It should be noted that these concerns were expressed prior to the issuance of the CWRM D&O):

1. Community participant Skippy Hau noted that "not all lands belong to the State" and recommends that private lands should and need to be identified by signs and safe parking areas. In addition, many visitors and tour groups assume that most lands belong to the State resulting in illegal trespassing. Also noted that rental cars regularly block Hāna Highway creating and blocking traffic.

2. Mr. Hau states that the EMI Aqueduct System requires mapping that shows the 388 intakes, ditches, dams, pipes, and flumes. Each diversion should be located and identified accurately with GPS coordinates. Elevations should also be recorded. The amount of water moving through the system should be measured at specific locations within the EMI Aqueduct System as well.

3. Other questions and clarifications from Mr. Hau included the following:

    a. Is the 20,000 gallons per day for Nāhiku and Kula Agricultural Park a minimum?
    b. Isn't the interim instream flow supposed to maintain a minimum flow for each stream?
    c. Will EMI property be clearly identified along the boundaries of State land?
    d. Please identify "settlements" along Hāna Highway.

e. Please clarify "diversified agricultural uses as it economically feasible." The term is used but not clearly identified or the need for water.
f. The three Department of Water Supply treatment facilities water use should be clearly identified. Please identify actual use, not maximum capacity. The reservoir capacities do not clarify actual water use.
g. Please clarify abandoned diversion. Is the diversion and other structures to collect water removed and natural stream restored? Mr. Hau noted that historically structures and associated materials have been abandoned throughout East Maui. He recommends that debris and abandoned structures should be completely removed and/or buried.
h. Mr. Hau recommends that concrete walls and control structures that are planned for full and permanent restoration should be completely removed and streams restored to their natural conditions.

4. In addition, Mr. Hau relayed via email that he recommends a five-year lease with constant updates due to the fact that the project description lacks information on the amount of water flowing through the EMI Aqueduct System and the actual amount of water collected at each diversion and/or ditch without the factor of climate change accounted for.

5. Participant Kyle Nakanelua's recommendations for this project was simply, "Follow the law! Support the law! File for your permit. There's a policy and there's procedures. Adhere to the policy and follow the procedures. And stop trying to circumvent it [the law] because you smart. You know, just be honest, be transparent."

Based on information gathered from the follow-up community consultation conducted after the publication of the DEIS, and after issuance of the CWRM D&O, participants voiced the following concerns not related to the cultural context:

1. Mr. Lafayette Young is concerned about restoring Honopou Stream to 100 percent and the effect that may have on the passageway under Hāna Highway. There are times when the passageway is blocked by debris carried downstream (mostly large amounts of hau) and Mr. Young and his neighbors are not able to make it home or leave their homes. Mr. Young says the passageway underneath the Hāna Highway cannot handle the full stream flow.

2. Ms. Lucianne de Naie has already seen ground disturbing activities taking place within the License Area. She has also seen the overgrowth and extreme lack of maintenance to most ditch access roads and trails. She highly recommends that EMI conduct a proper AIS review of historic resources within the License Area.

3. Mr. Albert Perez shared that A&B/EMI should have been the responsible party to care for the natural resources but that invasive species have increased tremendously due to their lack of proper stewardship.

In summary, during ~~the information gathered from~~ the initial community consultation conducted during the preparation of the DEIS, participants voiced the following concerns related to the

cultural context (It should be noted these concerns were expressed prior to issuance of the CWRM D&O):

1. Mr. Hau states that native gathering rights should be addressed. The gathering of ʻōpae (general name for shrimp), ʻoʻopu (general name for fishes included in the families Eleotridae, Gobiidae, and Blennidae), and hīhīwai (endemic grainy snail; Neritinu graposa) continue throughout East Maui streams that are being diverted.

2. Mr. Hau adds that State lands should be open to the public for hunting and gathering. The general public should have access for recreational activities such as hiking, scenic viewing, and swimming at waterfalls.

3. Mr. Robert Hobdy voiced his concerns, which include that the EIS study should:
    a. Provide adequate stream flow to support diversified agriculture in the Hamakualoa and Koʻolau region.
    b. Provide adequate stream flow to support indigenous fish, shrimp, and mollusk species in the Hamakualoa and Koʻolau region.

4. Participant Kyle Nakanelua is concerned with the act of diverting water. He explicitly states that "when those places dry up that adversely impacts the way of life, the cultural practice if you will" and it "adversely impacts the people's way of life that live there."
    a. To support this claim, Mr. Nakanelua states that ʻōpae was once prevalent in the streams that flowed through their family property named Lakini. He relates that when he began to regularly clean the property his grandmother would still catch ʻōpae. He adds that today there is no ʻōpae but there are prawns. When CSH asked if ʻōpae was being overpicked, he replied "no" because "we were the only one there." He also does not think the introduction of prawns is to blame but believes "that the flow of water is impactual" and has seen the water decline since 1989.

5. A 2014 declaration provided by Dan Clark from Keʻanae stated he needs cool, fast running water for optimal kalo production. Due to low stream flow results, there has been an increase in disease to his kalo, which decreases production.

6. Jonah Jacintho states in his 2014 declaration that due to a lack of stream flow, fish populations have decreased therefore he cannot fish as much. To increase the population of ocean fish, fresh water is integral for spawning and nutrients. He also added that more water in stream beds would also increase ʻoʻopu, prawn, and hīhīwai populations.

7. In Lezley Jacintho's 2014 declaration, she states that due to lack of stream flows, her kalo production has declined due to root rot and other diseases. She adds that stream flow output is also important in the spawning of different species of fish. The lack of stream flow affects her gathering rights as a Native Hawaiian and her ʻohana (family). Native species such as ʻoʻopu needs fresh water to travel back upstream, which compromises their reproduction. Fish, hīhīwai, ʻōpae, and ʻoʻopu populations are also scarce and many families cannot gather these resources causing them to move away.

Another concern Ms. Jacintho voiced is stagnate water, which causes leptospirosis and other bacteria.

8. Kauʻi Kanakaʻole voices in her 2014 declaration the Papaku Makawalu framework, which incorporates traditional Hawaiian knowledge and moʻolelo (stories) and connects it with wahi (place). Papaku Makawalu consists of three Papa or houses of knowledge (earth, atmospheric, and the living). In this case, Ms. Kanakaʻole points out that without water, all three Papa could not exist. She shares moʻolelo on Oʻopuola Stream, Makapīpī Stream, Kaʻaiea Stream, and ʻŌhiʻa Stream. She points out that ʻŌhiʻa Stream was known for its healing powers and that the people of this area understood that this water was "special, sacred, kapu (taboo) and only to be used in unique circumstances."

9. Pualani Kimokeo states in her 2014 declaration that due to a lack of stream flow there is an increase in pocket rot and "guava seed," which she describes as a growth on the taro. There are also apple snails in her loʻi kalo, which she states like the warm water. She points out that farmers in Keʻanae have to compete for water.

10. In Earl Smith, Sr.'s 2014 declaration, he states that he recalls gathering ʻōpae, hīhīwai, and ʻoʻopu from Hanawī, Makapīpī, and Oneʻo Streams. He can only find these species in Hanawī Stream. Near the coast, he would fish for moi (threadfish; Polydactylus sexfilis), aholehole (Hawaiian flagtail; Kuhlia sandvicensis), manini (reef surgeonfish; Acanthurus triostegus), and enenue (chub; Kyphosus bigibbus) but has noticed a depletion of fish. He attributes this to a lack of stream flow that empties in the ocean.

11. In Edward Wendt's 2014 declaration, he states that he gathers and fishes in the streams to provide a protein source for his family, neighbors, and kūpuna (elders) who may be unable to gather for themselves. He also enjoys teaching traditional fishing practices and values to students. However, due to the lack of adequate stream flow, Mr. Wendt is unable to teach students how to mālama (to take care of) streams, fish, and gather. The diminished stream flow has negatively impacted the muliwai, fisheries, and his loʻi kalo. Invasive species such as the apple snail and African tulip tree have infringed his loʻi kalo.

Based on information gathered from the follow-up community consultation conducted after the publication of the DEIS, after issuance of the CWRM D&O, participants voiced the following concerns related to the cultural context:

1. Mr. Kamakana Ferreira, on behalf of OHA, suggests that A&B should commit to developing a procedure for addressing cultural access and keeping individuals informed of activities occurring in the License Area. He is aware that there may be potentially many more community members who were and are reluctant to participate in the consultation process so potential access impacts may be much greater than anticipated.

2. Mr. Kamakana Ferreira also shared that according to the HSHEP done as part of the DEIS, there is a potential for an 85% loss of habitat in non-petitioned streams not covered by the CWRM D&O when water is fully diverted. The Proposed Action at

these streams would have a direct impact on native stream and estuarine life throughout the region that would in turn potentially limit or foreclose the perpetuation of cultural practices, the intergenerational transmission of cultural knowledge, and the maintenance of traditional subsistence lifestyles.

3. Mr. Lafayette Young shared that fish populations have been "severely impacted" since the end of sugar production on Maui. The rise of stream levels have scoured the banks releasing cubic tons of mud into the streams which empties out into the ocean.

4. Ms. Lucienne de Naie mentioned many historic properties (archeological sites) within the Ke'anae portion of the License Area. She said many sites she has seen for herself, but most are unrecorded. However, Ms. Lucienne de Naie did not specify precise location of these sites. She is concerned that they could be inadvertently impacted or destroyed by road maintenance work, modification of intakes to meet stream flow standards, repairs to ditches, spill ways and other diversion structures, and the construction of new routes to bypass fallen trees.

5. Ms. Lucienne de Naie also shared that ditch repairs involve impounding volumes of stream water while repairs are being done, then releasing a large volume all at once. She is concerned that historic lo'i, 'auwai, and other culturally important resources downstream may be completely destroyed. Mr. Albert Perez also acknowledges this in his comment letter to the DEIS.

6. Mr. Albert Perez says the increased flow due to lack of diversions and/or reduced diversions has had a positive impact on stream environments, ocean environments, flora and fauna, and natural resources available to traditional gatherers. He says the negative impacts of increasing diversions from the current amount needs to be evaluated.

7. Mr. Albert Perez mentioned that East Maui residents fish and gather from streams throughout the proposed License Area and they report that the amount of stream water reaching the ocean has increased and so has the fish populations.

Based on information gathered from the cultural and historical background, and the community consultation, significant cultural resources were identified within the License Area, as well as outside of the License Area. It should be acknowledged that although some of the impacted cultural resources exist outside of the License Area, what takes place within the License Area directly affects these cultural practices and resources. At present, there is documentation and testimony indicating traditional and customary Native Hawaiian rights are currently being exercised within the License Area. Cultural resources, practices, and beliefs were identified as currently existing within the License Area. In addition, East Maui, which includes the License Area and beyond the License Area, maintains a rich subsistence and cultural history.

The earliest initial occupation in East Maui is estimated at 1200 AD (Haun et al. 2004). The abundance of traditional land divisions and wahi pana spanning from Hāmākua Loa to Hāna suggest that habitation continued to increase after initial establishment. Xamanek Researches conducted an AIS in 2000 of a parcel near the muliwai of Hanawana Stream. A charcoal sample from the study yielded a radiocarbon date of AD 1425 to 1665. In conjunction with

moʻolelo and kaʻao, such material evidence indexes the importance of East Maui and its natural resources in supporting early inhabitants and traditional practices. Throughout this analysis, an effort is made to ground physical evidence within traditional cultural frameworks or knowledge systems. That is, understandings of East Maui's ecological processes and anthropogenic activities have been informed by various traditional sources, including moʻolelo, mele, or oli. As pointed out by anthropologist Laura Nader and reiterated by Dr. Kathleen Kawelu, "science is not free of culture; rather, it is full of it" (Kawelu 2015:6; Nader 1996: xiii). Several moʻolelo, unique to East Maui, do indeed provide key insights into the socio-cultural and socio-economic realities of pre-Contact life. Ka Moʻolelo o Hiʻiakaikapoliopele relates how Hiʻiaka stopped in Wailua Iki and stumbled upon a crowd celebrating hula in a hālau filled with men, women, and children. This moʻolelo exhibits the popularity of hula in this area as well as a burgeoning population in East Maui.

Piʻilani, Mōʻī of Maui, ordered to have a hand-fitted, basalt block road constructed, which connected Wailuku to Hāna. This road served as a trail for residents and was also accessed during times of war. During the last half of the eighteenth century, war occurred frequently. The road, along with canoe landings and inhabited places, were common sites for robbery and death for makaʻāinana. After Piʻilani's death, his son Kihapiʻilani continued the construction of the road, extending through Kaupō and across Haleakalā. It was called the Alaloa of Kihapiʻilani, also known as the King's Road. The amount of labor that went into the Alaloa suggests that there was a large population of able-bodied men to complete the trail. The caloric demands of such a workforce would have no doubt been significant, suggesting that a large amount of food also was available to sustain the workers.

East Maui was and still is an ideal place to cultivate kalo based on the rich soils and the amount of rain that occurs per year. The License Area contains various tributaries. Wet patches ~~were and still~~ exist in the makai regions, while dryland kalo was planted in the mauka areas. Keʻanae and Wailuānui ~~Wailua Nui~~ continue to be thriving regions makai of ~~within~~ the License Area that still practice traditional taro farming.

ʻŌlelo noʻeau, mele, and oli all attest to the abundance of water, in addition to the resources available from the ocean and uplands. However, documents such as LCAs and associated maps exhibit the expansive population of East Maui during ~~The~~ the Māhele. Although most of the LCAs are outside of the License Area, it is important to point out that the water that runs through the License Area leads to these kuleana parcels, many of which are still kuleana properties held by the same families today. Land use was inventoried during ~~The~~ the Māhele. Common uses and kuleana include residence, farming (loʻi, kula, kīhāpai, pōʻalima, specific patches for olonā and hala), associated farm structures (pig pens), water ways (ʻauwai, fishponds, streams, beaches, and the sea), forests, and infrastructure (government road, trails, foot paths). Land use records indicate that almost every property had at least one loʻi kalo with some of the highest concentrations in the Huelo and Keʻanae portions of the License Area ~~license areas~~, the latter still being an active community that continues the practice. Although quantity of water matters for the community, it is also about velocity. Mr. Kyle Nakanelua relates the importance of having "a really crisp and vigorous flow" to the water because "that's what keeps everything stimulated and alive" which contributes to having a healthy stream and flow. Having water that is cold and constantly running are vital components of farming wet land kalo.

In addition to kalo, pohole or the fiddlehead fern is also a staple in the diet for residents of East Maui along with watercress, ʻulu, bananas, lūʻau, etc. Traditional subsistence is important to those who live in this remote area of East Maui as it not only is a reliable food source but ensures a healthy diet. Plants such as pohole and watercress are aquatic plants, which need an abundant amount of fresh, running water for optimal growth. Pohole is a wild plant that needs to be foraged and is widespread throughout the License Area. Pohole that is growing in or adjacent to tributaries that have limited and/or diverted water are most likely impacted gathering grounds.

The water source for the East Maui streams came from the backside of Haleakalā, which supplies the streams with fresh water, providing an ecosystem for aquatic life. Fresh, brackish, and ocean resources were and continue to be an important food source for Native Hawaiians (McGregor 2007:109). Habitation patterns model settlement near the ocean, which alludes that Native Hawaiians settled close to their food sources such as the ocean and in areas that were viable for kalo growth. Native Hawaiian author and historian Samuel Kamakau relates that the people of Koʻolau worshipped sharks "in order to be saved from being eaten by a shark when they went fishing" (Kamakau 1991:78). The favored method of fishing off of East Maui was the kākā and kūkaula methods. The kākā method required a hook and line and was utilized at a depth of 200 fathoms. The kūkaula method also used hook and line but was employed at 50+ fathoms. Through interviews, informal discussions with community members, and CWRM declarations, it is evident that residents within and in the vicinity of the License Area rely heavily on fresh and salt water resources as a food source.

Many community members stated that they formerly utilized stream fauna as a food source, however, due to the stream water being limited and/or diverted in conjunction with invasive species, it is now deemed an unreliable food source. However, many comments submitted in response to the DEIS, including from East Maui residents, stated that they have observed an increase in stream fish populations since the cessation of sugarcane operations in late 2016. ʻOʻopu, ʻōpae, and hīhīwai were staples to East Maui residents' ~~resident's~~ diets. Kūpuna who lived near the streams in the 1920s and 1930s also caught and ate ʻōhua and hinana, which were prevalent in tributaries. East Maui residents and those who intimately know the mauka regions of East Maui know where to gather these limited aquaculture resources. For example, State of Hawaiʻi Aquatic Biologist, Skippy Hau, shared that at one time ʻōpae could be found in streams spanning from mauka to makai. Today ʻōpae can be found only in the mountain areas where stream water is cooler but have mostly adapted to inconsistent stream flows. Mr. Hau also shared that hīhīwai, one of the slowest migrating animals, utilize heavy rains and flash flooding to transport larvae into the ocean, so they can migrate upstream again over a period of time. However, fresh water is also needed to assist in this process. Although, "the natural environment has a built-in capacity to respond and adapt to traumas and shocks (system resilience)," (Minerbi, 1975:8) this is not infinite. Diverted streams, whereby the mauka-makai connection is severed, strain the resiliency of the stream's ecosystem by inhibiting reproduction rates of freshwater animals as well as growth patterns as there can be variations in the availability of food resources for freshwater animals, especially during prolonged dry periods (Harvey et. al, 2014).

In addition, salt water resources are also being compromised by limited fresh water being emptied into the ocean, which is a vital component for propagation. In his declaration, Mr. Earl Smith, Sr. would fish for moi, aholehole, manini, and enenue but has since observed a

considerable decline in populations and relates this to the lack of fresh water entering the ocean. In his declaration, Mr. Jonah Jacintho also related that a lack of stream flow inhibits nutrients from mauka traveling makai, which creates warmer waters and an unfavorable ecosystem for fish, mollusks, and other ocean life to replenish. Although the License Area is not adjacent to the ocean, the ocean is directly affected because the fresh water that runs throughout the License Area is limited and/or being diverted. Modifications to flow, such as diversion, invariably result in a dramatic decline in ocean life by restricting nutrients that are carried via tributaries and emptied into the ocean, which are needed for healthy conditions and growth patterns.

However, the SE & MRC report (2019) (Appendix B) provided some important information regarding the interactions of streams and the ocean in East Maui contrasting the statements made above. Of particular significance is that the effects of stream water on marine waters must be considered minor in these habitats. This result is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing conditions of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting. In all cases where it was possible to sample across the boundary where streams flowed to the ocean, there were sharp gradients reflecting the intense mixing of stream water to background ocean levels. Observations of the habitats in these transition zones indicated that they were composed primarily of sand and barren rock. Owing to continual, intense wave energy, these nearshore areas do not constitute important habitats for coral reef communities and associated marine species. Beyond the narrow transition zone, the influence of stream water is minimal owing to rapid and intense mixing. These processes Moreover, as noted above in Section 4.2.3, several comments submitted in response to the DEIS raised concerns about impacts of stream diversions to the estuarine environments in East Maui located below the diversions. The HSHEP model used by Trutta to conduct an analysis of impacts of streamflow diversions on the habitat of native amphidromous stream animals (see Appendix A), also considered estuarine reaches present in the stream segments subject to analysis. Table 4-7, shows the five streams that have any possibility of an estuarine reach. For these five streams, three streams (Waiohue, Pi'ina'au, and Honomanū) are the most likely to have estuarine reaches and all three of these streams have either full or habitat flow restoration required under the CWRM D&O. Of the two streams that may have a small estuarine reach, Pa'akea will have connectivity flow restoration, while 'O'opuloa will have no flow restoration and will remain as per the 1988 IIFS. Thus overall, the majority of estuarine habitat will be either fully or partially restored under the Proposed Action.

The CWRM D&O, however, notes that a total of nine streams (one is considered a tributary to Pi'ina'au Stream) have esturine reaches, four of which were noted by the HSHEP + aerial image review approach as to having estuarine reaches. The streams included in the CWRM D&O are shown in Table 4-8 below along with their overlap with streams determined with the method used by the HSHEP model. According to CWRM, anywhere that the DLNR Division of Aquatic Resources (DLNR-DAR) conducted an estuary survey for the East Maui streams, it was considered an estuary. This includes surveys conducted in bays and/or streams. While the DLNR-DAR's methodology used is for estuary surveys, it does not define the size or extent of an estuary such as the HSHEP model, only that the DLNR-DAR survey was conducted to look for the presence of fish near a stream mouth. Hence, the difference between the two methodologies.

The streams recognized by the CWRM D&O as to having estuarine reaches, four streams (Makapipi, Waiohue, West Wailuāiki, and Piʻinaʻau and its tributary Palauhulu) all have full flow restoration ordered and three streams (Kopiliula, East Wailuāiki, and Honomanū) have habitat flow restoration ordered. Based on these flow restoration statuses, the majority of estuarine habitat will be restored in these streams. The remaining two streams (Hanawī and Paʻakea) have connectivity flow restoration ordered. For Hanawī Stream, the connectivity flow restoration is intended to connect the stream segment between the diversion and the large spring. Hanawī Stream already has substantial flow downstream of the spring and therefore any estuarine segment will continue to have a good mix of fresh and saltwater inputs. Paʻakea is a small stream, and the connectivity flow will improve freshwater input to the estuarine stream segment although not as much as in the other streams. Therefore, similar to the combined classification approach in Table 4-7, the majority of estuarine habitat for streams based on the CWRM D&O determination will be restored by the flow restoration ordered under the IIFS.

Based on the cultural and historical background presented above, in conjunction with archaeological evidence, oral histories, declarations, and interviews throughout East Maui, the CIA determined that there are specific valued natural and cultural resources within the License Area. There is evidence of identified cultural resources and traditional and customary cultural practices associated with natural and cultural resources that are regularly exercised within the License Area, which includes the following activities and resources:

1. Foraging, traditional, and generational gathering of freshwater species for personal consumption. These species include but are not limited to ʻōpae, ʻoʻopu, pūpūloʻi (also known as pūpū Pākē or Chinese snail), crayfish, prawns, and hīhīwai.

2. Foraging, traditional, and generational gathering of plants that may be in or adjacent to tributaries for personal consumption. These species include but are not limited to pohole and watercress.

3. Traditional and generational gathering of introduced plants that can be cultivated or foraged. These species include but are not limited to ʻulu, bananas, wild kalo, wild lūʻau, guava, ʻuala, ʻawapuhi, tī, oranges, hāhā, avocado, puakenikeni, and medicinal plants for lāʻau lapaʻau.

4. Traditional and generational gathering of plants that can only be foraged. This includes but is not limited to pepeiao, various types of ferns (ornamental), and hau.

5. Traditional and generational gathering of rocks that are used for traditional food preparation. These activities include but are not limited to imu and the production of stone tools for traditional food preparation (i.e., pōhaku kuʻi ʻai).

6. Traditional and generational fishing and gathering methods utilized for the shoreline and offshore. Species gathered include but are not limited to limu (seaweed), ʻopihi (limpets), lobster, enenue, kole, ulua, moi, aholehole, ʻanae, kumu, tako, moanakali, ʻōmilu, ʻūʻū/menpachi (soldierfish; Holocentridae), ʻāweoweo (Bulleye; Priacanthus meeki), pāpio, paʻananu, ʻōʻio, uhu, lae, kala, black crab, hāʻukeʻuke, and kūpipi.

7. Public comments provided on the DEIS discuss knowledge of, or visits to, archaeological sites in East and Central Maui. Specifically, public comments identify, a legendary pōhaku in Wahinepe'e, which is discussed above in Section 4.5.

The following provides a tabulation of cultural resources, practices, and beliefs that were discussed via approved interviews and the declarations that are part of the public record in the CWRM proceedings. The analysis is categorized by cultural practices in Table 4-13 and Table 4-14, and by streams in Table 4-15. It should be noted that Table 4-13 and Table 4-14 were included in the CIA report (Appendix F) that was a part of the DEIS. However, they were not included within the text of the DEIS. Thus, this is not new information being presented. However, Table 4-14 is an addition to both the updated CIA report (in Appendix F to the FEIS) and the EIS and includes some new information. Table 4-15 synthesizes and presents information about cultural practices, in a different format organized by stream, from Table 4-13 and Table 4-14; Table 4-15 also provides the CWRM D&O stream restoration status, if applicable.

Table 4-13: Cultural Practices Via Approved Interviews and Declarations

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Farming/Gardening			
Farming, generally	Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue)	More water would improve ability to better garden and farm, follow traditional lifestyles	14
Kalo farming (wet land)	Wailuanui, Ke'anae, Honopou, Waianu	Water level/flow/velocity,	14

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Valley, Lakini, Waiokamilo	invasive pests (apple snails, feral pigs), temperature all decrease yield and increase rot and disease (e.g., "guava seed"); 'auwai can become clogged affecting the above; families unable to continue selling poi must find other work; more flow requires less cleaning; competition between farmers; more water, less worry; from an O'ahu-based community member who has conducted research in East Maui: "Ke'anae-Wailuanui is a viable traditional economy which has maintained historic and cultural integrity, traditional lifestyles, and social continuity to an equal or greater extent than any of the other taro growing landscapes in Hawai'i;" alteration of any interrelated element (field, stream, 'auwai) can affect entire system—extremely complex; incentives should be provided for taro farming (e.g., tax relief, support for community ditch maintenance)	
Farming, gardening misc. crops	(Kula, misc. garden veggies); (Honopou,	None Identified	4

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	misc.); (East Maui community member - "native crops"); (O'ahu-based community member via historical documentation - 'awa, yams, kō, arrowroot, breadfruit, banana)		
Growing watercress	East Maui	None Identified	2
Raising livestock (pigs, chicken, cattle)	Ke'anae	None Identified	1
Gathering			
Gathering, generally	Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue, Ke'anae	From an O'ahu-based community member who has conducted research in East Maui: "Gathering from a variety of places is important in order to maintain the resources. The choice of place to gather is determined by the weather and other natural signs….Within the traditional cultural landscape area for Ke'anae-Wailuanui unoccupied areas with flowing pristine streams and the forested areas are integral to the livelihoods of the families in the district" ... "Through subsistence, families attain essential resources to compensate for low incomes…subsistence not only provides food, it also ensures a healthy	12

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
		diet…is a valuable form of exercise and stress reduction and contributes to good physical and mental health. It is also a form of recreation that the whole family can share in." Provide food for those who cannot gather on their own (kūpuna, etc.)	
Gathering rocks for imu	Honopou	None Identified	1
Gathered Plants			
Gathering pohole	Honomanū, Honopou, Hanawī, and Makapīpī	Different types only found in mountainous areas of Maui	5
Gathering limu	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	None Identified	6

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
Gathering watercress	Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	4
Gatheing tī leaf	Honopou	None Identified	1
Gathering lūʻau	Honopou, Honomanū, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī,	Wild taro growing in abandoned loʻi along streams has distinct flavor	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Makapīpī, and Waiohue		
Gathering ʻawapuhi	Honopou	None Identified	1
Gathering puakenikeni	Honopou, Honomanū	None Identified	1
Gathering pepeiao	Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Gathering hāhā	Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa,	None Identified	1

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue		
Gathering ferns for lei	Honopou, Honomanū, Hanawī, and Makapīpī	None Identified	1
Gathering medicinal plants	Honopou	None Identified	2
Gathering 'uala	Honopou	None Identified	1
Gathering banana	Honopou	None Identified	2
Gathering bamboo	Honopou	None Identified	1
Gathering ulu	Honopou, Honomanū	None Identified	2
Gathering kalo	Honopou, Honomanū	None Identified	3
Gathering fruit (e.g., mango, guava, oranges, avocados)	Honopou, Honomanū, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/ Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	None Identified	3
Gathering hau	Honopou	None Identified	1
Gathering medicinal plants	Honopou	None Identified	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Gathered Proteins			
Gathering hīhīwai	Honomanū, Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/ Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue, One'o	Lack of flow restricts the snails to the estuary; diversions may carry snail larvae away from ocean; smaller estuaries prevent up migration; "slowest migrating animal" good indicator of the adequacy of stream flow; from an O'ahu-based community member who has conducted research in East Maui: "The gathering of hihiwai is also carefully managed. The location of the hīhīwai is knowledge that has been passed down from generation to the next for their protection and proper management. It is not information that is made available to the general public."	11
Gathering 'ōpae	Wailuanui, mountain areas, Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/ Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West	Few left nowadays; caught now only in mountain areas where water is cool and less diverted; from an O'ahu-based community member who has conducted research in East Maui: "Ke'anae-Wailuanui is one of the few remaining areas in the Hawaiian Islands where 'ōpae can be gathered. Virtually every stream has 'ōpae at some	9

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue, Keʻanae, One'o	time during the year. However, it is easier to gather ʻōpae in the tunnels of the EMI ditch system. The irrigation ditch itself is an excellent breeding area for the ʻōpae because it has flowing water year-round. Some streams below the ditch, however, don't have enough flowing water to sustain the ʻōpae year-round when the water is diverted into the ditch system," ʻaʻaniu net used to gather it	
Gathering prawns	Honopou, Honomanū	(though these are invasive and may be a threat to ʻōpae, people still gather for food)	3
Gathering native crayfish	Honopou	None Identified	2
Gathering ʻopihi	Honopou, Punalaʻu/ Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East	None Identified	7

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering haukiuki	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	3
Gathering pūpūloʻi	Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Gathering pūpū	Honopou	None Identified	1
Gathering kūpipi	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī, Wailuaiki and Wailuanui	None Identified	2
Catching crab	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Catching lobster	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	3
Fishing			
Fishing, generally	Wailuanui, Keʻanae, Honopou, Honomanū, Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	Process of restoration/keeping ecosystem alive; loss of fishing opportunity translates to less opportunity to teach kids how to make traditional tools and implements; from an Oʻahu-based community member who has conducted research in East Maui: "Through subsistence, families attain essential resources to compensate for low incomes … subsistence not only provides food, it also ensures a healthy diet… is a valuable form of exercise and stress reduction and contributes to good physical and mental health... It is also a form of recreation that the whole family can share in."; "The koʻolau region also offered sheltered bays from which deep sea fisheries could be easily accessed, and near shore fisheries, enriched by nutrients carried in the fresh water, could be maintained in fishponds and coastal fisheries. It was around	11

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
		these bays that clusters of houses where families lived, could be found, and in these early times, the residents generally engaged in subsistence practices in the forms of agriculture and fishing."	
Fishing for ʻoʻopu	Wailuanui, Honopou, Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue, Keʻanae, One'o	From an Oʻahu--based community member who has conducted research in East Maui: "Certain species of ʻoʻopu are endangered and others are rare. They require pristine and flowing stream waters to exist. Keʻanae-Wailuanui is one of the few areas where they still can be found in sufficient size to be occasionally caught for subsistence food."	9
Fishing for kole	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea,	None Identified	6

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for ʻōʻio	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	2
Fishing for akule	N/A	None Identified	2
Fishing for manini	Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī,	None Identified	3

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Makapīpī, and Waiohue		
Fishing for moi	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	None Identified	6
Fishing for kala	Honopou	None Identified	2
Fishing for pala	Wailuanui-Ke'anae	None Identified	1
Fishing for weke	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	2
Fishing for aholehole	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Wahinepe'e, Puohokamoa,	None Identified	7

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Haʻipuaʻena, Punalaʻu/Kōlea, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for moanakali	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	2
Fishing for ulua	Honopou, Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī,	None Identified	5

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Makapīpī, and Waiohue		
Fishing for honu	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopili'ula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	None Identified	5
Fishing for mullet	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	3
Fishing for omilu	Honopou	None Identified	1
Fishing for pāpio	Honopou, Punala'u/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena,	None Identified	4

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for uhu	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī, Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī,	None Identified	5

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Makapīpī, and Waiohue		
Fishing for uau	Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Fishing for paananui	Honopou	None Identified	1
Fishing for ʻūʻū/menpachi	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	2
Fishing for aweoweo	Honopou	None Identified	1
Fishing for lai	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	2
Fishing for poʻopaʻa	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī, Wailuaiki and Wailuanui	None Identified	3
Fishing for kumu	Honopou, Honopou, Hanehoi/Puolua,	None Identified	3

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for hinaleʻa	Wailuaiki and Wailuanui	None Identified	1
Fishing for takoʻhe'e	Honopou	None Identified	1
Fishing for puhi	Honopou, Punalaʻu/Kōlea, Honomanū, Hanawī, and Makapīpī	None Identified	1
Fishing for pelagics (ahi, aku)	None Identified	None Identified	2
Fishing for ono	None Identified	None Identified	1
Fishing for marlin	None Identified	None Identified	1
Fishing for mahimahi	None Identified	None Identified	1
Fishing for enenue	Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena,	None Identified	5

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for uʻu	Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2
Fishing for ʻuku	Honopou, Hanehoi/Puolua, Waikamoi, Alo,	None Identified	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for anae (specific type of mullet)	Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Fishing for ‘ama‘ama	None Identified	None Identified	1
Fishing for uouoa	None Identified	None Identified	1
Fishing for elm	None Identified	None Identified	1
Fishing for ‘opakapaka	None Identified	None Identified	1
Catch squid	None Identified	None Identified	1
Hunting			
Hunting, generally	N/A	From an O‘ahu--based community member who has conducted research in East Maui: “Through subsistence, families attain essential resources to compensate for low incomes…subsistence not only provides food, it also ensures a healthy diet… is a valuable form of exercise and stress reduction and contributes to good physical and mental health. It is also a form of recreation that the whole family can share in.”	4
Pig hunting	East Maui (generally, and Ke‘anae-Wailuanui)	None Identified	3
Axis deer hunting	Kaupō (South Maui)	None Identified	1
Environment			
Healthy streams / wai / Mālama kahawai	Honopou, Wahinepe‘e, Puohokamoa, Ha‘ipua‘ena, Punala‘u/Kōlea, Honomanū, Nua‘ailua, Pi‘ina‘au, Palauhulu, ‘Ōhi‘a/Waianu,	Anthropogenic disruption to continuously flowing streams can decimate endemic stream fauna/overall ecosystem (including loss of fish and other food resources in streams and at ocean) (some families break	13

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliʻula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	apart dams built by others); sugar and cattle too water intensive; can also be impacted by natural disasters (EQs, landslides, etc.); families must work to clear their sections of ditches and streams of rocks and debris; loss of ability to follow local traditional life styles; effect on spiritual connection to wai; more flow requires less cleaning; competition between farmers; AMS metering of water flows seen as very important, but this data is not consistently collected or provided to public—no funding, some meters were removed; don't overharvest stream resources; less water allows vegetation (including invasive species like African tulip) to establish along stream banks	
Mālama ʻĀina / He aliʻi ka ʻāina, He kauwā ke kanaka	Honopou, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo,	Families must work to clear their sections of ditches and streams of rocks and debris; holistic; resources are shared	10

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue		
Use of mauka-makai trails	None Identified	None Identified	2
Culture			
Holistic Hawaiian culture / "cultural kīpuka" / cultural viability (passing down of traditions, continued survival)	Ke'anae-Wailuanui	"Enclave of Hawaiian subsistence, cultural, and spiritual beliefs, customs, and practices;" represents cultural survival; eroded by increasing lack of water; "The lack of water has caused too much pilikia. When nobody cares, nobody understands our practices and our need to harvest. It pains me. It's very emotional." "Water is life; everything connected to water"; lack of water decreases opportunity to pass down traditions; less water means more times spent finding resources to gather, less time for recreation and 'ohana; "when those places dry up that adversely impacts the way of life, the cultural practice if you will"	11

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Recreation (can include spiritual feeling of a place, connection to ancestors)	Wailuanui, Ke'anae, Honopou, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	When ecosystems are impacted and in bad health, spiritual feeling is lost; ability to enjoy healthy/beautiful surroundings lost; tranquility of sounds and sights naturally flowing water; can get sick swimming in stagnant waters (i.e., leptospirosis, etc.)	9
Cultural sites - traditional	Pākanaloa Heiau and 'Ōhi'a Spring; two heiau; war temple	Damage from invasive species, littering	2
Cultural sites - historic	Chinese graveyard in Honomanū and other sites along Pi'ina'au Rd., including old ditchmen homes; EMI ditch system itself; historic taro terraces (partly mapped by CSH); "Kipapa of Kihapiilani" (early belt road/trail); St. Gabriel's church	Ditch system features not always seen as a positive (some discussion from a community member as a positive; also discussion from a community member as negative—overgrown and abandoned; another community member added that it is negative because it cuts through sacred forest)	2
'Aumakua	Maulili (shark) at estuary; general in terms of honoring	None Identified	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	while collecting resources		
Mo'olelo	Ku'ula and Hina and Ha'aluea at Wailuanui (1); Kane, Kanaloa (3) - springs; Papaku Makawalu (1); Wailuaiki was the home of the goddess Kapoma'ilele, the sister of Pele who distracted Kamapua'a with her flying genitals, luring him to Maui (1); story of Laukaieie (1)	Health of reef; abundance of water is what makes this land valuable to its inhabitants; water traverses all three papa; "story of Laukaieie as told by Moses Manu in Nupepa Ka Oiaio (1894-1895) provides an abundance of rich cultural information about the Ko'olau-Hāmākua region and its traditional and customary practices…. At the core of this, free flowing water is central for creating abundance, life, and growth in the region."	4
Stream baptism	Honopou	None Identified	1
Making of traditional tools and implements	Honopou Honomanū	None Identified	1
Hula/gathering kinolau in mountains	None Identified	None Identified	1
Washing clothes in streams	None Identified	None Identified	2
Soak hau for rope	None Identified	None Identified	1
'Ohana burial	Located at St. Gabriels (2);	None Identified	2

Table 4-14: Cultural Practices Via Declarations (Anonymous Tally)

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Farming/Gardening			

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
Farming, generally	Waiokamilo and Kualani, Kukuipuka Gulch, Keʻanae, Wailua, Waianu & Pahoa, Hamau Stream, Palauhulu Stream, Honopou	Farming to feed family; traditional way requires no commercial fertilizers; agricultural homesteads described in numerous native testimonies for LCAs and LGs	17
Kalo farming (wet land)	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue; [Kaʻalaea Valley, Waihe'e Valley and Waiahole (Oʻahu)]	"The lack of stream flow is a problem for my family because we cannot grow kalo or gather how our kupuna used to. We are unable to open up new taro patches. We have also lost taro due to the lack of water…. Families cannot support themselves and have to leave the area to make money;" "I want my kids to learn — that's the most important to me. But they can't without the water. My granddaughter asks me, 'Papa, when we going to open up the farm again?'"; "The lack of water has caused financial setbacks, and it has reduced the quality and quantity of taro. Additionally, not all of the loʻi on my property are opened up. Abandoned loʻi above our patches requires more work and maintenance to get water to our loʻi." People having to farm	17

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
		areas off their own family land because not enough water. Native testimonies describing loʻi.	
Gathering			
Gathering, generally	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	"However, we can't get the same amount of these resources as my ʻohana used to be able to. We also need to go further to gather"; "I gather and fish to feed my family and kupuna who cannot go and get food themselves." Each ʻohana has its own traditions. "I gather maybe two or three times a year in order to supply food for ʻohana gatherings on special occasions"; "If there was enough water in the streams, my ʻohana would gather as my kupuna did."	16
Gathered Plants			
Gathering pohole	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu,	None Identified	8

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering limu	Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	3
Gathering pīlali	None Identified	None Identified	1
Gathering watercress	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula	None Identified	8

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering lūʻau	Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	4
Gathering pepeiao	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea,	None Identified	7

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering hāhā	Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	5
Gathering hāpuʻu	Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Gathering olena	Honopou, Waikamoi, Alo, Wahinepeʻe,	None Identified	1

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering wauke	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Gathering banana	Honopou, Waikamoi, Alo, Wahinepeʻe,	None Identified	5

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering bamboo	Piʻinaʻau, Palauhulu, ʻŌhiʻa, and Kopiliula	None Identified	3
Gathering ulu	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
Gathering kalo	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	3
Gathering fruit (e.g., mango, guava, oranges, avocados, papaya)	Honomanū, Wailua, Waikani (Wailuanui), and East Wailuaiki	None Identified	3
Gathering mountain apple	None Identified	None Identified	2
Gathered Proteins			
Gathering hīhīwai	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani	"We have to go high in the mountains to find the ʻOpae and hihiwai" "There's not that much hihiwai"	15

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	(Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue		
Gathering 'ōpae	Honopou, Waikamoi, Alo, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	"We have to go farther, higher in the mountains than we used to find the 'opae. We also used to go to Honomanū but it's dirty now"; "The water problem combined with the prawns that eat the 'opae really changed the population"; "It takes about four hours to walk to where you can gather ['opae]. Before you could just get out of the car and you would see them. These days there is sometimes nothing and you need to turn around empty-handed;" "I gather 'opae in Pi'ina'au and Palauhulu only. The other streams do not have enough water to support my gathering. I gather maybe two or three times a year in order to supply food for 'ohana gatherings on special occasions;" "Currently, my 'ohana gathers 'opae above the diversions in Wailua, West Wailuaiki, East Wailuaiki, Hanawī,	16

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
		Makapīpī, and Waiohue. We have to go above because there is no ʻopae below."	
Gathering prawns	Honomanū, Piʻinaʻau, Palauhulu, Waiokamilo, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, Hanawī, and Makapīpī; Honopou, Kualani, Wailua, and Makapīpī	None Identified	4
Gathering ʻopihi	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	11
Gathering haukiuki	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa,	None Identified	1

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue		
Gathering pūpūlo'i	Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u/Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue	None Identified	3
Gathering wana	Honopou, Waikamoi, Alo, Wahinepe'e, Puohokamoa, Ha'ipua'ena,	None Identified	1

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering pipi	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2
Gathering kupeʻe puʻu	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena,	None Identified	1

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Gathering frogs	Piʻinaʻau, Palauhulu, ʻŌhiʻa, and Kopiliula	None Identified	2
Gathering goldfish	Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	3
Catching crab	Honopou, Waikamoi, Alo, Wahinepeʻe,	None Identified	3

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Puohokamoa, Haʻipuaʻena, Punalaʻu/Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Catching lobster	Kailua, Nuaʻailua, Piʻinaʻau, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, and Hanawī; Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	3
Fishing/Diving			

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
Fishing, generally	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	"However, we can't get the same amount of these resources as my ʻohana used to be able to. We also need to go further to gather;" "I gather and fish to feed my family and kupuna who cannot go and get food themselves;" "There also is not as much fish to eat;" "We would mālama our own koʻa's to make sure that we could keep the population going;" "Back then, fish were big and plentiful. We could catch more fish going a shorter distance by canoe;" "the fish are now scarce so we don't catch very many;" "We catch the same kind of fish as our kupuna, just less of them. We have to go further. We also use newer tools than before time."	16
Fishing/gathering for ʻoʻopu	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua,	"There is no ʻoʻopu for us to gather."	14

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue; Waiolohi, Ching's Pond		
Fishing for kole	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	N/A	8
Fishing for ʻōʻio	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu,	N/A	6

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for akule	Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa /Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	N/A	6
Fishing for manini	Kailua, Nuaʻailua, Piʻinaʻau, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, and Hanawī	N/A	2
Fishing for moi	Honopou, Waikamoi, Alo, Wahinepeʻe,	N/A	13

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for kala	None Identified	None Identified	2
Fishing for pala	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
Fishing for weke	Puohokamoa, Haʻipuaʻena, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Wailua, and West Wailuaiki, Honopou	None Identified	2
Fishing for aholehole	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	13
Fishing for ulua	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu,	None Identified	3

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for honu	None Identified	None Identified	3
Fishing for mullet	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	
Fishing for pāpio	Kailua, Nuaʻailua, Piʻinaʻau, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, and Hanawī. Palauhulu;	None Identified	5

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for uhu	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	7
Fishing for uau	Wahinepeʻe, Puohokamoa,	None Identified	1

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for ʻūʻū/menpachi	Piʻinaʻau and Palauhulu	None Identified	3
Fishing for aweoweo	Kailua, Nuaʻailua, Piʻinaʻau, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, and Hanawī; Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani	None Identified	3

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	(Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for lai	Honopou, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki	None Identified	1
Fishing for poʻopaʻa	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	6
Fishing for kumu	Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani	None Identified	5

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	(Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for hinaleʻa	Honopou, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki	None Identified	1
Fishing for tako/heʻe	Honopou, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki	None Identified	2
Fishing for puhi	Piʻinaʻau, Palauhulu, and ʻŌhiʻa	None Identified	1
Fishing for pelagics (ahi, aku)	Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
Fishing for "deep seven bottom fish" (onaga, ehu, ʻopakapaka, kalekale, lehi, gindai, and hapuupuu)	Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Fishing for mahimahi	Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	1
Fishing for enenue	Puohokamoa, Haʻipuaʻena,	None Identified	10

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Wailua, and West Wailuaiki; Honopou, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki		
Fishing for u'u	Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, and Waiohue	None Identified	1
Fishing for anae (specific type of mullet)	Honopou, Waikamoi, Alo, Wahinepe'e, Puohokamoa, Ha'ipua'ena, Punala'u /Kōlea, Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea,	None Identified	7

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for uouoa	None Identified	None Identified	1
Fishing for awa	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2
Fishing for pakaawa	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula	None Identified	1

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for palani	Kailua, Nuaʻailua, Piʻinaʻau, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, and Hanawī; Punalaʻu / Kōlea, Honomanū, Nuaailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	None Identified	2
Fishing for pakeawa	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu /Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani	None Identified	1

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	(Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Fishing for noho	Kailua, Nuaʻailua, Piʻinaʻau, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaʻa, and Hanawī	None Identified	1
Fishing for kūpipipi	Honopou, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki	None Identified	1
Hunting			
Hunting, generally	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu / Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula,	"I hunt in most of the areas the streams flow, and I notice there is not as much water in the streams."	7

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
	Hanawī, Makapīpī, and Waiohue		
Pig hunting	Puohokamoa, Haʻipuaʻena, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Wailua, and West Wailuaiki	"When my family would hunt wild pig, we would try and let go the pregnant sows and babies to preserve for the future"	3
Environment			
Healthy streams / wai / Malama kahawai	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu / Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue	"Cleaning the above-named streams to help the water flow all the way to the ocean and support the ecosystem we rely on to farm, fish, hunt, and gather;" "Gathering according to the moon and not always going to the same places so we didn't overharvest the stream;" "The lack of stream flow is a problem for me as a Hawaiian. It hurts me to see the ʻāina and its resources suffering;" "My family and I had to leave the area because there was not enough water and that made it harder to continue fanning and gathering;" "Always throwing the small fish back into the ocean;" "also sometimes have to	16

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
		spend money to provide substitute foods for meals and special occasions, though there really is no substitute for the ʻopae I get myself;" "We knew not to overharvest, were mindful of seasonal spawning, and respected the cycle of life;" "Now, we have to go longer distances to catch more fish because of the lack of stream water flowing to the ocean;" "[Traditionally] they didn't have problems that required the same kind of cleaning because there was more flow;" "there has been fighting amongst community members over water needs. This shouldn't be happening;" "If there was enough water in the streams, I would live at home and live off the land we were raised on."	
Mālama ʻĀina / He aliʻi ka ʻāina, He kauwā ke kanaka	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu / Kōlea, Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu, ʻŌhiʻa/Waianu,	None Identified	14

Cultural Practice	**Area/Location**	**Declarant/Interviewee Comments**	**Tally of People/ Mentions**
	Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puakaʻa, Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue		
Culture			
Holistic Hawaiian culture / "cultural kipuka" / cultural viability (passing down of traditions, continued survival)	None Identified	"Families cannot support themselves and have to leave the area to make money;" "The lack of stream flow is a problem for me because we need water so future generations can continue our traditions;" "Because of the lack of stream flow, we are losing our cultural practices;" "If water was returned to the streams, I would appreciate seeing mother nature working as intended;" "also like teaching my son what I learned growing up;" "I don't want my kids eating out of a tin can. I want them to eat natural food."	14
Recreation (can include spiritual feeling of a place, connection to ancestors); swimming, enjoying	Honopou, Waikamoi, Alo, Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu / Kōlea,	"In some places the water is dirty and just sits because there's not enough flow. I got a staph infection four times just swimming in the water;"	14

Cultural Practice	Area/Location	Declarant/Interviewee Comments	Tally of People/ Mentions
scenery, camping, etc.	Honomanū, Nua'ailua, Pi'ina'au, Palauhulu, 'Ōhi'a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula Puaka'a, Pa'akea, Waia'aka, Kapā'ula, Hanawī, Makapīpī, and Waiohue; Ching's Pond	"Being up in the mountains feels free… There is something spiritual about being around the streams;" "To me, more water means more beauty."	
Washing dishes in streams	None Identified	None Identified	1
Bathing in streams	None Identified	None Identified	1

Table 4-15: Cultural Practices Via Approved Interviews and Declarations Organized By Stream

Stream & CWRM D&O Status	Cultural Practice
Honopou – Ordered for full restoration	• Farming: general, wetland kalo, miscellaneous garden vegetables • General gathering • Gathering rocks for imu • Gathering plants: pohole (mountain variety), limu, watercress, tī leaf, lū'au, 'awapuhi, puakenikeni, pepeiao, hāhā, ferns for lei, medicinal plants, 'uala, banana, bamboo, ulu, kalo, fruit (e.g., mango, guava, oranges, avocados), and hau • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), prawns, native crayfish, 'opihi, haukiuki, pūpūlo'i, pūpū, kūpipi, • "abundant with 'o'opu and 'ōpae" (Lafayette Young) • Catching crab and lobster • Fishing: general, 'o'opu, kole, 'ō'io, manini, moi, kala, weke, aholehole, moanakali, ulua, honu, mullet, omilu, pāpio, uhu,

Stream & CWRM D&O Status	Cultural Practice
	'ū'ū/menpachi, aweoweo, lai, po'opa'a, tako/he'e, puhi, enenue, uau, paananui, kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors • Stream baptism • Making traditional tools and implements • Cultural sites: "at the top of Honopou are vertically buried iwi kupuna" (Lafayette Young)
Ho' olawa – Status quo	• Fishing: bay has abundant fish and lobster (Lafayette Young) • Cultural sites: "bay is big enough to hide war canoes" (Lafayette Young), kalo lo'i (Lucienne de Naie), 1882 Spreckels Ditch cement supports (Lucienne de Naie)
Mokupapa – Status quo	None Identified
Waipio – Status quo	None Identified
Hanehoi – Ordered for full restoration	• Fishing: kole, manini, moi, ulua, honu, uhu, enenue, kumu, u'u, uku, and anae • Cultural sites: kalo lo'i (Lucienne de Naie)
Hoalua – Status quo	• Cultural sites: kalo lo'i (Lucienne de Naie)
Hanawana[15] – Status quo	• Cultural sites: kalo lo'i (Lucienne de Naie)
Kailua – Status quo	None Identified
Nā'ili'ilihaele – Status quo	• Cultural sites: kalo lo'i (Lucienne de Naie)
Puehu – Status quo	None Identified

[15] It should be noted that Hanawana is referred to as Hanahana in the CWRM D&O.

Stream & CWRM D&O Status	Cultural Practice
'O'opuola – Status quo	None Identified
Kaaiea – Status quo	None Identified
Punalu'u – Status quo	None Identified
Kōlea - Punalau/ Kōlea ordered for habitat restoration (H_{90})	• General farming • General gathering • Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, haukiuki, pūpūlo'i, and kūpipi • Catching crab and lobster • Fishing: general, 'o'opu, kole, 'ō'io, manini, moi, weke, aholehole, moanakali, ulua, honu, mullet, pāpio, uhu, 'ū'ū/menpachi, lai, po'opa'a, puhi, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Waikamoi – Ordered habitat restoration (H_{90})	• Fishing: kole, manini, moi, ulua, honu, uhu, enenue, kumu, u'u, uku, and ana
Wahinepe'e – Status quo	• General farming • General gathering • Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, and pūpūlo'i • Fishing: general, 'o'opu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, u'u, uku, and anae • Recreation, spiritual feeling of place, and/or connection to ancestors
Puohokamoa - Ordered for	• General farming • General gathering

Stream & CWRM D&O Status	Cultural Practice
connectivity restoration	• Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Haʻipuaʻena - Ordered for connectivity restoration	• General farming • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Punalaʻu - Punalau/ Kōlea ordered for habitat restoration (H_{90})	• General farming • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, haukiuki, pūpūloʻi, and kūpipi • Catching crab and lobster • Fishing: general, ʻoʻopu, kole, ʻōʻio, manini, moi, weke, aholehole, moanakali, ulua, honu, mullet, pāpio, uhu, ʻūʻū/menpachi, lai, poʻopaʻa, puhi, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Honomanū - Ordered for habitat	• General farming • General gathering

Stream & CWRM D&O Status	Cultural Practice
restoration (H_{90})	• Gathering plants: pohole (mountain variety), limu, watercress, lūʻau, puakenikeni, pepeiao, hāhā, ferns for lei, ulu, kalo, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), prawns, ʻopihi, haukiuki, pūpūloʻi, and kūpipi • Catching crab and lobster • Fishing: general, ʻoʻopu, kole, ʻōʻio, manini, moi, weke, aholehole, moanakali, ulua, honu, mullet, pāpio, uhu, ʻūʻū/menpachi, lai, poʻopaʻa, puhi, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors • Making of traditional tools and implements
Nuaʻailua - Ordered for connectivity restoration	• General farming • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: ʻoʻopu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors • Cultural sites: kalo loʻi (Lucienne de Naie)
Piʻinaʻau - Ordered for full restoration	• Farming: general and wetland kalo • Raising livestock (e.g., pigs, chicken, cattle) • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados); • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka

Stream & CWRM D&O Status	Cultural Practice
	• Holistic Hawaiian culture/ "cultural kīpuka"/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors • Cultural sites: kalo loʻi (Lucienne de Naie), grave marker in Piʻinaʻau area (Lucienne de Naie)
Palauhulu - Ordered for full restoration	• Farming: general and wetland kalo • Raising livestock (e.g., pigs, chicken, cattle) • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Holistic Hawaiian culture/ "cultural kīpuka"/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors
ʻŌhiʻa - Status quo (N/A, below ditch system)	• Farming: general and wetland kalo • Raising livestock (e.g., pigs, chicken, cattle) • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados); • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, enenue, kumu, uʻu, uku, uau (petrel?), and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Holistic Hawaiian culture/ "cultural kīpuka"/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors
Waiokamilo - Ordered for	• Farming: general and wetland kalo • Raising livestock (e.g., pigs, chicken, cattle) • General gathering

Stream & CWRM D&O Status	Cultural Practice
full restoration	• Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Holistic Hawaiian culture/ "cultural kīpuka"/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors
Kualani[16] - Ordered for full restoration	• Farming: general and wetland kalo • Raising livestock (e.g., pigs, chicken, cattle) • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, and pūpūloʻi • Fishing: general, ʻoʻopu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Holistic Hawaiian culture/ "cultural kīpuka"/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors
Wailuānui - Ordered for full restoration	• Farming: general and wetland kalo • General gathering • Gathering plants: limu, watercress, lūʻau, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae, ʻopihi, pūpūloʻi, and kūpipi

[16] Although this stream continues to be referred to as "Kualani", it is in fact the easternmost tributary of Waiokamilo Stream and now known as "East Waiokamilo Stream." Waiokamilo Stream has been ordered for full restoration. Kualani Stream is below the EMI Aqueduct System and has never been diverted (CWRM D&O, FOF 62,184,186).

Stream & CWRM D&O Status	Cultural Practice
	• Fishing: general, ‘o‘opu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, po‘opa‘a, hinale‘a, enenue, uau (petrel), kumu, u‘u, uku, pala, and anae • Environmental stewardship: Mālama kahawai and Mālama ‘Āina/ He ali‘i ka ‘āina, He kauwā ke kanaka • Holistic Hawaiian culture/ “cultural kīpuka”/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors
West Wailuaiki - Ordered for full restoration	• Farming: general and wetland kalo • General gathering • Gathering plants: limu, watercress, lū‘au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ‘ōpae (cool water mountain areas), ‘opihi, pūpūlo‘i, and kūpipi • Fishing: general, ‘o‘opu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, po‘opa‘a, enenue, uau (petrel), kumu, u‘u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ‘Āina/ He ali‘i ka ‘āina, He kauwā ke kanaka • Holistic Hawaiian culture/ “cultural kīpuka”/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors
East Wailuaiki - Ordered for habitat restoration (H_{90})	• Farming: general and wetland kalo • General gathering • Gathering plants: limu, watercress, lū‘au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ‘ōpae (cool water mountain areas), ‘opihi, pūpūlo‘i, and kūpipi • Fishing: general, ‘o‘opu, kole, manini, moi, pala, aholehole, ulua, honu, pāpio, uhu, po‘opa‘a, enenue, uau (petrel), kumu, u‘u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ‘Āina/ He ali‘i ka ‘āina, He kauwā ke kanaka • Holistic Hawaiian culture/ “cultural kīpuka”/ cultural viability (passing down of traditions, continued survival) • Recreation, spiritual feeling of place, and/or connection to ancestors

Stream & CWRM D&O Status	Cultural Practice
Kopili'ula - Ordered for habitat restoration (H_{90})	• General farming; • General gathering • Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, and pūpūlo'i • Fishing: general, 'o'opu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Waiohue - Ordered for full restoration	• General farming • General gathering • Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, and pūpūlo'i • Fishing: general, 'o'opu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Pa'akea - Ordered for connectivity restoration	• General farming • General gathering • Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, and pūpūlo'i • Fishing: general, 'o'opu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Waia'aka - Status quo	• General farming • General gathering

Stream & CWRM D&O Status	Cultural Practice
	• Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, and pūpūlo'i • Fishing: general, 'o'opu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Kapā'ula - Ordered for connectivity restoration	• General farming • General gathering • Gathering plants: limu, watercress, lū'au, pepeiao, hāhā, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, and pūpūlo'i • Fishing: general, 'o'opu, kole, manini, moi, aholehole, ulua, honu, pāpio, uhu, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Hanawī - Ordered for connectivity restoration	• General farming • General gathering • Gathering plants: pohole (mountain variety), limu, watercress, lū'au, pepeiao, hāhā, ferns for lei, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, 'ōpae (cool water mountain areas), 'opihi, haukiuki, pūpūlo'i, and kūpipi • Catching crab and lobster • Fishing: general, 'o'opu, kole, 'ō'io, manini, moi, weke, aholehole, moanakali, ulua, honu, mullet, pāpio, uhu, 'ū'ū/menpachi, lai, po'opa'a, puhi, enenue, uau (petrel), kumu, u'u, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama 'Āina/ He ali'i ka 'āina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Makapipi - Ordered for	• General farming • General gathering

Stream & CWRM D&O Status	Cultural Practice
full restoration	• Gathering plants: pohole (mountain variety), limu, watercress, lūʻau, pepeiao, hāhā, ferns for lei, fruit (e.g., mango, guava, oranges, avocados) • Gathering proteins: hīhīwai, ʻōpae (cool water mountain areas), ʻopihi, haukiuki, pūpūloʻi, and kūpipi • Catching crab and lobster • Fishing: general, ʻoʻopu, kole, ʻōʻio, manini, moi, weke, aholehole, moanakali, ulua, honu, mullet, pāpio, uhu, ʻūʻū/menpachi, lai, poʻopaʻa, puhi, enenue, uau (petrel), kumu, uʻu, uku, and anae • Environmental stewardship: Mālama kahawai and Mālama ʻĀina/ He aliʻi ka ʻāina, He kauwā ke kanaka • Recreation, spiritual feeling of place, and/or connection to ancestors
Various Streams within License Area	• Growing watercress • Hunting pig • Cultural sites: terraces, platforms, structures that appear to be heiau or shrines, historic trails (Lucienne de Naie)

It should be noted that the information gathered ~~from~~ during the consultation process was gathered prior to the issuance of the CWRM D&O, and much of the information was taken from declarations that were submitted to CWRM several years ago in support of setting the IIFS. The information presented below has since been updated based on comments received on the DEIS and through additional consultation based on comments received on the DEIS.

Impacts and Mitigation Measures

Based on information gathered about ~~from~~ the cultural and historical background of the License Area and the greater East Maui region, and ~~the~~ through community consultation, significant cultural resources were identified within the License Area, as well as outside of the License Area. It should be acknowledged that although some of the impacted cultural resources exist outside of the License Area, what takes place within the License Area directly affects these cultural practices and resources. At present, there is documentation and testimony indicating traditional and customary Native Hawaiian rights are currently being exercised within the License Area. Cultural resources, practices, and beliefs were identified as currently existing within the License Area. In addition, East Maui, which includes the License Area and beyond the License Area, maintains a rich subsistence and cultural history.

In the CIA published with the DEIS, CSH described potential impacts to the regional environment, taro farming, freshwater ecosystems, and cultural sites. To address impacts to the regional environment, taro farming, and freshwater ecosystems, the CIA deferred to other qualified professionals to offer recommendations for mitigation measures, and also relied on pertinent information from the CWRM D&O. Based upon

post-DEIS consultation, the CIA also discusses two potential additional impacts (access by cultural practitioners and climate change). Furthermore, the CIA considers the mitigation recommendations provided by qualified professionals within the technical studies prepared for the EIS. For those impacts falling within CSH's subject matter expertise, CSH offers specific recommendations based upon community consultation, technical knowledge, and relevant research. The mitigation measures provided in the CIA have the potential to mitigate impacts of the Proposed Action on cultural resources, practices and beliefs. CSH has identified potential impacts and made the following recommendations.

The information on the following pages was included in the CIA published with the DEIS but has been revised and reorganized for readability and expanded upon based on comments recieived on the DEIS in the updated CIA and has been incorporated into the text of this FEIS.

Impact to the Regional Environment

CIA participants expressed broad interests and concerns regarding the environmental impacts related to changes in stream flow, the diversion of stream water, climate change, and ocean outflow. These concerns spanned the entire region of East Maui and in some cases also referenced Hāna and Central Maui as regions that stand to be impacted by the Proposed Action. Several participants advocated for a return to natural stream flow conditions from mauka to makai, and are concerned that any disturbance to the natural stream flow has, and will continue, to impact cultural practices in East Maui. Participants have also noted both positive changes (increase in fish populations, increase in stream flow for taro farming) and negative changes (increased erosion causing near-shore brown water and blockages of culverts from uprooted vegetation) to the regional environment since the significant reduction in stream diversion after the closing of HC&S commercial sugar operations in Central Maui in 2016.

Participants in the CIA asked the following questions:

- How much water is being diverted at each location of intakes, ditches, dams, pipes, and flumes?
- How much water is being diverted from East Maui to Central Maui?
- Is climate change accounted for?

~~CSH Recommendation:~~ Recommendations for Regional Environment Impact

~~It is recommended that these questions be addressed by qualified professionals who possess an understanding of stream flow mechanics, water diversion, and climate statistics within the License Area.~~

~~For the purposes of this DEIS, diversion quantities from the CWRM D&O were used to estimate the maximum amount of water to be diverted by the EMI Aqueduct System from the License Area. Water that is being diverted out of the License Area is measured at Honopou Stream (refer to Section 2.1.2 for more details). Climate change is addressed in Section 4.3.1.~~

Field surveys and habitat modeling conducted by Trutta (Appendix A) (discussed in detail in Section 4.2.1) in support of the EIS for the Proposed Action concluded that the

CWRM D&O flow restorations, on a regional scale, improve the instream habitat conditions for various native amphidromous stream animals when compared to historical diversions. The native species habitats that were evaluated as part of the study conducted by Trutta include ʻOʻopu nākea (freshwater fish family Gobiidae), ʻOʻopu alamoʻo (freshwater fish family Gobiidae), ʻOʻopu naniha (freshwater fish family Gobiidae), ʻOʻopu nōpili (freshwater fish family Gobiidae), ʻOʻopu akupa (freshwater fish family Eleotridae), ʻŌpae kalaʻole (freshwater shrimp), ʻŌpae ʻoehaʻa (freshwater prawn), and Hīhīwai (freshwater snail) which are considered cultural resources.

The stream and ocean water chemistry report conducted by SE and MRC (Appendix B), concluded that the effects of stream water on marine waters is minor in these habitats, which is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing condition of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting. Moreover, only five streams in the License Area were found to have estuarine reaches, of which all of those streams are subject to the CWRM D&O and will have flow restoration.

The terrestrial flora and fauna study prepared by SWCA (Appendix C) (discussed in detail in Section 4.4) in support of the EIS has determined that the Proposed Action, specifically the diversion of water within the existing EMI Aqueduct System, will have no impact on terrestrial flora and fauna resources, nor will the Proposed Action increase habitat fragmentation over current conditions subject to the avoidance and minimization measures detailed in Section 4.4.1 and 4.4.2 above. The outlined avoidance and minimization measures will ensure that further invasive species are not introduced into the License Area, especially in the pristine environments, maintaining native species populations, which are considered cultural resources.

The SIA (Appendix G) (discussed in further detail below in Section 4.7.2) prepared by Earthplan in support of the EIS recommends that the establishment of a "Core Working Group" comprised of geographic communities, environmental, agriculture, and business interests, and public agencies would be beneficial in mitigating the social impacts that result from the Proposed Action. The group would serve as a forum for exchanging ideas and collaborative efforts, as well as provide feedback and suggestions to Mahi Pono from the various stakeholders. Each member of the Core Working Group would be expected to reach out to their own networks to extend the discussion beyond the Core Working Group. While there would likely be strong differences in perspectives and opinions, the Core Working Group would need to find ways to establish core principles, common ground and manageable solutions. Assumably, this forum would include discussion and exchange on cultural issues related to the Proposed Action.

The SIA also recognizes that East Maui residents have a unique relationship with the Proposed Action. While impacts are first and foremost culture-related, they are also entrenched in a social context that is the basis for this mitigation recommendation. The social impact of diverting water is generational, one that has affected livelihoods, family cohesion, the ability to integrate with environment for food gathering and recreation,

resource stewardship, and personal connections or disconnections with values inherent in their lifestyles.

For the Keʻanae – Wailuānui community to move past historical impacts, the SIA recommends that there needs to be established a point of departure. Mitigation needs to go beyond the physical restoration of streams. It needs to address the social context and include apology and reconciliation. This needs to be done within a cultural foundation that binds the community together, and key players, including Mahi Pono, public agencies and elected officials. The manner and forum for this process should be defined by cultural leaders integral with the process.

In addition to the recommendations provided by the other technical studies conducted as part of the EIS, CSH recommends that the Proposed Action include monitoring and public reporting of stream flow volumes. At present, the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within the EMI Aqueduct System. The information obtained is reported to CWRM on a monthly basis. CSH recommends that this monitoring system is maintained and upgraded as needed in order to report accurate information on stream flow and diversion amounts to the community.

Impact on Taro Farming~~:~~

A majority of participants who are taro farmers voiced their concern of the lack of water needed to maintain a healthy and productive loʻi kalo or taro patch. A cold, vigorous flow of water is needed for the production of kalo. Without an ample amount of water continuously flowing, many taro crops have been subject to invasive species such as the apple snail, root rot, and growths. Many taro farmers are unable to continue their traditional and generational cultural practice. Pualani Kimokeo states in her 1 November 2014 declaration that due to a lack of stream flow there is an increase in pocket rot and "guava seed," which she describes as a growth on the taro. There are also apple snails in her loʻi kalo, which she states like the warm water. She points out that farmers in Keʻanae have to compete for water. However, in his 13 April 2020 interview, Mr. Kyle Nakanelua points out that since the issuance of the CWRM D&O, Honomanū and several other streams have been flowing nicely, including Puohokamoa and Waikamoi.

Specific streams mentioned by community participants where this impact is identified include: Honopou (Puniawa Tributary), Waikamoi (Alo Tributary), Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Punalaʻu (Kōlea and Ulunui Tributaries), Honomanū, Nuaʻailua, Piʻinaʻau, Palauhulu (Hauoli Wahine and Kano Tributaries), ʻŌhiʻa (or Waianu), Waiokamilo, Kualani (or Hāmau), Wailuānui (Waikani Waterfall), West Wailuāiki, East Wailuāiki, Kopiliʻula, Puaʻakaʻa (a tributary of Kopiliula Stream), Paʻakea, Waiaʻaka, Kapāʻula, Hanawī, Makapīpī, and Waiohue. However, these streams are ~~were~~ subject to the CWRM D&O decision.

~~Recommendation~~ Recommendations for Taro Farming Impact

The CWRM, through the CWRM D&O, has ordered full restoration of water flow to streams that supply water to active taro farming areas. Fully restored streams include

the following list, with streams where taro farming impacts were identified, as noted above, in **bold**:

- **Honopou (Puniawa Tributary)**;
- Huelo (Puolua)
- Hanehoi
- **Piʻinaʻau**
- **Palauhulu (Hauoli Wahine and Kano Tributaries)**
- **Waiokamilo**
- **Wailuānui (Waikani Waterfall)**
- **Waiohue**
- **West Wailuāiki**
- **Makapīpī**

The CWRM ordered full restoration of these streams primarily to mitigate impacts to water flow to taro growing areas or for community and non-municipal domestic water use. These streams will remain fully restored and diversions will not be permitted. Therefore, the CWRM D&O ordered restoration provides mitigation for cultural impacts to taro farming from water diversion at these locations.

The CWRM ordered full and partial restoration of streams it concluded to have the potential to benefit greatly from the restoration of flow necessary to restore habitat in a stream, based on the biological diversity and habitat that already exists. Habitat flow restoration includes the following list, with streams where the taro farming impacts were identified shown in **bold**:

- **Punalaʻu (Kōlea and Ulunui Tributaries)**
- **Honomanū**
- **Kopiliʻula**
- **Waikamoi (Alo Tributary)**
- **East Wailuāiki**

The CWRM ordered habitat flow restoration to allow stream species to flourish and reproduce, benefitting not only the natural environment but also allowing for better opportunity for the exercise of traditional and Hawaiian right. These streams will be restored to 64% of the median base flow as discussed in Section 1.3.4, which will also minimize cultural impacts to taro farming from water diversion along these streams.

The CWRM ordered connectivity flow restoration in various streams with low biological rating or those that do not have the potential to improve habitat drastically with increased flows. Connectivity flow is set 20% of the instream flow as discussed in Section 1.3.4. Connectivity flow restoration includes the following list, with streams where the taro farming impacts were identified shown in **bold:**

- **Puohokamoa**
- **Haʻipuaʻena**
- **Nuaʻailua**

- **Paʻakea**
- **Kapāʻula**
- **Hanawī**
- **Puaʻakaʻa (a tributary of Kopiliʻula Stream)**

According to the CWRM D&O, none of these streams have registered diversions for taro cultivation nor is taro cultivation known to occur on these streams despite these streams being recognized by CIA participants (CWRM D&O, FOF 195, 213, 263, 409, 441, 474, 491). No additional information specifically regarding taro diversions on these streams was provided through the community consultation conducted for the CIA.

~~It is recommended that a botanist, ethnobotanist, or similar qualified professional provide an assessment of the ideal conditions of water flow and water temperature needed for kalo growth in comparison to the current water flow and water temperature of impacted areas in order to understand and address the stated impact.~~

Generally speaking, ~~The application of~~ the CWRM D&O has the potential to reduce or eliminate any potential ~~this~~ impact to cultural resources or practices identified along ~~impact~~ streams that have been alleged to have the ability to impact taro farming. ~~Eight of the streams mentioned by community participants where this impact is identified have been fully restored in accordance with the CWRM D&O. Honopou (Puniawa Tributary), Piʻinaʻau, Palauhulu (Hauoli Wahine and Kano Tributaries), Waiokamilo, Wailuānui (Waikani Waterfall), West Wailuāiki, Makapipi, and Waiohue.~~

While ~~The~~ the CWRM's approach does not automatically set precedents for other areas, ~~but~~ it provides a model of water use that integrates traditional culture with modern natural resource management (CWRM COL 138-145, 2018).

As discussed further below in Section 4.7.4, in the updated Agricultural and Related Economic Impacts report (Appendix I) conducted by Plasch Econ Pacific, LLC, taro farms in East Maui, including farms using water from the non-petitioned streams not subject to the CWRM D&O, are assumed take place in Honopou, Keʻanae and Wailuā, and would rely primarily on the taro streams ordered for full restoration. Further, all or nearly all of the additional taro cultivation will occur in existing/historical taro cultivation areas, not in new areas, given the barriers presented by terrain and the economic challenges of initiating new taro farms. Hence, under the Proposed Action, there is not anticipated to be significant impacts to existing or potential future taro farming in East Maui.

However, in order to address any impacts on taro farming, CSH recommends that the Proposed Action include monitoring and public reporting of stream flow volumes. At present, the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within its ditch system. The information obtained is reported to CWRM on a monthly basis. CSH recommends that this monitoring system is maintained and upgraded as needed in order to report accurate information on stream flow and diversion amounts to the community.

Impact on Freshwater Ecosystems~~:~~

Several community participants voiced their concern regarding indigenous freshwater species that may be impacted by the act of diverting water. These species include but are not limited to *ʻōpae*, *ʻoʻopu*, *pūpūloʻi* (also known as pūpū Pākē, or Chinese snail), crayfish, prawns, and hīhīwai (endemic grainy snail; *Neritinu graposa*), which are still gathered regularly by residents for personal consumption. Furthermore, community participants shared their concern of water not exiting stream beds and flowing into the ocean. This estuary environment creates an ecosystem where freshwater and saltwater species spawn and travel back upstream (such as *ʻoʻopu*) or continue to grow in the ocean.

During the DEIS comment period, several community members noted that they have observed a rebound in stream and ocean life following the full release of stream water for the identified taro streams in 2018 and the implementation of the IIFS required under the CWRM D&O. Commenters noted: "a return in akule (bigeye scad)," "more fish," "flourishing fishponds," "fish spawning in muliwai (estuary)," "many hukilau (community net fishing technique) feeding families abundantly," and an "increase in stream flow and stream life" since full release in 2018.

In his 22 May 2020 written statement, Mr. Albert Perez notes that East Maui residents fish and gather from streams throughout the proposed License Area and these residents report that the amount of stream water reaching the ocean has increased, and that fish populations have increased since EMI stopped diverting so much water.

However, in their 15 April 2020 written questionnaire, Mr. Ferreira and Mr. Tanaka of OHA commented that the end of sugar production in 2016 did not result in immediate changes to stream diversions. Streams were slowly returned over the course of many years and various aquatic species' life histories suggest that population changes caused by restored estuarine and stream habitat may take several years as well.

In his 24 March 2020 interview, Mr. Lafayette Young shares that after sugar plantations closed, all the flowing streams began flowing at a much higher levels than those to which the banks were accustomed. He noted that rushing water scrubs the banks and erodes the soil, causing more and more of the banks to be exposed. Consequently, the water carries the soil down where it empties into the ocean. Mr. Lafayette Young explained that this is the first of the negative consequences and said the water has been "unbelievably dirty for the last 18 months" since the diversions for sugarcane stopped.

Specific streams mentioned by community participants where impacts to freshwater ecosystems had been noted include: Wahinepeʻe, Puohokamoa, Haʻipuaʻena, Honopou (Puniawa Tributary), Punalaʻu (Kōlea and Ulunui Tributaries), Honomanū, Nuaʻailua, Piʻinaʻau, Waiokamilo, Wailuānui (Waikani Waterfall), Kopiliʻula, Paʻakea, Kapāʻula, Hanawī, Makapīpī, Waiohue, Waikamoi (Alo Tributary), Hanehoi, Palauhulu (Hauoli Wahine and Kano Tributaries), ʻŌhiʻa (or Waianu), Kualani (or Hāmau), East Wailuāiki, West Wailuāiki, Puaʻakaʻa Tributary, and Waiaʻaka. It is understood that these streams are ~~were~~ subject to the CWRM D&O decision.

~~CSH Recommendation~~ Recommendations for Freshwater Ecosystems Impact

As discussed above, in the CIA published with the DEIS, CSH described potential impacts to the regional environment, taro farming, freshwater ecosystems, and cultural sites. To address impacts to the regional environment, taro farming, and freshwater ecosystems, the CIA deferred to other qualified professionals to offer recommendations for mitigation measures, and also relied on pertinent information from the CWRM D&O. Following publication of the DEIS, the CIA considered the mitigation recommendations provided by qualified professionals within the technical studies prepared for the EIS. ~~It is recommended that a biologist or similar qualified professional provide an assessment of the impacts of water diversion to indigenous freshwater species (ʻōpae, ʻoʻopu, and hīhīwai) within the License Area. The application of the CWRM D&O has the potential to reduce or eliminate this cultural impact. Nine of the streams mentioned by community participants where this impact is identified have been fully restored in accordance with the CWRM D&O. These include Honopou (Puniawa Tributary), Piʻinaʻau, Waiokamilo, Wailuānui (Waikani Waterfall), Makapipi, Waiohue, Hanehoi, Palauhulu (Hauoli Wahine and Kano Tributaries), and West Wailuāiki Streams.~~

~~Trutta and SWCA prepared reports in support of the DEIS assessing the impacts of the Proposed Action, particularly impacts on indigenous freshwater species, and terrestrial flora and fauna. The impacts of the Proposed Action to freshwater species are discussed in Section 4.2.1 and the impacts to terrestrial flora and fauna are discussed in Sections 4.4.1 and 4.4.2. Moreover, the two reports are appended to the DEIS (See Appendix A and Appendix C).~~

As noted above, field surveys and habitat modeling conducted by Trutta (discussed in detail in Section 4.2.1) in support of the EIS concluded that the CWRM D&O flow restorations, on a regional scale, improve the instream habitat conditions for various native amphidromous stream animals when compared to historical diversions. However, it is noted that there will be a decrease in the potential HU for stream animals from the theoretical Natural Condition. The native species habitats that were evaluated as part of the study conducted by Trutta include ʻOʻopu nākea (freshwater fish family Gobiidae), ʻOʻopu alamoʻo (freshwater fish family Gobiidae), ʻOʻopu naniha (freshwater fish family Gobiidae), ʻOʻopu nōpili (freshwater fish family Gobiidae), ʻOʻopu akupa (freshwater fish family Eleotridae), ʻŌpae kalaʻole (freshwater shrimp), ʻŌpae ʻoehaʻa (freshwater prawn), and Hīhīwai (freshwater snail) which are considered cultural resources within the freshwater ecosystems in the License Area.

The stream and ocean water chemistry report conducted by SE and MRC, concluded that the effects of stream water on marine waters is minor in these habitats, which is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing condition of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting. Moreover, only five streams in the License Area were found to have estuarine reaches, of which all of those streams are subject to the CWRM D&O and will have flow restoration.

In order to further address impacts to freshwater ecosystems, CSH recommends that the Proposed Action include monitoring and public reporting of stream flow volumes.

At present, the CWRM D&O requires EMI to report on changes in stream diversions and ditch settings as irrigation requirements increase. EMI also maintains a system of optical encoders with float tape and data loggers within its ditch system. The information obtained is reported to CWRM on a monthly basis. CSH recommends that this monitoring system is maintained and upgraded as needed in order to report accurate information on stream flow and diversion amounts to the community.

Impact on Cultural Sites:

~~While no human burials have been identified by previous archaeological studies within or immediately adjacent to the License Area, historical research indicates that Honomanū Valley and other areas throughout East Maui once held a sizable population. LCA documentation indicates that there were settlements along the coast, however, a pedestrian survey was also conducted where there was evidence of habitation in the higher reaches of the valley (E. M. Fredericksen and Fredericksen 1998b).~~

Following publication of the DEIS, several participants expressed knowledge of cultural sites within the East Maui region and within the License Area, including agricultural terraces, trails, legendary sites, and human burials. In response to those comments on the EIS CSH conducted additional outreach to those who commented on traditional and customary practices or resources. In her 27 May 2020 written statement, Ms. de Naie describes that she has personally seen: loʻi kalo terraces at Hoʻolawa Stream (Hoʻolawa ili and Hoʻolawa nui tributaries), Puolua Stream [Huelo Stream], Hanehoi Stream, Hoalua Stream, Hanawana Stream [Hanahana Stream], Nāʻiliʻilihaele Stream, Nuaʻailua Stream, Piʻinaʻau and further East; pre-Contact ʻauwai at various streams; a historic grave marker in the Piʻinaʻau area; historic trails; terraces and platforms atvarious streams; remains of the abandoned 1882 Spreckels Ditch (cement supports) at Hoʻoloawa Stream; and structures that appear to be heiau or shrines at various streams. In his 13 April 2018 interview, Mr. Nakanelua shares his knowledge of a heiau (pre-Christian place of worship) complex called Pākanaloa. The site consists of two platforms, but in recent years it has been choked by hau (beach hibiscus; Hibiscus tillaceus) and trash. The Redo family resides near the heiau where they operate a watercress farm. On their property is a spring known as ʻŌhiʻa. However, according to Walker (1931) Pākanaloa heiau was destroyed / not found, but was said to have been a war heiau to Kanehekili, located on the upper slopes of Keʻanae peninsula and outside of the License Area. In his 26 June 2018 interview, Mr. Hew recalled a few [archaeological sites] in Honomanū, including a small Chinese graveyard and a few more along Piʻinaʻau Road. He was told there was a ditchman who lived with his family in that area whose kuleana (responsibility) was to maintain the ditch and regulate the water. In his 24 March 2020 interview, Mr. Young shared that at the top of Honopou Stream are vertically buried iwi kupuna. Public comments provided on the DEIS by Mr. Perez also discussed the potential for impacts to archaeological sites in East Maui. Specifically, Mr. Perez identified a legendary pōhaku in Wahinepeʻe, which was unable to be located by CSH.

Participants expressed concern regarding the proximity of these cultural sites to the EMI Aqueduct System, impacts from road maintenance work and repairs, and also

suggest that past water diversion practices have increased stream bank erosion, thereby impacting cultural sites.

~~Recommendation~~ Recommendations for Cultural Sites Impact~~:~~
~~It is recommended that any personnel involved in access, maintenance, or any other related activities within the License Area be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are inadvertently discovered within the License Area, these discoveries should be reported immediately to the SHPD. In the event that iwi kūpuna and/or cultural finds are encountered, consultation with lineal and cultural descendants of the area is also recommended.~~

CSH recommends any persons who are required to enter the License Area as part of the Proposed Action be made aware of the potential for discovery of undocumented surface historic properties such as walls, trails, terraces, mounds, and/or caves. These structures should be avoided, protected, and reported to the SHPD. The SHPD will determine if additional mitigation measures are required.

In the event that human skeletal remains are identified within the License Area as part of the Proposed Action, any work in the immediate vicinity of the remains will be stopped and the discovery will be immediately reported to the SHPD (during regular business hours) or to DOCARE (outside of regular business hours) and to the Maui Police Department (to include notification to the medical examiner) in accordance with HAR § 13-300-40.

In the event that a historic property other than a burial is inadvertently discovered within the License Area as part of the Proposed Action or alternatives, work in the immediate area will be halted and the SHPD will be notified as soon as possible in accordance with HAR § 13-280-3. The SHPD shall gather sufficient information to evaluate the significance of the historic property.

These recommendations align with recommendations that were made for the Waikamoi Preserve during a cultural-historical study of East Maui (Maly and Maly 2006).

Impact to Access by Cultural Practitioners
Several participants identified on-going cultural practices such as gathering, fishing, and hunting activities within the License Area and their right to maintain access to these activities. Participants emphasized the need to identify and protect access to public land. Participants also discussed the potential for impacts from increased access to the License Area. However, no details regarding issues with access (i.e., specific areas where access is needed) for specific cultural practices or to specific cultural sites were identified during consultation. In his May 22, 2020 written statement, Mr. Perez notes that since the reduction in the amount of water diverted, people have grown accustomed to being able to enter public trails in the License Area without restriction. He noted that increased diversion and maintenance of the EMI Aqueduct System will reduce this access unless steps to ensure unrestricted access are taken. However, it is not clear how reduced diversions would have changed perceptions on public access. According to EMI, its public access policies have remained consistent both before and

after the end of sugar farming and EMI's public access policies are not dependent upon the amount of water the EMI Aqueduct System may be diverting at any point in time.

Recommendations for Access by Cultural Practitioners

As discussed in Section 4.8 of this EIS, public access to the License Area is currently limited to permitted access by hunting groups and hiking clubs, as well as individuals hiking. EMI has confirmed that no individual that has approached EMI regarding access for cultural purposes has ever been denied access.

In their 15 April 2020 written questionnaire response to CSH, Mr. Ferreira and Mr. Tanaka of OHA recommend that the EIS should consider an array of approaches to mitigate potential impacts on practitioner access and use of the License Area, such as the maintenance of a consultation list of willing practitioners that can be used to communicate with and accommodate these individuals, developing an established procedure for cultural access, and including signage that encourages cultural use. Notwithstanding the apparent lack of conflict or limitations on cultural access under current conditions, CSH nevertheless recommends that the State and the Water Lease lessee create an established procedure to handle cultural access and also consider signage that encourages cultural use pursuant to the State of Hawai'i Constitutions, Article XII.

Taking those recommendations into consideration, CSH recommends that should the Water Lease be issued, the access policy for the License Area include access by cultural practitioners via a process similar to what is used for hiking groups or via a consultation list of willing practitioners. CSH further recommends that any access policy be developed in consultation with the landowner (the State) and the Water Lease lessee and in consideration of applicable law related to traditional and customary Native Hawaiian rights.

Impact of Climate Change

The United States Environmental Protection Agency states the following:

> *Hawaii's climate is changing. In the last century, air temperatures have increased between one-half and one degree (F). Warming in the oceans around Hawaii has damaged coral reefs, and, in recent decades, increased ocean acidity has threatened reefs and other marine ecosystems. Average precipitation decreased in the last century, reducing freshwater availability on some islands and affecting delicate land-based ecosystems, often harming native species. In the last 50 years, sea level has risen along Hawaii's shores, increasing erosion and threatening coastal communities and infrastructure. (United States Environmental Protection Agency 2016)*

A 2016 study on climate change impacts on cultural landscapes in the Pacific West region identifies the 86.24-acre Pu'ukoholā Heiau National Historic Site on the northwest coast of Hawai'i Island as susceptible to sea level rise, particular the coconut grove, a contributing feature of the site (Melnick et al. 2016). Pu'ukoholā Heiau National Historic Site is one documented example of impacts on low-lying coastal historic properties from climate change in Hawai'i.

A 2017 Hawaiʻi Sea Level Rise Vulnerability and Adaptation Report identifies 3,130 acres on Maui that would be subject to chronic flooding due to 3.2 ft (0.97 m) of sea level rise. The report describes the socio-economic impact of sea level rise that would include the displacement of approximately 1,600 individuals, the loss of 760 structures, and the flooding of 11.2 miles of roadway on Maui (Tetra Tech and DLNR Office of Conservation and Coastal Lands, 2017).

The report addresses cultural resources on the island of Maui as follows:

> *In addition to Native Hawaiian communities, many Native Hawaiian cultural and historical resources are located near the shoreline and are threatened by sea level rise. Coastal erosion already threatens areas that have served as burial grounds, home sites fish ponds, and other places of cultural significance (Kane et al. 2012). The number of cultural sites on Maui in the SLR-XA is projected to increase from 33 sites with 1.1 feet of sea level rise, to 48 with 3.2 feet of sea level rise. This includes an unnamed resource located along the coast in Keʻanae. (Tetra Tech and DLNR Office of Conservation and Coastal Lands 2017:105)*

Cultural resources located within the chronic flooding area are already being impacted by sea level rise. Burial sites along the Hāmākuapoko District coastline, located approximately 15.0 km (9.3 miles) from the License Area, are being impacted by high surf and high tide events leading to the inadvertent exposure and discovery of human skeletal remains (SHPD 2019a, 2019b, 2020).

As discussed by Tetra Tech and DLNR Office of Conservation and Coastal Lands (2017), the low-lying traditional landscape of Keʻanae Peninsula in East Maui is particularly vulnerable to sea level rise. Potential cultural impacts could include impacts on near-coastal taro farming, freshwater ecosystems, cultural sites and coastal access by cultural practitioners. Sea level rise has the potential to inundate near coastal loʻi and historic structures or cause indirect impacts on water quality in coastal pond fields with the introduction of increased salinity.

In his 26 June 2018 interview, Mr. Hew mentioned how natural disasters, like heavy rain, landslides, and earthquakes have also interrupted the natural flow of water. He was told stories by locals of Hāna that an earthquake caused the Mokulehua Stream water to sink into the ground instead of flow down to the ocean. In another instance, heavy rains and big floods have washed away ponds, like Makapipi, where he once took his kids swimming. Heavy rains caused a landslide that completely took out the pond adjacent to the Hana Highway and although a pond stands there today, it is now 200 ft below its original location.

The License Area occupies elevations from approximately 30 m to 2,286 m (100 ft to 7,500 ft) above mean sea level. Therefore, cultural impacts related to sea level rise are not likely within the License Area. Climate change has the potential to decrease rainfall amounts within the License Area, therefore causing a decrease in stream flow that could impact taro farming and freshwater ecosystems, although the flow requirements

under the CWRM D&O would remain intact. Climate change has the potential to increase the frequency and intensity of weather-related events, such as tropical storms, hurricanes, and brush fires. These unpredictable events have the potential to impact taro farming and freshwater ecosystems. These climate-related impacts have the potential to occur irrespective of any Water Lease.

Recommendations for Climate Change Impact

The 2017 Hawai'i Sea Level Rise Vulnerability and Adaptation Report recommends a Statewide approach to preserve Native Hawaiian culture and communities with sea level rise that includes: 1) develop an archipelagic-wide inventory of Native Hawaiian cultural resources and practices impacted by sea level rise; 2) work with Native Hawaiian Communities to develop a culturally-based adaptation process and protocols to preserve *iwi kūpuna* and Native Hawaiian cultural resources and practices with sea level rise; and 3) develop adaptation plans to preserve access to coastal lands and water within Native Hawaiian communities with sea level rise (Tetra Tech and DLNR Office of Conservation and Coastal Lands 2017:238-240). However, these recommendations are aimed toward alleviating impacts due to sea level rise, which is not anticipated to be a concern within the License Area as discussed in Section 4.3.2 above.

Summary of Overall Cultural Mitigation Recommendations

Mitigation recommendations were developed based upon community consultation that occurred as part of the preparation of the CIA, the CWRM D&O of June 20, 2018, CSH expertise, and the other technical studies that were prepared for the EIS. In general, recommended mitigation includes specific monitoring, training, inspecting, communicating, and reporting measures that have been proposed by CWRM, CSH, and other technical studies.

CSH offers specific recommendations summarized as follows: 1) continue monitoring and public reporting of stream flow volumes through maintenance and upgrades to the existing system of optical encoders with float tape and data loggers within the EMI Aqueduct System; 2) notify and ensure appropriate training of any persons required to enter the License Area as part of the Proposed Action regarding the potential for discovery of undocumented cultural sites and the procedures for reporting such finds; 3) facilitate access via an appropriate access policy and procedure for cultural practitioners who wish to enter the License Area to practice their traditional and customary Native Hawaiian rights in accordance with applicable law.

Consistent with the spirit and intent of the process surrounding cultural impact assessments, CSH also recommends that any future amendments to the Proposed Action and its potential impacts on the identified cultural resources, practices, and beliefs be fully vetted with the potentially affected community by engaging relevant stakeholders in discussion. Such discussion would keep the community informed while inviting feedback on approaches to addressing potential impacts and exploring alternatives and appropriate mitigation measures.

As determined by CSH, the mitigation measures suggested in the CIA have the potential to mitigate impacts of the Proposed Action on the cultural resources, practices and beliefs described herein.

Upcountry Maui

No changes to Upcountry Maui are planned as part of the Proposed Action. The EMI Aqueduct System conveys water to Upcountry Maui to the MDWS to meet domestic and agricultural water demands. Upcountry Maui is a highly altered urban environment.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on cultural resources and practices in Upcountry Maui are anticipated.

Central Maui

CSH's CIA only assessed the License Area within the greater East Maui region. The EMI Aqueduct System conveys water to the Central Maui agricultural fields ~~to~~ in Central Maui and has done so for over 100 years to support agricultural operations. The agricultural fields have been cultivated for over a century to grow sugarcane and there are no known cultural practices that occur or cultural resources within the agricultural fields in Central Maui. However, in the update to the CIA in response to comments made on the DEIS, Mr. Albert Perez shared that collision with human-made structures is one of the primary causes of injury or mortality to ʻōpeʻapeʻa (Hawaiian hoary bats). Any impact on this species impacts those to whom ʻōpeʻapeʻa are ʻaumakua. They are also listed in the Kumulipo. ʻŌpeʻapeʻa are part of the ecosystem; their kūkae goes onto the ground, and eventually these nutrients end up in the ocean, where they help feed fish and other marine organisms. Impacts on any native species, including ʻōpeʻapeʻa, have wide-ranging cultural impacts. He reported that snagging on barbed wire is the most significant source of reported mortality, and noted that since acquiring the land from A&B in Central Maui, Mahi Pono has installed miles of fencing, and has used barbed wire on the top strands. He explained that any impact on this species impacts those to whom ʻōpeʻapeʻa are ʻaumakua. They are also listed in the Kumulipo. ʻŌpeʻapeʻa are part of the ecosystem; their kūkae goes onto the ground, and eventually these nutrients end up in the ocean, where they help feed fish and other marine organisms. Impacts on any native species, including ʻōpeʻapeʻa, have wide-ranging cultural impacts. He also noted concerns about the potential for increased dust plumes arising from increased agricultural activities in Central Maui and the effect of dust on the ocean and reef.

Public comments provided on the DEIS discuss knowledge of, or visits to, archaeological sites in Central Maui. Specifically, public comments mentioned identified the following cultural sites in the Central Maui agricultural fields in: Hāmākua Poko, and Hāmākua Loa, and also mentioned Papanene Heiau However, except for the Papanene Heiau, no specific cultural sites were identified in comment letters on the DEIS. Nor did any consulted parties, before or

after publication of the DEIS, or through additional consultation following publication of the DEIS, identify any specific cultural sites in the Central Maui agricultural fields.

In response to comments received on the DEIS regarding Papanene Heiau, which certain commenters indicated may be located within the Central Maui agricultural fields, CSH conducted an additional literature review and field inspection. However, CSH archaeologists were unable to locate Papanene Heiau within the License Area during a field inspection (Yucha and Hammatt 2020). Out of respect for privacy and potential confidentiality of precise locations of cultural sites and practices, CSH did not probe community interview participants during the consultation period. Moreover, based upon a review of the available documentation, CSH determined that the most likely location for Papanene Heiau (which has reportedly been destroyed since prior to 1931) is in Spreckelsville, which is several miles from the Central Maui agricultural fields associated with the proposed Water Lease, and therefore would not be affected by the Proposed Action.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action will allow for the transition of the agricultural fields in ~~the continued use of~~ Central Maui to a diversified ~~for~~ agricultural operations ~~production~~, with a significant change in that the prior monocrop sugarcane will be replaced by diversified agriculture. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on cultural resources and practices in Central Maui are anticipated as there are no known cultural practices or resources within the Central Maui agricultural fields. With respect to the potential for impacts to the ʻōpeʻapeʻa (Hawaiian hoary bats), SWCA recommends that barbed wire not be used for any fence construction. Furthermore, to protect the ʻōpeʻapeʻa, no trees taller than 15 feet should be trimmed or removed between June 1 and September 15.

Consistent with the long-term agricultural uses of the Central Maui agricultural fields, a steady increase in farming activity in Central Maui is planned, with full build out of Mahi Pono's farm plan projected to take place in 2030. Agricultural activities and operations will be kept within existing agricultural fields that, prior to the end of sugar production in 2016, were continuously plowed for more than a century. Additional plowing within an established agricultural plow zone will not pose a new or increased impact to cultural resources any more so than past agricultural plowing. However, there is a potential to impact known and/or undocumented cultural resources if ground disturbance occurs outside of the established agricultural fields or significantly deeper than the established agricultural plow zone. Consultation with the SHPD is recommended in the event that agricultural use in Central Maui is proposed for areas outside of established agricultural zones or for projects that would involve ground disturbance beneath the agricultural plow zone.

Regarding the cultural sites alleged within the Central Maui agricultural fields, comments on the DEIS indicated that there were cultural sites of concern in Hāmākua Poko and Hāmākua Loa, as well as the Papanene Heiau. With the exception of the

Papanene Heiau, no specific sites were identified as existing in Hāmākua Poko and Hāmākua Loa through the additional consultation that followed the DEIS comments, Furthermore, as explained above, the Papanene Heiau has been documented as destroyed as was not located during the additional field survey.

4.7 Socio-economic Characteristics

4.7.1 Population / Demographics

The County of Maui consists of three major islands, Maui the "Valley Island", Moloka'i the "Friendly Island", and Lana'i, the "Pineapple Island". Demographic and other information pertaining to the License Area within East Maui was reviewed from the U.S. Census 2010 for Maui County and is shown in Table 4-16 ~~4-6~~.

The resident population of the County of Maui has demonstrated a substantial increase over the last two decades with the 1995 resident population of 117,895 increasing to 151,300 persons in 2010. Forecasts for 2020 reflect an island-wide population of 174,450 persons.

The proportion of Native Hawaiians and Pacific Islanders (25.8 percent) in Ke'anae, Wailuānui, and Nāhiku is significantly high in comparison to the Makawao District (8.3 percent) and Maui Island (9.5 percent). These communities also had the third highest proportion of White residents in the project area at 42.8 percent, while 45.9 percent of the Makawao District was White, compared to the 35.1 percent island-wide. The proportion of Asians (2.1 percent) in Ke'ane, Wailuānui, and Nāhiku is significantly low compared to Makawao District's 15.8 percent and Maui Island's 29.7 percent.

The Olinda census-designated place (CDP) had the highest proportion of workforce (ages 25 to 64) with a combined 63 percent, followed by the Ha'ikū-Pa'uwela CDP workforce at 61 percent, and Kula CDP at 60 percent. Kēōkea had the highest proportions of children under 18 years of age (26.2 percent) followed by Makawao, Pukulani, and Hāli'imaile (24 percent).

Table 4-16 ~~4-7~~
Demographic Characteristics

Subject	Ke'anae Wailuānui Nāhiku	Makawao District (Partial) CDPs							
		Ha'ikū-Pa'uwela	Hāli'imaele	Kēōkea	Kula	Makawao	Olinda	Pukalani	Total Maui Island
RACE									
Native Hawaiian and Pacific Islander	25.8%	7.1%	11.8%	25.8%	4.2%	8.4%	3.2%	9.5%	9.6%
Asian	2.1%	8.1%	35.0%	8.7%	16.3%	15.9%	7.6%	23.9%	29.7%
White	42.8%	59.4%	20.5%	29.0%	56.3%	38.2%	71.1%	33.2%	35.1%
Black or African American	0.4%	0.3%	0.1%	0.7%	0.5%	0.4%	0.2%	0.4%	0.8%
American Indian and Alaska Native	0.5%	0.5%	0.1%	0.6%	0.4%	0.6%	1.3%	0.3%	0.4%

Some Other Race	1.1%	1.1%	2.5%	0.7%	1.2%	1.0%	0.8%	1.8%	2.1%
Two or More Races	27.4%	23.4%	30.0%	34.7%	21.2%	35.5%	15.8%	30.9%	22.8%
AGE									
Population	1,056	8,118	964	1,612	6,452	7,184	1,084	7,574	167,207
Under 18	21.0%	23.0%	24.0%	26.2%	20.0%	24.2%	18.7%	24.0%	21.8%
18-24	5.6%	7.0%	7.6%	7.0%	5.2%	8.1%	5.2%	7.3%	8.8%
25-44	22.2%	28.3%	28.4%	25.4%	20.7%	27.0%	26.3%	25.1%	27.0%
45-64	39.1%	32.7%	26.7%	30.1%	39.1%	29.9%	36.3%	31.3%	29.6%
65 and older	12.1%	9.0%	13.4%	11.3%	15.0%	10.8%	13.6%	12.4%	12.8%
Median age	-	39.6	37.9	38.7	47.7	38.4	44.9	40.5	39.6

Source for Makawao District: ***Maui County Data Book: 2015****, Table 1.3.6 Summary Characteristics of Persons by Race Census Designated Places, Maui County For Ke'anae, Wailuānui and Nāhiku, information was extracted as the net value between the Hāna CT 301 and the Hāna CDP.*

It should be acknowleged that COVID-19 could cause a change in Maui's population. With a weaker economy due to the worldwide pandemic and severe restrictions on tourism, it is anticipated that fewer residents will move to Maui seeking jobs and housing, and some residents will leave the island to find jobs elsewhere (Bank of Hawai'i Foundation, 2020).

East Maui

East Maui encompasses the License Area and consists primarily of rural residences. According to the Draft Maui Island Water Use and Development Plan (March, 2019, Updated July 2020), this region had a population of 11,890 ~~11,892~~ residents in 2015. This population is projected to increase by 3.6 percent to 12,321 by 2035. Over 90% of this population is within the Pā'ia-Ha'ikū Community Plan area.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. In general, the Proposed Action will maintain existing conditions, subject to the requirements under the CWRM D&O and any reservations in favor of the DHHL. No significant direct adverse impacts on demographics or population in East Maui are ~~is~~ anticipated to result from the Proposed Action. Operation of the EMI Aqueduct System would allow for the implementation and cultivation of Mahi Pono's diversified agricultural plan in Central Maui, which would serve to directly and indirectly stimulate economic activity on the island of Maui and potentially drive population growth, which could conceivably impact population in East Maui.

Upcountry Maui

In 2017, there were an estimated 37,128 residents and 14,178 households within the Upcountry Maui Water System Service Area ~~service area~~.

The County of Maui projects that the population in the Upcountry Maui Water System Service Area will grow to 44,000 ~~43,675~~ in 2035 ~~2030~~ (~~CWRM D&O, p. 210~~ Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). This would translate to an estimated 16,678 households.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. In general, the Proposed Action will maintain existing conditions, subject to compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant direct adverse impacts on demographics or population within the Upcountry Maui are anticipated to result from the Proposed Action; continued water supply to Upcountry Maui should not reduce or stimulate population growth. Operation of the EMI Aqueduct System would allow for the implementation and cultivation of Mahi Pono's diversified agricultural plan, which would serve to directly and indirectly stimulate economic activity on the island of Maui and potentially drive population growth.

Central Maui

There are no residences within the agricultural fields in Central Maui. Moreover, no housing or similar development is proposed in Central Maui under this EIS.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. In general, the Proposed Action will maintain existing conditions, subject to the limitations imposed by the CWRM D&O and any reservations in favor of the DHHL. No significant direct adverse impacts on demographics or population within Central Maui are anticipated to result from the Proposed Action. Operation of the EMI Aqueduct System would allow for the implementation and cultivation of Mahi Pono's diversified agricultural plan in Central Maui, which would serve to directly and indirectly stimulate economic activity on the island of Maui and potentially drive population growth.

4.7.2 Social Characteristics

Earthplan was contracted by WOC to prepare a ~~Social Impact Assessment (~~SIA~~)~~ in support of the ~~DEIS~~ EIS (See Appendix G, Updated June 2020). Earthplan's SIA assesses how the Proposed Action affects the human environment. While there are many facets to the human environment, the social context is basically framed by relationships. The social aspects of an area relate to people living and interacting with other people. The SIA explores how changes in the physical environment of a community or neighborhood caused by a proposed land development may affect the neighborhood as a social environment.

Earthplan conducted seven focus group discussions in November 2018 to discuss the how the Proposed Action might affect the participants' interests, interest and participation in previous lease- and water-related events, such as the CWRM D&O proceedings, media coverage and participation in the scoping meetings subsequent to the publication of the EISPN related to the

Proposed Action. After the November 2018 focus group sessions A&B sold the Central Maui agricultural fields to Mahi Pono. To gauge how community issues may be affected by the change in ownership and agricultural operations, Earthplan conducted interviews with a cross section of key community leaders in April 2019.

The November 2018 focus groups were conducted, as follows:

- Two focus groups with Upcountry Community Associations, including Kula, Pukalani, and Makawao Community Associations
- Farmers and ranchers
- Mālamalama Maui (a two-year community project to use arts and culture)
- Huelo/Ha'ikū residents and farmers
- Environment and sustainability
- Ke'anae and Wailuānui (Ko'olau Moku) residents, farmers, and cultural practitioners

Collectively, 64 people signed in at the seven focus group meetings. However, the actual number of participants is higher because some who arrived after the session started did not sign in. Four people participated in two sessions to share their views from different perspectives.

From the seven focus group discussions, a set of common topics were raised by the participants related to the Proposed Action. These topics were:

- Relationship to A&B, the EMI Aqueduct System, and the proposed Water Lease
- Community Interaction
- Legal Proceedings
- How changes may affect participants personally or other people they know
- Credible basis for the 30-year Water Lease application
- Suspicion that the 30-year Water Lease will eventually support urbanization
- Change in Upcountry Water System
- Maintenance of the EMI Aqueduct System
- Balance in water resource allocation
  - Water is a public trust
  - Support for sustainable local agriculture

- Hawaiian system of water use in agriculture is balance
- Need for more farmers in East Maui
- The need for resolution for downstream users in watershed areas

In April 2019, Earthplan, contacted community leaders who helped convene the November 2018 focus group meetings and other community leaders who may provide insight not represented in the November 2018 focus group meetings, to gather input in light of the sale to Mahi Pono and Mahi Pono's stated intention to pursue diversified agriculture in Central Maui.

These April 2019 interviews were not intended to be statiscally analyzed. Rather, they were intended to stimulate discussion about the recent changes. A total of 18 people were interviewed, who represented a broad cross section of community interests and involvement. The following presents a profile of those interviewed:

- Nine of those interviewed participated in the November 2018 focus group meetings. The other nine people were invited initially-contacted interviewees or were referred to the interviewer as possible interests that may not have been represented in the November 2018 focus group sessions.

- Eight people are actively involved in farming and ranching. Some are subsistence farmers, while others raise flowers and livestock in businesses they own. Several have leadership positions in organizations that support ranching and farming.

- Eight people are business owners or executives. Their businesses are related to real estate, a restaurant, flowers, livestock, and macadamia nuts.

- Eight people are active in community organizations that advocate for and address various community needs and interests. Their efforts are related to the community planning, resource management, the arts, education, religiion, affordable housing and economic opportunity.

- Six people are community leaders in geographic-specific organizations in Ke'anae, Hāna, Ha'ikū, and Kula.

- Three people in leadership roles in environmental and sustainability organizations

Topics brought up from the 18 interviews were:

- Strong desire for continued agriculture in Central Maui

- Optimism that Mahi Pono would be able to bring environmentally friendly large scale diversified farming

- Recognition of the need for water to support agriculture

- Opportunities to re-evaluate ways to achieve balance among water user groups

- Opportunity for food self-sufficiency and reduction of food import

- Concerns and challenges associated with the Proposed Action
  - Enough water to support Mahi Pono's farm plan
  - Legislative proceedings related to State water leases
  - BLNR responsibility and accountability
  - Public trust, the need for more information on water needs, and amount of time needed to secure proper permits
  - Agricultural exportation may take precedence over local market
  - Use of chemicals
  - EMI Aqueduct System conditions
  - Source of labor
  - Lack of clarity on how individual ranchers will be incorporated in Mahi Pono's farm plan
  - The need for consistent, transparent communication and to make things "pono" with the East Maui Native Hawaiian communities

From November 2018 to April 2019, perceptions of the participants generally changed from being pessimistic to being optimistic with the change in land ownership from A&B to Mahi Pono. However, some concerns raised in the November 2018 focus group meetings persisted ~~still persist today~~.

Below is a summary of Earthplan's focus group meetings and interviews conducted in November 2018 and April 2019 respectively. It should be noted that these were and are perceptions of the participants that represent the existing conditions at the time the SIA was conducted related to each geographic region being assessed in this FEIS ~~DEIS~~. Some of their perceptions may conflict with what is presented and discussed elsewhere within this FEIS ~~DEIS~~. The SIA was updated in June 2020 based on comments received for the DEIS to include a more comprehensive discussion on cumulative social impacts which is included in the discussions below.

East Maui

November 2018 Focus Group Meetings

A focus group with residents and farmers from Huelo and Ha'ikū was convened on November 15, 2018 at Hale Akua in Huelo. Most of these participants live in the Huelo watershed area owned by the State of Hawai'i. They generally lived downstream of the EMI Aqueduct System and many live and farm in areas adjacent to streams that are subject to the CWRM's D&O.

As landowners and farmers downstream of the EMI Aquduct System, two major concerns emerged among participants. First, many reported that the EMI Aqueduct System is not maintained in a manner that was safe for people in the area and located downstream. Focus group participants said that portions of the ditch area are so overgrown with vegetation that people visiting the area are injured if they stumble upon or fall into ditches and flumes that are not readily visible. Two bridges on State land often flood in this wet season, and people cannot drive to their residences until the water level subsides. It was felt that the bridges are unsafe because of a lack of maintenance.

Also, people who visit popular areas in the vicinity of the State Forest Reserve, such as Twin Falls (which is partially within License Area; the upper falls are within the License Area but, the area that is frequently visited is outside the License Area), and area trails, noted that these areas are subject to overgrown landscaping and flash flood conditions. Participants noted that neither EMI nor the State has participated in maintenance of the EMI Aqueduct System and trails in this area, even though this area attracts residents and visitors alike.

Also, participants said that EMI personnel do not notify residents in the area when the gates open to allow downstream flow. The sudden onrush of stream water has endangered several people who happened to be in/near the stream at that time.

It was noted that, with the closing of the sugar plantation, the low level of maintenance has deteriorated even further given the reduction of EMI staffing to, reportedly, about eight people.

A second major concern with this group is fairness in how they, as a community, have been treated in two ways. First, they reported of the 25 streams in the petition before the CWRM, only three streams in the Huelo watershed were considered kalo streams and designated for full flow. While they agreed with such designation in other watersheds, they felt more streams in their area should have been considered. It noted that that according to the CWRM D&O, IIIFS petitions were only pursued for five streams in Huelo.

Another fairness related concern raised by the group is that residents and farmers in Huelo and Haʻikū have very limited rights to watershed streams. Except for those whose properties have deeds allowing stream water access via pipes, most cannot access stream water. They cannot use the water for agriculture or domestic uses. Participants noted that they are off the electricity grid, and they are very interested in using stream flow for hydroelectricity. It was reported that there have been drought times in which residents had to truck in water even though they live next to streams. It was also said that those who were fortunate to have wells on their property share their water with neighbors during these times.

The ~~Environmental and Sustainability~~ focus group meeting comprised of people interested in the environment and advocate sustainability principles took place on November 16, 2018 at the Maui Beach Hotel. Participants brought up discussions relevant to East Maui. At the time, it was reported that the public has very limited access to EMI Aqueduct System as EMI maintains locked gates. The EMI Aqueduct System upkeep is unknown and the participants suspect that much of the EMI Aqueduct System is in disrepair. They believe that the State should have its own maintenance access for community-based monitoring. Such community access should also allow for cultural practices.

A focus group was held with residents, farmers, and cultural practitioners on November 16, 2018 at Keʻanae School with residents from the Keʻanae, Wailuānui – Koʻolau Moku. The prevalent theme in this focus group meeting was the foundational impact of generational change and legacy. Participants shared an inherent personal angst that permeated ethnic identities and communal cultural practices.

This focus group repeatedly cited instances of multiple 'ohana generations that had to deal with the transition from full stream flow to EMI stream diversions. Participants stressed that wai (water) is life, the starting point for Hawaiian culture in all forms, including food, soft fiber,

medicine. The wai from streams contain food sources and fed kalo patches and agricultural activities. In the past, keiki (children) played in streams and intimately learned about nature and the ecosystem. Participants personally experienced these activities and it pained them that their ability to pass this legacy on to their children and grandchildren has been hindered by EMI stream diversions.

Kupuna participants noted that getting water back in the steams has been occurring over decades, starting with their own kupuna. Several people said, "We are weary of this fight." Further, this group was unique in having many young people; they acknowledged the sacrifices of their kupuna and are prepared to fight for their children, again stressing the multi-generational effect of water leases in East Maui.

Another perspective that was a common theme is the natural order of the environment. It was often noted that Hawaiian cultural practices are based on using the environment in its natural state. As one person said, "We are servants of nature." They described the ahupua'a land system and the 'auwai (ditch/canal) that fed their agricultural fields in a systematic way.

They stressed that the flow of streams into the ocean has also been an integral part of cultural resources. Stream fish, shrimp and mollusks need the interaction between streams and nearshore waters and this allows for healthy ecosystems and productive food gathering.

Without exception, participants in this focus group wanted to see streams restored and diversion structures entirely removed. While they felt that releasing the kalo streams as initially done by A&B in 2016 and as now required under the CWRM D&O is a step in the right direction, they believed that continued stream diversions in this area need to end.

Regardless of changes in stream diversion and restoration, participants believed that the EMI Aqueduct System infrastructure is not being maintained or managed. There were stories of the need for better maintenance, including downstream scouring in flooding conditions, dry streams with only intermittent release from gates, and washed out bridges.

One recollection is of a site visit with County officials of the EMI Aqueduct System. The road was so overgrown that vehicle almost drove into the ditch. When one person exited the vehicle, he stepped into the ditch and water reached his knees.

Another instance of ineffective stream management is related to mosquitos, which became more prevalent during times when stream flow was low due to diversions. The population of mosquito fish, which ate the mosquitos, eventually decreased as the ponds dried up. Additionally, the population of toads, which also controlled mosquitos, decreased with EMI's increased spraying of Roundup, a chemical weed killer.

Participants reported that EMI staffing has decreased to eight people and they were not hopeful that maintenance and management would improve in the near future.

April 2019 Interviews

"Balance" was a frequent theme among interviewees. They acknowledged that various groups need water originating from East Maui State watershed lands and felt that users should have

access to water they truly need. Of note is that, regardless of one's own interest in the Water Lease, no one wanted water withheld from other groups.

There was disagreement as to the source of water and how the water is allocated. Further, interviewees sometimes felt that A&B's efforts towards the Water Lease was self-serving and divisive. Nevertheless, people were hopeful that this contentious environment was coming to an end with Mahi Pono as the new owner. Those interviewed expressed willingness to explore options regarding water if community needs, such as local farming / ranching, food self-sufficiency, and so on, can be met.

As expressed in the November 2018 focus groups, many felt that, as a public trust, stream water from State watershed lands should not be diverted for private purposes.

It was pointed out that State watershed stream water used in the EMI Aqueduct System is one of four sources of water that can be used. Other sources reportedly include water from watershed lands owned by EMI, Central Maui water wells on lands now owned by Mahi Pono, and the West Maui Ditch System.

An issue often raised in the November 2018 focus group sessions was the reportedly poor condition of the EMI Aqueduct System. Interviewees also discussed this topic from the perspective of reducing water losses. They said that the reduction of water losses would reduce the amount of water required for agricultural operations.

These interviewees wanted to know how Mahi Pono will ensure that continued use of the EMI Aqueduct System will be monitored and operated for efficient use of water, which is valued as a public trust, an integral environmental resource, and essential for healthy ecosystems.

Interviewees pointed out that, even though the CWRM D&O restored several streams in East Maui, the social and cultural effects of historical and significant stream diversions have yet to be rectified. This belief was reiterated several times in the November 2018 focus groups and expressed by those interviewed.

While there has been interaction between Mahi Pono and East Maui residents, there still needs to be acknowledgement of past wrongs and a "path to healing" that will allow residents and the new landowner to have a constructive relationship.

Those interviewed understood that Mahi Pono is not responsible for whatever occurred during A&B's tenure. Mahi Pono inherited a legacy that developed for over one hundred years. Nevertheless, to move forward as an integral part of the Maui community, Mahi Pono needs to "make pono" with East Maui so that everyone can move forward. One person said, "There needs to be apology, repentance and reparation."

Impacts and Mitigation Measures

The social impact of diverting water from East Maui is generational, one that has affected livelihoods, family cohesion, the ability to integrate with environment for food gathering and recreation, resource stewardship, and personal connections or disconnections with values inherent in the lifestyles of East Maui residents.

East Maui residents, farmers and cultural practitioners have been advocating for the reduction of stream diversions and the return of full stream flows. Focus group participants and interviewees stressed that previous water leases have had significant impact on their culture, social well-being and generational ability to thrive in East Maui. From a social perspective, it is important to understand the community's practical need and use of the water as well as the intangible values and beliefs associated with the water. While it is understood that water is crucial to sustain the environment and its inhabitants, some expressed that water, or wai, is considered life itself. While complex water systems are developed to operate factories, irrigate farms, and produce electricity, laws are also passed to balance societal water needs to protect the quality of water. The Proposed Action challenges the Maui communities and decision makers to balance the practical needs with social values and beliefs.

While the CWRM D&O addresses or mitigates that impact to some degree, the proposed Water Lease would still affect streams in their area. However, during consultation related to the preparation of the SIA it was expressed by some participants and generally supported by fellow community members the there is a need for the water to be shared for other users that rely on it to meet their domestic and agricultural needs. Some also questioned the need for a 30-year water lease, and emphasized shorter lease terms. The Proposed Action is viewed as a continuation of taking East Maui water to support a private for-profit company. The Proposed Action is not seen by some participants as part of a solution, but rather as an extension of past wrongs. Participants vowed to continue to oppose the proposed Water Lease, and advocate the removal of all diversion structures from the kalo and community streams designated for full restoration. They also noted that East Maui streams have been flowing well since sugar cultivation ceased. They were very concerned that once active steam diversion resumes, stream flow in the majority of East Maui streams will be lessened and again restricted. Some who commented on the DEIS raised the issue that many communities in East Maui do not have access to MDWS water and assert that the stream water that flows from the License Area is their only source of water, including those streams that were not subject the CWRM D&O. Under the Proposed Action these communities may experience impact in their daily lives as the Mahi Pono farm plan develops towards full build-out. However, some share the belief that there is enough water available to meet each group's needs if water distribution is fair and equitable. For the East Maui community members, the challenge is that one entity is seeking to continue water diversions which have taken place for over 100 years. Many were skeptical about committing a large amount of water over the course of three decades for a conceptual farm plan. However, in the interviews with a cross section of community interests that took place after Mahi Pono's acquisition of the Central Maui agricultural fields, interviewees wanted to see Mahi Pono succeed. They felt that the company's success, if achieved as proposed, is good for the community.

For the East Maui community, there is still much uncertainty surrounding the Proposed Action. Such uncertainty affects the social environment because people have difficulty envisioning how certain public policies from County of Maui 2030 General Plan: Countywide Policy Plan and Maui Island Plan would be realized (discussed further in Section 3 of the SIA (Appendix G)) for the natural environment, including restoring wetlands and watersheds and stream flows; protecting cultural access to mountain,

ocean, and island resources for traditional Hawaiian cultural practices; diversifying and expanding sustainable agricultures to feed the local population and support local farmers; and ensuring a reliable and affordable supply of water. Though public policies and plans manifest community values and expectations and are developed based on community input, the actual realization of policies related to the Proposed Action may seem out of reach if uncertainties are not answered and conflicts are not addressed. This uncertainty lends itself to distrust in government agencies, their permit and approval processes, and elected officials. This distrust can lead to cynicism and apathy, both of which negatively impact the overall quality of life. To guide community expectations about what may happen and when, public agencies, legislative bodies, and the Water Lease applicant should outline and publicize a roadmap with highlights and milestones related to coordinated inter-agency and applicant actions.

For East Maui farmers, the proposed Water Lease would continue to divert water from streams not designated for full restoration, although some are mandated to have partial restoration to support the stream habitat. When active diversions ~~resumes~~ resume at greater levels, it is expected that an overall decrease in stream flow will occur in East Maui when compared to lower diversion ~~current~~ conditions, but there will be an overall increase in stream flow compared to when sugar was fully operational in Central Maui.

EMI has indicated that it is modifying or removing several diversion structures to complete restoration of diverted streams that have been designated for full flow. This has positive social value for East Maui because it represents progress in stream restoration. Stream restoration addresses physical mitigation and will support cultural and food gathering practices. EMI is also moving its focus to streams in Huelo as a part of its stream abandonment project, specifically Hanehoi Stream. There are other stream diversions in these areas that may require further, more complicated designs that may need more time.

In the April 2019 follow-up interviews, there was hope that Mahi Pono would address problems with physical infrastructure by improving stewardship of the EMI Aqueduct System. EMI has been increasing the size of its crew and continue to evaluate the needs for further employees to maintain both the EMI Aqueduct System and the associated access roads and trails. As noted in Section 2.1.2, EMI continually maintains the EMI Aqueduct System as well as its associated access roads and trails. It evaluates areas of the EMI Aqueduct System regularly to identify where maintenance / repair activities are necessary and adds them to a list of maintenance projects. Moreover, in response to comments received on the DEIS, EMI staff have been conducting sweeps to locate / remove debris from the License Area. It was stressed, however, that, while physical and environmental mitigation is crucial, there is still a fundamental need to rectify social, cultural and emotional impacts that have developed for over one hundred years. Although Mahi Pono did not cause these impacts, the company has inherited a legacy that is generational and needs to be addressed to help these East Maui communities move forward.

While community outreach efforts can be successful in working with some community members, expanding community outreach to the general community in a transparent and open process would help to increase the base of community influence. An

organized expansion of community outreach would help to increase community dialogue, manage overall community expectations for predictable outcomes, and continue to encourage community cohesion.

Two areas of mitigative measures are recommended for consideration, should the proposed Water Lease be granted by the BLNR. These measures are intended to establish an ongoing working relationship between the community, Mahi Pono and EMI, and related public agencies, as well as continue resolution with East Maui communities.

It is recommended that interest groups, or stakeholder groups, are clearly defined so that there is recognition of who will be affected by the proposed Water Lease. Groups should include geographic communities, environmental, agriculture and business interests, and public agencies. Each group would be encouraged to reach consensus on their own needs, concerns, opportunities and possible solutions.

A starting point for identifying stakeholder groups could be the interviewees and focus group participants that participated in Earthplan's SIA and their networks.

It is recommended that interest groups are equitably represented in a "Core Working Group" that would serve as a forum for exchanging ideas and collaborative efforts, as well as provide feedback and suggestions to Mahi Pono. Each member of the Core Working Group would be expected to reach out to their own networks to extend the discussion beyond the Core Working Group. While there would likely be strong differences in perspectives and opinions, the Core Working Group would need to find ways to establish core principles, common ground and manageable solutions.

The fundamental value that will help bring people to the same table is trust. The proposed Water Lease has elicited skepticism and distrust over many decades, and these feelings prevent willingness for participating in mediation and collaboration. While developing trust among the various groups will be challenging, the first step is transparency. Being open about intent, plans, and activities can begin to establish credibility and open the door to dialogue.

Specifically for the Ke'anae – Wailuānui community to move past historical impacts, there needs to be established a point of departure. Mitigation needs to go beyond the physical restoration of streams. It needs to address the social context and include apology and reconciliation. This needs to be done within a cultural foundation that binds the community together, and key players, including Mahi Pono, public agencies and elected officials. The manner and forum for this process should be defined by the cultural leaders integral with the process.

Upcountry Maui

November 2018 Focus Group Meetings

The focus group meeting with the Kula and Pukalani Community Associations was convened on November 12, 2018 at the Kula Community Center. A separate session was held with the Makawao Community Association on November 13, 2018 at the Makawao Elementary School.

A common theme with the Upcountry Maui residents was the continuation of reliable water service to Upcountry Maui residents, businesses and farmers. There was general appreciation for water provided by the EMI Aqueduct System. It is noted that these Upcountry Maui residents felt that East Maui agricultural and cultural practitioners should also have the water they need for their activities. They understood the need for flowing cold water in kalo cultivation.

While participants understood their relationship with the EMI Aqueduct System, they believed that not all Upcountry Maui communities are served equally by the EMI Aqueduct System. They said that the EMI Aqueduct System supports the two water treatment plants for Kula, including Olinda /Upper Kula and Piiholo WTP only in times of drought. They believe there needs to be clarification on the actual Upcountry Maui dependence on the EMI Aqueduct System.

Another theme, expressed primarily in the Kula / Pukalani focus group, was that water is a public trust, and should not be controlled by a single private corporation. They suggested a restructuring of public utilities to include a water utility that would be administered similar to the current electricity in the public utility structure. Further, profit made from use of this public trust should be invested in public need.

At the time (November 2018), with the conversion of A&B to a real estate investment trust, participants believed that water for agricultural uses is inconsistent with a company whose primary purpose is real estate.

However, one person was very concerned about making any change to the EMI Aqueduct System unless it was really needed. He said that the EMI Aqueduct System has worked well for over 100 years, and that any change should be carefully studied to make sure that the modifications are necessary and make sense.

During the focus group meeting with ranchers and farmers held on November 12, 2018 at the Kula Community Center, it was stressed that participants wanted to see a cap on potable water for Upcountry Maui needs, though they stressed that residents should get water they need. When that cap is reached, alternative sources such as wells should be used.

Overall, participants in each group supported local water users. East Maui supported Upcountry Maui use of water and vice-a-versa. Participants also stressed that the amount of water from the EMI Aqueduct system serving Upcountry Maui, which participants identified as 6 mgd, is a very small portion of the total water being diverted. They believe that Upcountry Maui water needs should be put in perspective of the overall water quantity that would be made available with a 30-year Water Lease.

Participants doubted that the MDWS could adapt to changes if the EMI Aqueduct System were to curtail or discontinue providing water and services as is currently occurring. They said that the MDWS is already experiencing difficulty in maintaining the Upcountry Maui Water System now, and that any challenge would likely not be met. Residents were concerned that if domestic water was limited in any way, then the MDWS would need to pump water from wells. This would be more costly than receiving water from the EMI Aqueduct System and the MDWS

would likely pass this cost to the water users. Likewise, well development would also cost money and water users would end up paying through water fees.

April 2019 Interviews
"Balance" was a frequent theme among interviewees. They acknowledged that various groups need water originating from East Maui State watershed lands, and felt that users should have access to water they truly need. Of note is that, regardless of one's own interest in the Water Lease, no one wanted water withheld from other groups.

Impacts and Mitigation Measures

The effect of the Proposed Action on Upcountry Maui domestic and agricultural water users will depend on how much water will be released from the EMI Aqueduct System for the MDWS use. If Upcountry Maui water needs exceed its water allocation, other sources of water will need to be developed. The cost of well development and pumping is expected to result in increased water fees for Upcountry Maui consumers.

Two areas of mitigative measures are recommended for consideration, should the proposed Water Lease be granted by the BLNR. These measures are intended to establish an ongoing working relationship between the community, Mahi Pono and EMI, and related public agencies, as well as continue resolution with East Maui communities.

It is recommended that interest groups, or stakeholder groups, are clearly defined so that there is recognition of who will be affected by the proposed Water Lease. Groups should include geographic communities, environmental, agriculture and business interests, and public agencies. Each group would be encouraged to reach consensus on their own needs, concerns, opportunities and possible solutions.

A starting point for identifying stakeholder groups could be the interviewees and focus group participants that participated in Earthplan's SIA and their networks.

It is recommended that interest groups are equitably represented in a "Core Working Group" that would serve as a forum for exchanging ideas and collaborative efforts, as well as provide feedback and suggestions to Mahi Pono. Each member of the Core Working Group would be expected to reach out to their own networks to extend the discussion beyond the Core Working Group. While there would likely be strong differences in perspectives and opinions, the Core Working Group would need to find ways to establish core principles, common ground and manageable solutions.

The fundamental value that will help bring people to the same table is trust. The Proposed Action has elicited skepticism and distrust over many decades, and these feelings prevent willingness for participating in mediation and collaboration. While developing trust among the various groups will be challenging, the first step is transparency. Being open about intent, plans, and activities can begin to establish credibility and open the door to dialogue.

Central Maui

November 2018 Focus Group Meetings

During the focus group meeting with ranchers and farmers on November 12, 2018, participants stressed that water from the Water Lease should be allocated to agriculture first, and that the priority should be for local farmers, ranchers and flower growers who are actively in production, as determined by tax status.

The participants tended to oppose monocrops that would not be produced by local farmers. They noted that coffee production for Starbucks was cited in the media as a possibility in the A&B farm plan; this was not consistent with local farming. Also, it was noted that pongamia orchards, an alternative being considered by A&B, would bring invasive species to the area and is poisonous for cattle. They believed that A&B's recent conversion of sugar lands to ranch lands was an effort to lower taxes because of lower production value. They reported that these lands continue to have sugarcane and are not used for ranching.

This group strongly advocated for quantification of water under the Water Lease. They felt that a water lease without indications of how the water would be specifically used would be irresponsible. They suspected that, while some of the water might be reserved for the 23,000 acres of IAL, there may be less restrictions on water use of the remaining ~~10,000 acres of the 33,000~~ acres in Central Maui. They speculated that these lands could eventually be used for non-agricultural uses.

During the environment and sustainability focus group meeting on November 16, 2018, participants were concerned with the type of agriculture that the water would support. They felt that a display produced by A&B that illustrated possible diversified agriculture was neither credible nor sincere. Participants noted that media coverage indicated that A&B has a potential agricultural partner. However, participants noted that there is no indication if this is real. Further, this group believes any agricultural activities supported by a State water lease should be local based and not threaten the social environment with chemicals, downwind spraying and incompatible or potentially harmful crops, such as pongamia.

Overall, participants, particularly ranchers and farmers, expressed interest in leasing land from A&B. Frustration was shared about previous efforts of local farmers in negotiating leases with the company. Reportedly there has been a policy of a minimum of a thousand acres, which most local ranchers and farmers could not afford. One person described a situation in which he was willing to lease a large tract, then sublease affordable portions to other farmers; this was not permitted.

Participants wanted to see Central Maui be a place for a wide diversity of successful agricultural activities operated by Maui farmers.

Participants suspected that eventually water from State lands will be used to urbanize at least a portion of A&B land holdings. While it may be difficult from a land use entitlement perspective to convert these lands for urban uses, conversion of the non-IAL ~~10,000~~ acres ~~that are not designated as IAL~~ may be a more feasible opportunity. Participants strongly felt that the Water Lease should spell out specific uses allowed and what happens if A&B vacillates from the agreement. If unforeseen urbanization did occur, participants were very concerned that the

area's infrastructure would be significantly impacted. They did not believe that such development would be curtailed by public agencies and public officials interested in increased tax revenues.

April 2019 Interviews

These interviews took place after Mahi Pono's acquisition of the Central Maui fields from A&B. Those interviewed stressed that they wanted to see agriculture as a major land use on Central Maui. Several mentioned that the greenery experienced is an integral part of what makes Maui special. They said the green landscape is visually pleasing when driving along the coast and on mauka – makai highways. Interviewees talked about how they look forward to seeing this landscape as they fly over the agricultural fields when flying in and out of Maui. With the loss of the sugar industry, they were concerned that agriculture might be replaced by less desirable alternatives, namely more urban development. They did not want to see undeveloped Central Maui lands populated by residential communities and business complexes.

Interviewees pointed out the agriculture needs to re-establish a major role in Maui's economy. Though interviewees had different ideas about the source of and how much water would be needed for future agriculture, there was consensus that Central Maui agricultural activities will need water to remain economically viable. Those interviewed saw the potential for supporting businesses that supply the agricultural industry, such as irrigation, fertilizer, equipment, and so on. Local food vendors and restaurants would also have access to locally grown food, the supply of which is currently limited. Further, the continuation and promotion of agriculture encourages young people and future generations to consider farming as a way of life

Interviewees were heartened that Mahi Pono has publicly, and in one-on-one meetings, stated that no GMOs would be used in its agricultural operations. However, those interviewed were unclear about the extent to which chemical pesticides, fertilizers and soil additives would be used in agricultural operations. They urged Mahi Pono to share this information with the community. Moreover, those interviewed felt the use of chemicals would further "kill the soil" and is contrary to regenerating the soil and organic farming practices. It was noted that chemicals used even in the short-term time frame may detract from Mahi Pono's qualification to qualify for organic farming status.

A key positive aspect noted by interviewees is the wide variety of crops being discussed in farm plans and crop plans presented by Mahi Pono. They liked that one crop would not dominate the agricultural landscape. They noted that previous A&B discussions of possible monocrops were problematic because these crops, such as coffee, would dominate Maui's agricultural environment, only to be largely exported.

Those interviewed hoped that future Central Maui agricultural activities would help Maui and Hawai'i become increasingly food self-sufficient. As an island state, Hawai'i is dependent on imported food and vulnerable to limitations on the quality of this food and transportation disruptions. They hoped that the potential large scale agricultural operations and production with the new ownership of Central Maui lands would provide food supply for Maui and Hawai'i that can lead to food self-sufficiency.

Interviewees encouraged agricultural production that would include the local market as a major target, thereby increasing the potential for food self-sufficiency. They wanted to see a variety

of crops catering to the local market, and suggested produce such as dryland taro, avocado, guava, sweet potato, macadamia nuts, and popular vegetables such as bok choy and eggplant. They also hoped that Maui restaurants, supermarkets and food vendors could acquire local foods that would be fresh, affordable and a constant supply. Those interviewed expected that some of the agricultural produce would be exported as a necessary financial strategy. Interviewees wanted to see a healthy balance between allocating a portion of agricultural products for Maui food self-sufficiency and exportation for profit.

While it was noted that large scale agriculture is necessary to create a critical mass, it was also stressed that this scale of agriculture should be balanced by supporting individual livestock ranchers, small farmers and local businesses. Interviewees liked the community agricultural component proposed by Mahi Pono. They felt that, while it would provide land for small farmers, the consolidation of support, such as processing, equipment and marketing, would help lower costs for local farmers. However, it is noted that none of the interviewees indicated that they were personally involved in crop farming activities that may be part of the community farming program, nor did they know anyone who had been approached with this opportunity.

Overall, those interviewed wanted Mahi Pono to succeed. This is based on what they had heard, learned and discussed with Mahi Pono thus far. The new ownership and related ramifications imply a future that had not been previously envisioned, a future that could possibly achieve acceptable community objectives, realize viable diversified agriculture in Central Maui, support food self-sufficiency, help local ranchers and farmers, and revive agriculture as a viable economic stimulus for Maui. Interviewees appreciated that many agricultural jobs would result when Mahi Pono's farm plan is implemented. They were concerned, however, that, with the current low unemployment rate, Mahi Pono may find it difficult to fill new employment positions. Other challenges to finding employees could be housing and high labor costs.

The current lack of affordable housing was rasised as ~~is~~ a problem. Interviewees said that the housing market intended for Maui's local working population is typically filled by retirees moving to Maui who can afford the average-priced homes. This results in keeping housing costs high and pricing out local buyers. Maui residents therefore have difficulty in finding affordable housing that will allow them to remain on Maui.

Another problem cited was high labor costs and unionization. These present economic challenges to many businesses operating in and starting up on Maui. One person felt that unionization and high labor costs may be economic deterrents in establishing BMP, the requirements of which exceeds minimal industry standards.

Interviewees wanted to see these challenges addressed so that there is an optimal labor supply to support Mahi Pono's farm plan.

Impacts and Mitigation Measures

The effect of the proposed Water Lease on Maui-based farmers, ranchers, and flower growers will depend on whether they can participate in future diversified agriculture in Central Maui. Thus far, there has been discussion regarding setting aside land for local farmers and eventually creating support facilities and services intended to provide means to reduce costs for individual farms. Little or no mention has been made

regarding including livestock farmers in Mahi Pono's farm plan. Although not disussed in the SIA, Mahi Pono's farm plan commits 800 acres to various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services, thus supporting local farmers. Mahi Pono also intends to lease approximately 1,250 acres to other agricultural organizations for energy and other crops.

Interviewees have shared information with Mahi Pono regarding the significant contribution of agriculture on climate change. It was noted that agriculture is responsible for a significant portion of GHG emissions, and is therefore a main contributor to climate change.

Participants explained that regenerative agriculture integrates farm management practices to systematically improve soil health. Healthy soil would improve crop yields and resistance to pests. It was pointed out that regenerative agriculture reduces water use through the selection of crops that adapt well to local climate. If done properly, this practice can decrease reliance on agricultural chemicals, including fertilizers and biocides. Regenerative agriculture also integrates livestock that are humanely raised into crop production. In response to comments on the DEIS, Mahi Pono has confirmed that any use of agricultural chemicals for diversified agriculture in Central Maui would be in strict compliance with federal regulations and that Mahi Pono will exercise due care to prevent the release of fuels, lubricants and other hazardous materials. For clarification, Mahi Pono intends to use a limited amount of fertilizers and pesticides in accordance with all laws and regulations and only on an as-needed basis. In addition, since January 2020, Mahi Pono has committed to foregoing the use of Round-Up and other glyphosate-based products within the Central Maui agricultural fields. Mahi Pono's use of fertilizers and pesticides will follow BMPs approved by the DOH, the U.S. NRCS, the U.S. EPA, the DOA and other governmental agencies in regards to the use of chemicals, and controlling dust and erosion and, thus, runoff. The DOA's Pesticide Branch also provides regulatory oversight over Mahi Pono's pesticide use. In accordance with this oversight, records of pesticide use must be kept and made available to the Pesticide Branch upon request at any time. In addition, Act 45 which was passed by the 2018 Hawaii Legislature and effective on January 1, 2019 required that all Certified Applicators of RUP submit a report of the RUP that were applied each year.

Interviewees stressed that Mahi Pono should implement a watershed management plan ~~Water Management Plan~~. The watershed management plan ~~Plan~~ should outline improvements to the EMI Aqueduct System, including brush fire prevention and relate water needs to specific crops. They also stressed that Mahi Pono actively facilitate internship programs and educational activities that will help young. As was noted in Chapter 5 of the DEIS, Mahi Pono intends to lease some of its property to other agricultural organizations and provide plots for research and offer an internship program for high school and college students. people learn about agriculture, food self-sufficiency, and resource stewardship.

Two areas of mitigative measures are recommended for consideration, should the proposed Water Lease be granted by the BLNR. These measures are intended to

establish an ongoing working relationship between the community, Mahi Pono and EMI, and related public agencies, as well as continue resolution with East Maui communities.

It is recommended that interest groups, or stakeholder groups, are clearly defined so that there is recognition of who will be affected by the proposed Water Lease ~~water lease~~. Groups should include geographic communities, environmental, agriculture and business interests, and public agencies. Each group would be encouraged to reach consensus on their own needs, concerns, opportunities and possible solutions.

A starting point for identifying stakeholder groups could be interviewees and focus group participants and their networks.

It is recommended that interest groups are equitably represented in a "Core Working Group" that would serve as a forum for exchanging ideas and collaborative efforts, as well as provide feedback and suggestions to Mahi Pono. Each member of the Core Working Group would be expected to reach out to their own networks to extend the discussion beyond the Core Working Group. While there would likely be strong differences in perspectives and opinions, the Core Working Group would need to find ways to establish core principles, common ground and manageable solutions.

The fundamental value that will help bring people to the same table is trust. The proposed Water Lease ~~action~~ has elicited skepticism and distrust based on perception formed over many decades, and these feelings prevent willingness for participating in mediation and collaboration. While developing trust among the various groups will be challenging, the first step is transparency. Being open about intent, plans and activities can begin to establish credibility and open the door to dialogue.

4.7.3 Economic and Fiscal

Munekiyo Hiraga, in support of this FEIS ~~DEIS~~, prepared an Economic and Fiscal Impact Study (~~June 2019~~Updated December 2020) assessing the economic and fiscal impacts of the Proposed Action (See Appendix H). This study assesses economic and fiscal impacts of the Proposed Action on the EMI Aqueduct System and operations, and the implied impacts on three geographic areas of Maui under both baseline conditions (outlined below) and future conditions. For an assessment of future conditions, the year 2030 was selected as the point for analysis of the impacts of the Proposed Action because it is assumed that timeframe would allow for the full implementation of the farm plan in Central Maui. The three geographic areas are: (1) East Maui, including Nāhiku, (2) Upcountry Maui; and (3) Central Maui.

For clarification, it should be noted that GET is a State tax that flows to the State General Fund. However, the State legislature authorized counties to adopt a surcharge on the GET up to 0.5 percent, and such funds will remain in the County where the GET is generated. As of this writing, the County of Maui has not adopted a GET surcharge. However, the City and County of Honolulu has adopted a surcharge of 0.5 percent that is effective from January 1, 2007 to December 31, 2030. Economic impacts that occur on Maui will generate indirect impacts elsewhere, including on the island of O'ahu. At full farm operations in Central Maui, the farms and the families of its employees will purchase various goods and services, thereby generating

indirect sales. Most of the indirect sales will be on Maui, but some will be on O'ahu since Honolulu is the primary supply center in the State. These indirect sales will be subject to State excise tax. Because the County of Maui has not adopted a GET surcharge, the County of Maui does not collect an excise-tax surcharge.

Historical Baseline Conditions

A&B cultivated sugarcane continuously in Central Maui for over a century. EMI, originally a subsidiary of A&B and now jointly owned and operated by A&B and Mahi Pono, has operated the EMI Aqueduct System since 1878 to provide irrigation to the Central Maui fields. Water service by EMI to the MDWS for Upcountry Maui began in the early 1960's. Although A&B ended sugarcane operations in December 2016, the long history of sugarcane cultivation provides relevant baseline conditions for the purposes of assessing economic and fiscal impacts associated with the Proposed Action.

a. Typical Sugarcane Cultivation: 2006

The year 2006 is representative of the 1987 to 2006 period of "typical" sugarcane operations. Rainfall in East Maui was regarded as normal, the restoration of stream flows was not large enough to significantly affect HC&S sugarcane operations, and the plantation was economically healthy. The 2006 analysis was applied to EMI operations and impacts on Central Maui, and not to assess the economic and fiscal impacts for East Maui, Nāhiku or Upcountry Maui, as the impacts for these areas in 2006 were not expected to be substantially different from the 2008 to 2013 period.

b. Recent Sugarcane Cultivation: 2008 to 2013

This period was used to represent the recent sugarcane cultivation period, while sugar operations were still active and some stream restoration had been implemented. The 2008 to 2013 time period was selected because those years are representative of the last 6 full years of sugarcane operations, stream restoration had occurred, and because the CWRM D&O incorporated water diversion and distribution data for these years.

c. Interim Diversified Agriculture Operations (2017)

Since the cessation of sugarcane operations in 2016, some of the former sugarcane fields have been transitioned into other types of agricultural uses. The current "existing condition", however, is actually an interim condition which is expected to change over time as additional fields are transitioned to diversified agriculture under the Proposed Action. Mahi Pono has planted crops in a portion of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. While the interim diversified agriculture operations are the current "existing conditions", as of November 2020, most of the fields remain unprepared for planting and thus, are not being utilized to their full potential ~~much of the former sugar fields are currently fallow~~, thus the sugarcane cultivation analyses described above provide more appropriate benchmarks to which the Proposed Action may be compared for the purposes of economic and fiscal impacts.

Future Condition/Proposed Action

The economic and fiscal impacts of the Proposed Action include a discussion of operational costs, revenue, employment and earnings related to the EMI Aqueduct System; agricultural operations in Upcountry Maui, Central Maui, and East Maui (i.e., taro cultivation); and the impact on public/domestic water supplies (and related issues) in Nāhiku and Upcountry Maui. ~~analysis~~ Those impacts are described below, sorted by the impacts on EMI Operations and the respective impacts to East Maui, and secondarily to Upcountry Maui~~,~~ and Central Maui.

4.7.3.1. EMI Operations - Economic and Fiscal Impacts: Baselines and Proposed Action

a. Typical Sugarcane Cultivation: 2006

In 2006, EMI diverted an estimated 156.54 mgd of surface water. Average daily use by the MDWS was 3.23 mgd (Plasch Econ Pacific, LLC, Updated 2020 ~~2019~~).

Typical Sugarcane Cultivation: 2006 - Economic and Fiscal Impacts

In 2006, EMI's operational costs were $2.0 million, or $0.035 per 1,000 gallons (kgal). Operational costs include EMI labor, fringe benefits, materials, professional services, taxes, revocable permit rent to the State, and other expenses. It is noted that this represents the cost to transport the water to Māliko ~~Maliko~~ Gulch. There were additional costs for water transportation and storage from Māliko ~~Maliko~~ Gulch to the MDWS and the Central Maui agricultural fields. However, these additional costs were covered by HC&S. As such, the $0.035 per kgal cost does not reflect the full cost to provide water to the MDWS and Central Maui (Munekiyo, Updated 2020).

Direct spending by EMI, excluding the revocable permit payment to the State from the operational costs, was $1.8 million. The purchase of goods and services by EMI and the families of employees generated indirect sales and in turn, these suppliers generated more indirect sales by their purchases of goods and services. The indirect sales are estimated at $2.2 million. Total direct spending and indirect sales was $4.0 million, of which $3.2 million was on Maui and $0.8 million on O'ahu.

EMI employed 16 people in 2006 with a payroll of $0.8 million. As with indirect sales, EMI operations generated indirect jobs, including those at companies providing supplies and equipment, professional services, and those involved with supplying goods and services to families of employees. EMI operations generated about 7 indirect jobs with an associated payroll of $0.3 million. The total direct and indirect employment was 23, of which about 20 were on Maui. The direct and indirect jobs associated with EMI operations supported an estimated 51 people.

EMI revenues primarily consist of the revenue from water delivered to the MDWS. Per the 1973 Memorandum of Understanding, $0.06 per kgal has been the rate at which EMI charges the County of Maui for accessing raw, untreated water. This includes water for the Nāhiku community as well as the water drawn from the Wailoa Ditch at the Kamole-Weir WTP and both of the Ha'ikū Uka systems. EMI also received some land lease revenue, however the amount of lease income was nominal.

With respect to fiscal impacts, the MDWS paid EMI $0.06 per thousand gallons of water delivered for the Upcountry Water System. Based on delivery of 3.23 mgd, the MDWS payment to EMI in 2006 was $70,700.

Associated taxes accrued to the State of Hawai'i General Fund would include General Excise Tax (GET) on direct spending and indirect sales, and payroll taxes paid by employees. GET would be approximately $42,000, while payroll tax paid by employees is estimated at $47,400. The total tax revenue accrued to the State in 2006 was approximately $89,400.

EMI paid $158,284 in 2006 to the State Special Land Development Fund for the revocable permits for the water, which is equivalent to approximately $210,800 in 2018 dollars. The OHA receives 20% of the revocable permit revenue, while the DHHL receives 30%. This translates to approximately $42,200 for OHA and $63,200 for DHHL.

b. Recent Sugarcane Cultivation: 2008 to 2013

Between 2008 and 2013, EMI diverted an average of 113.71 mgd to HC&S (CWRM D&O, FOF 685). Average daily use by the MDWS was 7.1 mgd (CWRM D&O, FOF 551). The remainder was utilized by HC&S to support A&B's agricultural operations or represents system losses and including other water uses, such as water used for reservoirs, fire protection, dust control, and hydroelectric uses or use by industrial and farming lessees. (CWRM D&O FOF 686).

Recent Sugarcane Cultivation: 2008 to 2013 - Economic and Fiscal Impacts

Average operational costs for EMI between 2008 and 2013 was $2.0 ~~1.6~~ million, or $0.048 ~~0.039~~ per thousand gallons (kgal). As previously noted, this represents the cost to transport the water to Māliko ~~Maliko~~ Gulch; it does not reflect the full cost to provide water to the MDWS and Central Maui.

Direct spending by EMI, excluding the revocable permit payment to the State from the operational costs, was $1.8 ~~1.4~~ million. Total direct spending and indirect sales was $4.0 ~~3.2~~ million, of which $3.2 million was on Maui.

Fiscal impacts are determined based on an average usage of 7.1 mgd for which the MDWS payments to EMI totaled approximately $155,500 per year. GET would average approximately $41,000~~37,000~~ per year while payroll tax paid by employees is estimated at $45,400 annually. The total tax revenue accrued to the State was approximately $86,400~~82,400~~ per year.

EMI paid $187,900 to the State Special Land Development Fund for the revocable permits for the water, including approximately $37,600 for the OHA and $56,400 for the DHHL.

c. Interim Diversified Agriculture Operations (2017)

In 2017, an estimated 28.36 ~~23.99~~ mgd of surface water was diverted from the Collection Area. The MDWS used 2.86 mgd~~, which is significantly lower than the historical average cited by CWRM of 7.1 mgd~~.

Interim Diversified Agriculture Operations (2017) - Economic and Fiscal Impacts

In 2017, EMI operational costs were $1.7 million. Direct spending by EMI, excluding the revocable permit payment to the State, was $1.5 million. Total direct spending and indirect sales was $3.4 ~~342~~ million, of which $2.7 million was on Maui. EMI employed 13 people in 2017, with a payroll of $0.5 million. Total direct and indirect jobs was 19, with an associated payroll of $0.8 million.

In terms of fiscal impacts, based on the MDWS' water use of 2.86 mgd, the MDWS paid $62,600 to EMI for the delivery of surface water. Total State GET and payroll tax revenues would be $65,700. EMI paid $162,200 to the State Special Land Development Fund for the revocable permits for the water with the same proportional disbursements to the OHA and the DHHL.

d. Proposed Action - Issuance of Water Lease

Due to the nature of the EMI Aqueduct System, the operational costs are largely fixed, with minimal variable costs. Future operational costs for the EMI Aqueduct System are anticipated to be similar to the average cost experienced during the recent sugar operations period (2008-2013) (1.4 million annually), with the only variation being the amount of the Water Lease payments owed to the State. Therefore, while the costs remain constant, the per unit cost for delivery of water increases as the amount of water diverted decreases. The maximum amount of water allowed in compliance with the CWRM D&O translates to an estimated 87.95 mgd from the Collection Area plus an estimated 4.37 mgd that could be diverted from the area between Honopou Stream and Māliko Gulch ~~Maliko Streams~~, which is outside of the License Area, for an estimated total diversion of 92.32 mgd.

Proposed Action - Economic and Fiscal Impacts

Total operational costs for EMI labor, fringe benefits, materials, professional services, taxes, Water Lease, and other expenses are projected to be $2.2~~2.3~~ million per year. This would translate to ~~$0.068~~ $0.066 per kgal. A currently unknown factor in EMI's operating cost is the annual Water Lease payment to DLNR. For the purposes of the economic impacts analysis, the Water Lease payment has been calculated based on the equivalent per unit cost under the existing ~~2019~~ 2021 revocable permit. The revocable permit rent ~~payment set in November 2018~~ established by the BLNR in November 2020 for calendar year ~~2019~~ 2021 was ~~$230,964.24~~ $238,362, which represents an increase from the rent that was historically ~~previously~~ paid. Assuming ~~16.8~~ 32.3 mgd ~~MGD~~ is diverted under the ~~2019~~ 2021 revocable permit, the Water Lease rent rate would translate to ~~$0.038~~ $0.019 per thousand gallons. This rate of ~~$0.038~~ $0.019 is assumed as the basis for the future annual Water Lease ~~lease~~ payment to the DLNR. However, the actual Water Lease rental amount will be based on an appraisal conducted prior to issuance of the Water Lease which is within the purview of the BLNR as required under HRS Chapter 171. Should the Water Lease amount be higher or lower, the operational costs of the EMI Aqueduct System would be adjusted accordingly, as they would be for any other costs associated with complying with the other terms of the Water Lease.

Direct spending by EMI, excluding the long-term Water Lease payments to the State from the operational costs, is forecasted to be ~~$1.4~~ $1.8 million. Total direct spending and indirect sales is estimated at ~~$3.2~~ $4.0 million, of which ~~$2.6~~ $3.2 million would be on Maui.

EMI is expected to employ a staff of 17 people with a payroll of $0.8 million. Total direct and indirect jobs is projected as ~~was~~ 24, with an associated payroll of $1.1 million. The direct and indirect jobs associated with EMI operations would support an estimated 54 residents.

Fiscal impacts under the Proposed Action assume that the rate the MDWS pays to EMI will increase because EMI's per unit operating cost will increase as the fixed costs will be spread out over a lower volume of water diverted and possible higher Water Lease payments to the State compared to historic payments. It is estimated that EMI's operating cost under the Proposed Action would be ~~$0.068~~ $0.066 per kgal, which is higher than the current MDWS payment to EMI of $0.06 per kgal. The actual rate the MDWS will pay to EMI in 2030 will be subject to a future agreement between the parties. However, for the purposes of the fiscal impacts analysis, the 2030 water service fee rate is estimated to be ~~$0.10~~ $0.08, which has been calculated based on the ratio of operational cost to the MDWS service fee for 2008 to 2013. Under this assumption, EMI would receive an estimated ~~$268,000~~ $214,600 in 2030 from the MDWS.

The amount paid to the State Special Land Development Fund for the Water Lease would be based on an appraisal conducted prior to issuance of the Water Lease which is within the purview of the BLNR as required under HRS Chapter 171. Assuming the amount of the Water Lease is based on the equivalent per unit cost under the existing revocable permits, the annual payment to the Special Land Development Fund would be ~~$846,700~~ $427,000. Of this, ~~$169,300~~ $85,400 would be disbursed to OHA and ~~$254,000~~ $128,100 would be set aside for the DHHL. GET revenue would be estimated at ~~$37,000~~ $41,000 while payroll tax would be $45,400 per year.

4.7.3.2. East Maui - Economic and Fiscal Impacts: Baselines and Proposed Action

Impacts related to East Maui include both the agricultural users in East Maui, such as taro farmers, as well as residents in Nāhiku who rely on water delivered by MDWS through ~~the~~ EMI's West Makapipi Tunnel 2 (Well No. 4806-07) (also known as the Nāhiku Tunnel), a development tunnel located on EMI land directly adjacent to the Koolau Ditch ~~EMI Aqueduct System~~.

Due to the heavy rainfall on the windward slopes of Haleakalā and the many streams in the area, many of the makai communities in East Maui are well suited for growing taro and truck crops. Also, a number of farmers in East Maui have appurtenant and riparian rights to use water from these streams. Collectively, there are about ~~45~~ 55 acres in East Maui that are suitable for growing taro, and about ~~35~~ 45 acres for truck crops (Plasch, Updated 2020 ~~Econ Pacific, LLC, 2019~~).

Nāhiku is a small rural community in ~~east~~ East Maui located makai of ~~Hana~~ Hāna Highway in the vicinity of mile marker 25. The Nāhiku community is characterized by rural residential uses.

There is no significant commercial development in Nāhiku. MDWS receives water directly from the EMI's West Makapipi Tunnel 2 (Well No. 4806-07) (also known as the Nāhiku Tunnel), a development tunnel located on EMI land directly adjacent to the Koolau Ditch,~~Aqueduct System~~ for the Nāhiku community.~~, with the source of that water being a development tunnel located east of Makapipi Stream, that feeds into the Koʻolau Ditch and is accessed by MDWS in the Koʻolau Ditch near Makapipi Stream.~~

a. Baseline Condition

A number of East Maui farmers divert stream water to irrigate taro loʻi and small farms. Taro farming is difficult and labor-intensive, and the net returns are modest. Nevertheless, many farmers are attracted to the lifestyle and to growing this culturally significant crop. Farmers in East Maui have reported that past surface-water diversions to supply water to Central Maui left insufficient water in the streams for them to take full advantage of the agricultural potential in East Maui. The CWRM D&O returns free flowing water, with no upstream diversions, to all streams that have historically supported significant taro cultivation. As a result, ample stream water should now be available to irrigate taro loʻi and the small farms relying on East Maui streams as further analyzed in Section 4.7.4.

In Nāhiku, there are 43 water meters, all located along Nāhiku Road (County of Maui, Department of Water Supply, 2019). In 2013, there were 43 connections to MDWS' Nāhiku system, serving a population of 107 people. The average daily flow to the Nāhiku community was 41,000 gpd in 2013 (County of Maui, Department of Water Supply, 2019).

> **Baseline Condition: Economic and Fiscal Impacts:**
> Given the small population of Nāhiku and the lack of commercial land uses, the economic and related fiscal impacts for the Nāhiku community are considered negligible. Insufficient data is available to describe the economic and fiscal baseline conditions for East Maui.

b. Proposed Action - Issuance of Water Lease

Under the Proposed Action, the amount of water that can be diverted must be in compliance with the CWRM D&O, which required a return of flow to the taro streams in East Maui. The Proposed Action also contemplates a continuation of water delivery to MDWS and therefore the continuation of service to the Nāhiku community.

> **Proposed Action - Economic and Fiscal Impacts**
> The taro farms and other farms in East Maui that depend on stream flows would produce at full development about 1.2 ~~1.0~~ million pounds per year of taro, and about ~~400,000~~ 500,000 pounds per year of other crops. The resulting direct sales would be about $1.7~~1.4~~ million per year. Indirect sales generated by the purchase of goods and services would be about $1.9 ~~1.5~~ million per year. Thus, total direct and indirect sales would be about $3.6 ~~2.9~~ million per year (with rounding), of which about $2.9 ~~2.3~~ million would be on Maui and $700,000 ~~500,000~~ on Oʻahu. Profits from farm operations and indirect sales would be about $400,000 ~~300,000~~ (Munekiyo, Updated 2020).
>
> Full development of the taro farms and other farms in East Maui that depend on stream flows would result in about ~~14~~ 18 jobs and generate about ~~7~~ 8 indirect jobs, for a total

of about ~~21~~ 26 jobs. The payroll is expected to reach about $600,000 ~~500,000~~ for the direct jobs and $1.0 million ~~800,000~~ for all direct and indirect jobs. The direct and indirect jobs provided will support an estimated 58 ~~47~~ residents, most of which would be on Maui (Munekiyo, Updated 2020).

Given the small population of Nāhiku and the lack of commercial land uses, the economic impacts to Nāhiku under the Proposed Action, where water continues to be provided to the community, are considered negligible.

In terms of fiscal impacts, the taro farms and other farms in East Maui that depend on stream flows would generate approximately $83,000 ~~67,000~~ per year in State taxes at full development. For the County of Maui, property taxes will total about $200 ~~100~~ per year. The City and County of Honolulu will derive about $400 ~~300~~ per year from the excise tax surcharge. Given the small population of Nāhiku and the lack of commercial land uses, the fiscal impacts to Nāhiku under the Proposed Action, where water continues to be provided to the community, are considered negligible (Plasch, Updated 2020).

4.7.3.3 Upcountry Maui - Economic and Fiscal Impacts: Baselines and Proposed Action

As discussed in Section 2.1.3.1, ~~The~~ the MDWS Upcountry Water System relies on three surface water sources for potable water, one of which is delivered by the EMI Aqueduct System through the Wailoa Ditch to the Kamole-Weir ~~Water Treatment Plant (~~WTP~~)~~, and the other two through the MDWS higher elevation aqueducts (the Upper and Lower Waikamoi flumes) maintained by EMI through a contractual agreement. All three sources are addressed through a contractual agreement between the County and EMI ~~A&B~~, and under that agreement continued delivery to MDWS is contingent upon the issuance of the Water Lease.

Approximately 80% to 90% of water delivered within the MDWS Upcountry Maui Water System is supplied by surface water and the remainder is by groundwater (wells) (CWRM D&O, FOF 808 ~~799~~). As noted above, one of the water sources that the MDWS Upcountry Maui Water System Service Area ~~District~~ relies on for potable water is delivered by the EMI Aqueduct System through the Wailoa Ditch. The surface water delivered by Wailoa Ditch is treated at the Kamole-Weir WTP, which has the largest production capacity of the three WTPs within the MDWS Upcountry District.

In 1993, the MDWS determined that the Upcountry Maui Water System had insufficient supply for fire protection, domestic, and irrigation purposes to take on new or additional services without detriment to existing customers. A water meter priority list for landowners who had applied for water service in the area was established in 1994. As of January 3, 2019, there were 1,650 applicants on the water meter list (MDWS, 2019). However, according to the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020), approximately 1,800 requests for water connections are pending.

a. Recent Sugarcane Cultivation: 2008 to 2013

Between 2008 and 2013, the Upcountry Maui Water System used an average of 7.9 mgd. Approximately 60% of the MDWS' water use in the Upcountry Maui Water System is for residential, commercial, or institutional use and 40% is for agricultural users. Of this, an

average of 7.1 mgd was delivered directly by the EMI Aqueduct System (CWRM D&O, FOF 551 ~~at pp. 143, 213~~).

Recent Sugarcane Cultivation: 2008 to 2013 - Economic and Fiscal Impacts

In 2010, there were approximately 35,300 people within the Upcountry Maui Water System Service Area ~~service area~~ (CWRM D&O, FOF 797). Based on a median household income of $77,400, households in the Upcountry Maui Water System area had a collective income of $1.0 million.

It is estimated that there were approximately 830 businesses in Upcountry Maui in 2010, employing 5,100 individuals. Total payroll is estimated at $232.1 million and direct sales revenue associated with these businesses is estimated to be $836.4 million.

Fiscal impacts include revenues and expenditures related to the MDWS activities going into to the County's Water Supply Fund. Based on the average amount of water delivered by the EMI Aqueduct System between 2008 and 2013, it is estimated that the MDWS paid $155,500 to EMI.

The County of Maui assesses water service fees based on 18 different use classifications (i.e., single-family, multi-family, industrial, etc.). The same water rates are charged across the nine (9) water systems in Maui County. The average water service fee rate Countywide is $4.00 per kgal. Based on this rate and water usage between 2008 and 2013, water service fees averaged $11.5 million annually from Upcountry Maui.

b. Interim Diversified Agriculture Operations (2017)

According to the MDWS Annual Report, the Upcountry Maui Water System used 7.9 mgd in 2017, of which 2.86 mgd was provided by EMI. ~~MDWS's use of surface water from the EMI Aqueduct System was low in 2017 because heavy rainfall increased supplies from other County sources that depend upon rainfall (PlaschEcon Pacific, LLC, 2019).~~

Approximately 40% of the water delivered through the Upcountry Maui Water System is for agricultural uses, including supplying non-potable water to KAP, which consists of 31 farm lots ranging from 10 to 30 ~~7 to 29~~ acres owned by the County of Maui. The source of water for KAP and the planned 262-acre expansion of KAP, is Reservoir 40, which is sourced by the EMI Aqueduct System. The economic and fiscal impacts related to this supply to KAP are assessed in Section 4.7.4 regarding Agricultural Economy and therefore are not repeated here.

Interim Diversified Agriculture Operations (2017) - Economic and Fiscal Impacts

In 2017, there were estimated 37,100 residents and 14,200 households within the Upcountry Maui Water System service area. Based on a median household income of $77,400, households in Upcountry Maui had a collective income of $1.1 billion and consumption expenditures of $603.5 million. Residential property values within the Upcountry Maui Water System service area was approximately $2.3 billion in 2017.

There were approximately 880 businesses in Upcountry Maui in 2017, employing 5,400 individuals. Total payroll is estimated at $245.7 million. Direct sales associated with these businesses were approximately $885.6 million. Commercial property values within the Upcountry Maui Water System Service Area were approximately $145.8 million in 2017.

In total, direct sales from residents' consumption expenditures and Upcountry Maui businesses are estimated at $1.3 billion and residential and commercial property value is approximately $2.5 billion. In addition to residents and businesses serviced by the MDWS in Upcountry Maui, there are also numerous public uses that benefit from water from the EMI Aqueduct System and the MDWS. These public uses include but are not limited to, public and private schools, fire stations, community centers, and parks. The MDWS system also services agricultural users including the KAP.

Fiscal impacts during this period, based on an assumed delivery of 2.86 mgd from the EMI Aqueduct System in 2017, mean the MDWS would have paid $62,600. Based on the average water service fee rate Countywide of $4.00 per kgal and the assumed water usage in 2017, water service fees of $11.6 million were collected from Upcountry Maui and deposited into the Water Supply fund.

c. Proposed Action - Issuance of Water Lease

For the purposes of analyzing the impacts of the Proposed Action, it is assumed that the Upcountry Maui Water System will have access to 7.1 mgd supplied by the EMI Aqueduct System. However, that amount is not sufficient to address expected growth in Upcountry Maui, which is projected to require as much as an additional 7.95 mgd to meet future demands through 2030.

The MDWS projects that by 2030, the population of the area served by the Upcountry Maui Water System will grow to 43,675 residents, with a predicted additional water need of 1.65 mgd (CWRM D&O, FOF 797 ~~at 214~~). In addition to water demand resulting from population growth, additional water is needed to meet the demands of the applicants on the water meter waiting list. MDWS anticipates that it will need to develop between 4.2 mgd and 7.95 mgd in addition to the approximately 7.1 mgd currently provided through the EMI Aqueduct System, to meet demands through 2030 (CWRM D&O, FOF 816 ~~at 214~~). For the purposes of the economic and fiscal impacts analysis, it is assumed that the full 7.95 mgd will be needed to meet future demands through 2030.

The MDWS has evaluated a variety of strategies to meet the long-term future demands in the Upcountry Maui Water System and/or respond to reductions in the surface water supply. The strategies that have been determined to be most cost effective consist of combinations of additional basal well capacity and/or construction of raw water storage reservoirs. New basal well development would involve construction of new wells at the 1,300 foot elevation and/or wells at the 1,800 foot elevation, along with transmission pipelines, storage tanks, and booster pump stations. The costs of any new well development would also be passed on to the Upcountry Maui consumers. A possible limitation on the development of new wells is the Consent Decree that MDWS entered into in 2003 that requires that the MDWS conduct rigorous cost/benefit analyses of other water source options before developing groundwater in

the East Maui region. According to an assessment by Brown and Caldwell, development of additional basal wells may be a "viable strategy to meet future needs from a technical perspective; however, there are legal issues that must be resolved before the MDWS can proceed" (Brown and Caldwell, 2014). In addition, the hydrogeological viability of the wells would need to be assessed.

Constructing additional raw water storage reservoirs to store water from wet periods for use during dry periods presents another strategy to meet future water demand. The MDWS evaluated reservoirs ranging in size from 100 million gallons (mgal) to 300 mgal to serve the Olinda, Piiholo, and/or Kamole Weir WTPs. The analysis determined that the most cost-effective reservoirs would be reservoirs designed to feed the Piiholo WTP or the Kamole-Weir WTP (Brown and Caldwell, 2014).

New reservoirs have high capital costs but lower operational and maintenance costs compared to groundwater wells. There must be sufficient source water available to fill the reservoir. In comparison, new wells carry relatively lower capital costs but require transmission and storage improvements and have higher operational costs due to the cost of pumping groundwater. It is also noted that there is risk associated with drilling new wells because of the uncertainty of the quantity and quality of water that would be found. The assessment prepared by Brown and Caldwell opined that it would be easier to develop new basal wells than to construct new storage reservoirs due to the need for capital financing mechanisms to construct expensive reservoirs, and potential environmental issues associated with constructing a new reservoir in the Lower Kula area (Brown and Caldwell, 2014).

Proposed Action - Economic and Fiscal Impacts

Under the Proposed Action it is assumed that MDWS will continue to have access of up to 7.1 mgd through the EMI Aqueduct System. The County of Maui projects that the population in the Upcountry Maui Service Area will grow to approximately 43,700 in 2030, translating to an estimated 16,700 households. Assuming a median household income of $77,400, households in the Upcountry Maui Service Area are anticipated to have a collective income of $1.3 billion and consumption expenditures of $710.0 million. Residential property values within Upcountry Maui are estimated to grow to $2.7 billion.

Assuming proportional growth in line with population, there will be an estimated 1,100 businesses in Upcountry Maui in 2030, employing 6,700 individuals. Total payroll would be estimated at $304.9 million, while direct sales associated with these businesses would be $1.1 billion. Commercial property values within Upcountry Maui are estimated to grow to $180.9 million.

In total, direct sales from residents' consumption expenditures and Upcountry Maui businesses are estimated at $1.6 billion and residential and commercial property value is approximately $2.9 billion.

Fiscal impacts to Upcountry Maui arise from the assumption that the MDWS will need to develop 7.95 mgd of new water sources to meet future demands through 2030 (even with the continued supply of 7.1 mgd from the EMI Aqueduct System under the Proposed Action). The Brown and Caldwell analysis indicates that incremental basal

wells would be a strategy to meet future demands assuming no reduction in surface water flows. Under the Brown and Caldwell analysis, the life-cycle unit cost of developing and operating wells is $34 per kgal.[17] It is noted that the life-cycle unit cost to develop new water for Upcountry Maui customers is high. In comparison, a similar analysis conducted for the Central Maui Water System showed a unit cost of less than $10 per kgal, or less than one third the cost of Upcountry Maui water development (Brown and Caldwell, 2014). The total life-cycle cost for 7.95 mgd of new wells is $1.2 billion. The life-cycle cost is expressed as the net present value of all the costs incurred over 25 years, including capital, operating, and maintenance costs.

As previously mentioned, the rate that the MDWS pays to EMI will increase by 2030 because it is assumed that EMI's per unit operating cost will increase under the Water Lease. The actual rate the MDWS will pay to EMI will be subject to a future agreement between the two entities. However, for the purposes of this analysis, the 2030 water service fee rate is estimated to be $0.08 ~~0.10~~, which has been calculated based on the ratio of operational cost to the MDWS service fee for 2008 to 2013. Under this assumption, the MDWS would pay an estimated $214,600 ~~268,900~~ per year to EMI.

Water service rates vary by class of users (i.e., residential, commercial, agricultural, etc.). The average the MDWS water service rate Countywide is $4 per kgal. Inasmuch as the same water rates are charged across the nine water systems in Maui County, there are many factors that determine the water service rate. Therefore, it is difficult to predict what the water service rate would be in 2030. However, it is noted that the life-cycle unit cost to develop new water for Upcountry customers of $34 per kgal far exceeds the current average water service rate of $4 per kgal. It is assumed that the MDWS would seek a variety of funding sources to cover the cost to develop new wells. This may include County capital improvement program funds as well as State and/or Federal funds.

Nevertheless, due to the significant cost of new water source development, it would be reasonable to expect that water service rates would increase in the future to offset the costs of new water sources. As noted above, the County's water rate structure is uniform for all customers; water rates are not dependent on the service area a customer is located in (Brown and Caldwell, 2014). Therefore, under the MDWS' current rate structure, the increases would apply Countywide because rates do not vary by service area.

4.7.3.4. Central Maui - Economic and Fiscal Impacts: Baseline and Proposed Action

A&B continuously cultivated sugarcane on the fields of Central Maui for over a century. These Central Maui fields were irrigated by water from the EMI Aqueduct System and brackish groundwater. The impact analysis is based on approximately 30,000 acres of Central Maui fields that were historically serviced by the EMI Aqueduct System and supplemental brackish groundwater. Excluded from the analysis were fields west of Maui Veterans Highway that were irrigated with surface water from the Wailuku Water Co. and supplemental brackish water.

[17] Cost as reported in 2014 Brown and Caldwell analysis has been inflation-adjusted to be reflected in 2018 dollars.

a. Typical Sugarcane Cultivation: 2006

For the 2006 crop, 145,200 tons of raw sugar were produced from the Central Maui fields, of which approximately 84% (29,430 acres) was served by water sourced through the EMI Aqueduct System.

Typical Sugarcane Cultivation: 2006 - Economic and Fiscal Impacts

Sales of sugar and energy sourced from Central Maui generated approximately $101 million in direct sales. The purchase of goods and services by HC&S and families of those employees generated indirect sales estimated at $91 million. Total direct and indirect sales were $191 million, of which $160 million was on Maui. Profits from sugar operations and indirect economic sales were estimated at $19 million.

HC&S employed some 630 workers, and total indirect jobs during this time is estimated at 710, for a total direct and indirect employment of 1,300 jobs of which 1,100 jobs were on Maui. Payroll was approximately $48.5 million for direct jobs and $82.7 million for all jobs (direct and indirect). These jobs supported an estimated 3,300 residents.

In terms of fiscal impacts, sugar generated an estimated $5.9 million in State tax revenues and rental payments to the State. The revenues were low because the sale of exported sugar was exempt from excise taxes. Property taxes to the County of Maui were about $50,000 per year.

b. Recent Sugarcane Cultivation: 2008 to 2013

During this period, approximately 36,180 acres of land was farmed for sugar, of which approximately 84% (30,320 acres) were served by water sourced through the EMI Aqueduct System.

Recent Sugarcane Cultivation: 2008 to 2013 - Economic and Fiscal Impacts

The amount of sugar produced in this period was less than the prior period (136,300 tons/year versus 145,200 tons/year). Sales of sugar and energy generate annual revenue of approximately $116 million in direct sales. Total direct and indirect sales average ~~averted~~ nearly $220 million per year. Profits from sugar operations and indirect sales were estimated at $22 million.

HC&S employment was slightly lower than in the prior period (620 workers compared to 630 workers). Total direct and indirect employment is estimated at 700 workers. Payroll for direct workers is estimated at $34.3 million, or an average of $55,295 per job, and total payroll (direct wages and indirect benefits) was $68 million~~)~~. In response to comments on the DEIS, it is noted that the portion of payroll that is considered indirect includes fringe benefits such as medical and dental plan premiums, long-term disability and group life insurance premiums, contributions made to retirement plans, vacation payments, post-retirement expenses, and payroll taxes; i.e., things paid for by the company for the benefit of the employee. It should also be noted that only 15-20% of the employees on payroll were salaried staff including agronomists, chemists, engineers, and accountants. Most of the other employees were hourly workers, and worked significant overtime at 1.5 and 2 times the published pay rates.

Fiscal impacts include State tax revenue during this period, which averaged $5.1 million. Property taxes paid to the County of Maui were about $70,000 per year. The City and County of Honolulu received some $40,000 per year from the excise tax surcharge.

c. Interim Diversified Agriculture Operations (2017)

During this period very little of the Central Maui agricultural fields ~~lands~~ were in cultivation. Approximately 200 acres were used to grow pongamia and 500 acres used for unirrigated pasture.

Interim Diversified Agriculture Operations (2017) - Economic and Fiscal Impacts
Economic impacts during this period are negligible. The limited use of the Central Maui fields generated an estimated 10 direct and indirect jobs with a total payroll of $0.5 million.

Fiscal impacts during this period were $30,000 in tax revenues, and $20,000 per year paid to the County of Maui for real property taxes. The excise surcharge to the City and County of Honolulu was negligible.

d. Proposed Action - Issuance of Water Lease

Impacts from the Mahi Pono farm plan assuming issuance of the Water Lease are measured in two phases. First, during the estimated 10-year development period, where the Central Maui fields get prepared and used for diversified agriculture. Second, the full operations period, which follows the development period and is when the Central Maui fields are in full operation under the Mahi Pono farm plan.

Under the Mahi Pono farm plan Central Maui is expected to host a major expansion in crop farming and cattle grazing under the Proposed Action. Mahi Pono's current plans for Central Maui envision cultivating a broad range of food and non-food crops for local consumption by State of Hawaiʻi residents and visitors and export, including orchard crops (citrus, macadamia nuts, coffee, avocado, etc.), tropical fruits, vegetables and melons, row crops, annual crops, energy crops, and grass-fed cattle. In addition, the company plans to lease some of its land to other farmers at favorable terms, including relatively low rents for long periods. Solar farm development ~~A solar farm~~ is also proposed under the farm plan. Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As part of this upgrade, Mahi Pono's irrigation engineering team is also implementing high-efficiency irrigation systems. The new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycling and re-using all water used in Mahi Pono's processing plants; and (3) integrating various live technology feeds to constantly monitor plant, soil, and tree health.

Proposed Action - Economic and Fiscal Impacts - Development Period
Implementation of the Mahi Pono farm plans requires conversion of former sugarcane lands into cropland, irrigated pasture, and unirrigated pasture. An estimated 319,000 square feet of building space (for washing and packing areas, storage etc.) would be

required, as well as the development of solar farm(s) with a combined capacity of about ~~a~~ 37.5 MW ~~mW~~ ~~solar farm~~ along with storage batteries. The total development expenditures would be about $214.7 million, or an average expenditure of about $21.5 million per year assuming a 10-year development period. Indirect sales associated with development activities are estimated to be $18.5 million per year for a total of $39.9 million per year, of which $33.5 million would be on Maui and $6.5 million on O'ahu. Profits on development activity and indirect sales would be about $4.0 million per year.

Direct and indirect employment associated with the development activities to implement the farm plan would average about 326 jobs, of which 285 jobs would be on Maui and 42 jobs on O'ahu. Actual employment would vary over the 10-year development period. Payroll for the direct and indirect jobs would average $14.5 million per year and these jobs would support an estimated 730 residents.

Fiscal impacts will arise ~~raise~~ from the conversion of Central Maui farmlands from sugarcane to diversified agriculture and green energy would generate an average of about $1.9 million per year in State taxes, for a 10-year cumulative total of about $18.6 million. However, because developers of solar farms receive a State subsidy of $500,000 per 1 MW ~~mW~~ of generating capacity, the planned solar farm(s) would generate a State subsidy averaging $1.88 million per year for a cumulative total of about $18.8 million. Thus, State tax revenues from development activities less the energy subsidy would result in a cumulative loss of about $100,000 (with rounding).

The County of Maui would derive negligible tax revenues from the anticipated development activity and the City and County of Honolulu would derive cumulative excise tax surcharges of about $1.0 million.

Proposed Action - Economic and Fiscal Impacts - Full Operations

At full operations, the Mahi Pono farm plan will cause a substantial amount of crop production, including about 8 million pounds per year from the Community Farm, 321 million pounds per year from orchards, and 9 million pounds per year of tropical fruits, plus production from row crops, annual crops, and energy crops. Annual sales are expected to reach $155.9 million. The pastures would support a cattle herd of about 7,300 cow-and-calf animal units, produce over 4,300 calves per year, and generate revenues of about $4.8 million per year. The solar farm(s) would generate about 32.5 ~~82,125~~ MW ~~mW~~ of electricity per year, with revenues of about $8.2 million per year. Combined farm and energy revenues would reach $168.9 million per year in direct sales (far exceeding the 2006 revenues from sugar production of $101 million, and the $116 million average for the 2008 to 2013 period).

Purchases of goods and services by farmers and the families of employees would generate indirect sales and, in turn, these suppliers would generate more indirect sales by their purchase of goods and services. The indirect sales are estimated at about $160.7 million per year. Total direct and indirect sales would be about $329.5 million per year, of which about $273.3 million would be on Maui and about $56.2 million on O'ahu. Profits from farm operations, energy operations, and indirect sales would be about $33 million.

At full operations farm employment is expected to reach about 790 jobs (about 160 more than provided by sugar operations in 2006). The jobs would be typical of those provided by diversified-crop farming and ranching-managing soils and pests, operating and maintaining irrigation systems, planting crops, pruning trees, harvesting crops, sorting and washing crops, packing crops, trucking crops to markets and shipping terminals, moving cattle among pastures, maintaining fences, marketing, accounting, etc.

The purchase of goods and services by farmers and ranchers and by the families of their employees would generate an estimated 350 jobs. In total, about 1,140 direct and indirect jobs would be supported, including about 1,000 jobs on Maui. Payroll is estimated at $45.3 million for all direct and indirect jobs. The direct and indirect jobs would support an estimated 2,550 residents.[18]

COVID-19 could cause a change in Maui's housing market, including a weaker demand for homes during the economic recovery, an increased supply of available homes, and possibly lower home prices and rents. With a weaker economy, fewer residents will move to Maui seeking jobs and housing, and some residents will leave the island to find jobs elsewhere. And because of fewer visitors, some owners of resort condominiums are likely to rent their units to residents instead of visitors. Under these economic circumstances, home prices and rents may decline.

The hiring of workers will be spread over a number of years as the Mahi Pono farm plan is implemented. Assuming 10 years to reach full operations, direct employment will increase by approximately 80 jobs per year, while total direct and indirect jobs on Maui will increase by approximately 100 jobs per year.

Most jobs are expected to be filled by former sugarcane workers, skilled workers from Maui and other islands, recent graduates of agricultural programs at Hawai'i high schools and colleges, and unskilled workrs who would receive on-the-job training. In its first 18 months of existence, Mahi Pono hired 200 workers, all of whom were living on Maui when hired.

[18] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction:
Land Use, Central Maui
- Crops: decreased by 1,906 acres (11 mgd × 173.31 acres/mgd)
-Irrigated pasture: decreased by 161 acres (11 mgd × 14.62 acres/mgd)
-Unirrigated pasture: increased by 2,067 acres (11 mgd × 187.93 acres/mgd)

Sales (Mahi Pono and tenants):
- decreased by $18.4 million per year (11 mgd × $1.673 million/mgd)

Employment (Mahi Pono and tenants):
- decreased by 93 jobs (11 mgd × 8.447 jobs/mgd)

Payroll (Mahi Pono and tenants):
- decreased by $3.33 million per year (11 mgd × $0.303 million/mgd)

Based on past hirings, nearly all future employees are expected to come from Maui. Attracting workers should be easier than in the recent past due to many residents being unemployed due to the economic effect of the COVID-19 pandemic (Plasch, 2020).

Regarding fiscal impacts at full operations, diversified agricultural operations in Central Maui would generate an estimated $4.5 million in State tax revenues by 2030. Property taxes paid by to the County of Maui would be about $800,000 per year, and the City and County of Honolulu would derive about $140,000 per year from the excise tax surcharge.

4.7.4 Agricultural Economy

In support of this ~~DEIS~~ FEIS, Plasch Econ Pacific LLC prepared a report on Agricultural and Related Economic Impacts ~~(June 2019)~~ assessing the economic agricultural impacts of the Proposed Action (see Appendix I, Updated 2020). This study assesses agricultural and related economic impacts for the Proposed Action as compared to baseline conditions (outlined in section 4.7.3 above) and an agricultural assessment of three geographic areas: (1) East Maui, including Nāhiku; (2) Upcountry Maui, including KAP; and (3) Central Maui.

The year 2030 was selected as the point for analysis of the impacts of the Proposed Action because it is assumed that timeframe would allow for the full implementation of the farm plan in Central Maui.

East Maui - Agricultural Conditions

Because of the heavy rainfall on the windward slopes of Haleakalā and the many streams in East Maui, many makai areas along the streams are well suited for growing taro and truck crops. Also, a number of the landowners have appurtenant and riparian rights to use water from these streams for farming. The East Maui farms included in the analysis presented in this EIS include only those that could be directly affected by the Proposed Action. That is, taro farms and other farms in East Maui that are, or could be, irrigated with water diverted from the streams flowing through the License Area. These farms are located between the Honopou and Nāhiku portions of the License Area and include the communities of Honopou, Huelo, Kailua, Ke'anae, Wailuā, and Nāhiku. The affected landowners have appurtenant and riparian rights to use water from the License Area streams. The analysis excludes existing or potential farms in these communities for which the landowners do not have rights to divert streams to irrigate crops. Also excluded are the many existing or potential farms in Hāna and other parts of East Maui that would not be affected by the Proposed Action.

Collectively, the known landowners have about ~~45~~ 60 acres in East Maui that are suitable for growing taro, and about ~~35~~ 45 acres suitable for truck crops. This accounting includes only the known existing and potential farms in East Maui that could be affected by the Proposed Action as mentioned above ~~addressed by the CWRM D&O~~. Solar radiation for these areas is less than 350 calories per square centimeter per day, which is similar to or slightly below other taro-growing areas in Hawai'i.

A number of East Maui farmers divert stream water to irrigate taro lo'i and small farms. Taro farming is a chosen way of life and an important cultural activity for many. In the past, farmers in East Maui have reported that surface-water diversions to supply water to Central Maui left

insufficient water in the streams for them to take full advantage of the agricultural potential in East Maui.

In response to comments on the DEIS regarding the projected farming in East Maui as presented in the DEIS, an expanded discussion is provided in the Agricultural and Related Economic Impacts (Updated 2020), see Appendix I, and summarized below. At its peak, researchers have estimated that taro production throughout Hawai'i covered more than 20,000 acres (J.J. Cho, et al, "Hawaiian Kalo, Past and Future," 2007). Production declined after western contact for a variety of reasons. In the late 1700s and the early 1800s, explorers, traders, and immigrants introduced diseases that were new to the Hawaiians, and which proved deadly for many because they lacked immunities. This resulted in the loss of many taro farmers and their expertise, and reduced the demand for poi. Also, new foods were introduced, and immigrants had different food preferences. In addition, many Hawaiians left farming to pursue other work opportunities. By the mid-1800s, many taro farms were abandoned. In the late 1800s, rice production took over many of the abandoned taro farms or resulted in their conversion to rice production because it was a more profitable crop. During this same period, many streams began to be diverted to supply water to irrigate sugarcane fields. Both the rice and sugar industries benefited from the Reciprocity Treaty of 1875 which provided Hawai'i growers duty-free access to the United States. The rice industry declined in the early 1900s, while the sugar industry declined in the late 1900s and early 2000s. The decline of the sugar industry released considerable land and water for other agricultural activities, including taro.

By 1900, taro production throughout Hawai'i had declined to about 1,280 acres, (Cho). By 1966, only 400 acres were farmed (US USDA, National Statistics Service). In the mid and late 1960s, the State promoted poi nationally as a nutritional and non-allergic food (Hawai'i Department of Planning and Economic Development, "Hawai'i Economic Review," Summer 1965). Land in crop increased to 470 acres by 1977 but fell to 270 acres by 1990. By 2011, land in crop increased to 450 acres, then fell again to 340 acres by 2015.

Recent declines in taro production have been due to labor shortages, hurricanes (Iwa in 1982 and 'Iniki in 1992), crayfish, apple snails, taro pocket rot, taro blight, taro root aphid, root-knot nematode, etc. The major problem for commercial taro farming is that it is hard work for a relatively low return.

Most of Hawai'i's taro is produced in only a few areas, most of which are river valleys: Hanalei and nearby valleys on the north shore of Kaua'i (over 70%), Waipi'o on the Big Island, and Ke'anae and Wailuā on Maui. Taro is also grown in a few smaller valleys on Kaua'i, O'ahu and Maui.

East Maui Farms: 1980 to 2017

According to the Agricultural Land Use Maps (ALUM), the subject East Maui communities had about 105.5 gross acres in taro in 1980, including about 96.3 acres in Ke'anae and Wailuā, and 9.3 acres in Huelo. Based on Statewide ratios, net land in crop was about 48 acres (45%). About 13.1 gross acres were used to grow vegetables, and about 19.1 acres were used for flowers and nursery products (about 67% of the net taro acres). Some of the water used to irrigate taro is reused to grow other crops, thereby increasing the income to the farmers. Given

the challenges of gathering information about all farms in Hawai'i, some of the smaller farms may have been missed in the survey.

By 2015, these acreages had fallen to about 34.2 gross acres in taro, 9.8 gross acres in vegetables, and 2.6 gross acres in flowers and nursery products ("Statewide Agricultural Land Use Baseline 2015"). Nearly all these acreages were in Ke'anae and Wailuā. Based on Statewide ratios, net land in taro was about 19 acres (56%), and other crops were about 65% of the net taro acreage.

By December 2017, land in taro decreased to less than 30 gross acres (derived from Microsoft Zoom Earth and Google Earth Pro).

As indicated above, crop acreages decreased in the subject East Maui communities from 1980 to year-end 2017, even though less water was diverted from East Maui to Central Maui and more water was left in the streams. In recent years Waiokamilo Stream was fully restored, and comparatively little water was diverted in total from East Maui streams after the cessation of sugarcane operations in Central Maui in 2016.

The decline in taro acreage in these communities is consistent statewide trends. The decline in acreage for other crops is consistent with the shift of agricultural production from the Neighbor Islands to O'ahu following the close of the major plantations on O'ahu.

The decline in farming in the subject East Maui communities suggests that the limiting factors are economic, and not the supply of water. Farming small parcels typical of East Maui can be labor intensive, with relatively low returns for the effort. Economic limits to farming occur Statewide as indicated by the fact that only about 20% of the good farmland available in Hawai'i is farmed, including higher-quality farmland than that found in East Maui and in better locations (based on acreages derived by Plasch Econ Pacific from "Statistics of Hawai'i Agriculture," the National Agricultural Statistics Service, and the U.S. "Census of Agriculture").

Future Farming

Increased stream flows could allow more land in East Maui to be farmed. Also, cool fast running water is optimal for taro production (i.e., higher yields), and helps reduce crop diseases. However, in light of the CWRM D&O, ample stream water should now be available to irrigate taro lo'i and the small farms relying on water from those East Maui streams addressed by the CWRM D&O. The large volume of water that flows out of the taro lo'i can be used to irrigate other crops.

According to the CWRM D&O, based on information provided by the expert for Nā Moku 'Aupuni 'O Ko'olau Hui, the following acreages for potential taro were identified ~~the usable acreage of the farms~~ in East Maui that have water rights to the streams subject to the IIFS are as follows:

Table 4-17 ~~4-8~~: Usable Acreage in East Maui for Taro Lo'i

AREA	TARO LO'I (ACRES)	OTHER AGRICULTURE (ACRES)
Ke'anae	12.13	7.00

Wailuā	7.22	11.86
Wailuā	8.30	11.23
Wailuā	11.63	5.00
Honopou	5.55	N/A
Total Acres	44.83	35.09

~~This accounting only includes known farms and future farms per the CWRM D&O. Thus, stream restoration could result in about 44.83 acres planted in taro in East Maui, and 35.09 acres in other crops.~~[19]

For taro farms, Nā Moku estimated net acreage at 90% of gross acreage. However, analysis of the taro farms at Keʻanae indicates net acreage is less than 60% of gross acreage. This would result in a revised estimate of less than 32 acres in crop (49.805 acres × 60%).

In the IIFS proceedings, Nā Moku also submitted exhibits to CWRM for an additional 9.20 acres for a taro farm and house lot in Keʻanae, and 0.624 acres for taro and pasture lots in Honopou (CWRM D&O, FOF 675). While the CWRM D&O did not include this acreage in its accounting of the "*taro lots and polima*" (see CWRM D&O, FOF 669), if these additional lots were to be considered as able to support additional taro cultivation, they would increase the potential gross area for East Maui taro farms to about 60 acres. All of these farm areas would be supplied with water from the taro streams—i.e., the streams that are to be fully restored in accordance with the CWRM D&O.

Within the Nāhiku community, taro farming along Makapipi Stream occurred in the past, but satellite imagery from Google Earth Pro reveals no current taro farming. However, there are some agricultural lots located along Makapipi Stream that could draw water from that stream for irrigation. Makapipi Stream was ordered for full restoration of stream flow under the CWRM D&O.

In the Huelo and Kailua areas, CWRM ordered restoration of a number of streams. However, even if restoration was made on additional streams, it is likely that the amount of additional acreage put into taro would be minimal given that the areas lack the necessary river-valley characteristics of major taro growing areas, with many streams flowing through gulches.

For the analysis, taro farms in East Maui (from the Honopou to Nāhiku portion of the License Area), including farms using water from streams not subject to the CWRM D&O, are assumed to cover about 55 net acres by 2030 (a little over 60 gross acres, and assuming the high estimate of 90% of the land in crop). It is assumed that all or nearly all of the farming would take place in Honopou, Keʻanae and Wailuā, and would rely primarily on the taro streams ordered for full restoration. Further, all or nearly all of the additional taro cultivation will occur in existing/historical taro cultivation areas, not in new areas, given the barriers presented by terrain and the economic challenges of initiating new taro farms.

[19] This language has been omitted from the EIS as the report contained herein as Appendix I, which was updated in response to DEIS comments, shows that stream restoration could actually result in 55 acres of taro farms and 45 acres of other farms.

Wetland taro requires very large volumes of water flowing through the lo'i, partly to control the water temperature, thereby preventing taro rot. After flowing through the lo'i, the large volume of excess water can be used to irrigate other crops. For this analysis, it is assumed that the gross and net water requirements of taro are 140,000 gad gross and 30,000 gad net, respectively. Thus, approximately 110,000 gad exit the lo'i and are available to irrigate other crops, or are returned back to the streams. Other crops are assumed to require about 5,000 gad, which is a high estimate. ~~With these assumptions, the gross and net water requirements for the East Maui farms are about 6.3 mgd and 1.5 mgd, respectively. The high gross water requirement reflects the fact that nearly 80% of the water used for growing taro is diverted from streams, passes through lo'i, and is then returned to the streams.~~

Truck farms, would be irrigated with a portion of the water flowing out of the taro farms. The identified acreage of the truck farms is about 80% of the net taro acreage (35.09 acres ÷ 44.83 acres), which is higher than the percentages estimated for 1980 and 2015.

In addition to the above, Nā Moku submitted exhibits to CWRM suggesting the potential for an additional 433.84 acres in "agricultural lots" in the communities of Ke'anae, Waianu, and Makapipi (Nāhiku) (CWRM D&O, FOF 675). Nā Moku did not provide information on the acreages within the lots that could be farmed and the CWRM D&O did not include these acres in its accounting of farmland (CWRM D&O, FOF 673). Also, the CWRM D&O noted that the lot acreages overstate the amount of land that could be cultivated (CWRM D&O, FOF 639, 664). All of the lots are located along streams that are to be fully restored, or never were diverted by the EMI Aqueduct System, and thus are flowing in their natural condition. As such, a portion of these lots could be used for growing truck crops, without water being a limitation, at least with respect to the Water Lease. However, it is not known whether other satisfactory agronomic and economic conditions exist to cultivate a significant portion of these agricultural lots. For perspective, only about 12.4 gross acres in the subject East Maui communities were used to grow vegetables and nursery crops in 2015 (Melrose, et. al., 2015).

For the analysis, truck farms in East Maui (from the Honopou to Nāhiku portion of the License Area), which includes farms areas using water from the streams not subject the CWRM D&O, are assumed to cover about 45 acres by 2030 based on about 80% of the estimated 55 acres in taro. In effect, 10 acres were added to the truck-crop acreage identified in the CWRM D&O in order to account for (1) the possibility that CWRM D&O may have missed some farm areas that would be feasible to cultivate, and (2) an increase in taro farming could result in more truck farming by taro farmers who supplement their income by using flow-through water to irrigate other crops.

East Maui: Agricultural Impacts of the Proposed Action

The agricultural impacts to East Maui are assumed to take place irrespective of the issuance of the Water Lease. Hence, the Proposed Action is not anticipated to have any significant impacts on agronomic conditions in East Maui, nor on the future of East Maui farming. Taro farms and other farms (truck farms) in East Maui that depend on stream flows would produce at full development about 1.2 million pounds per year of taro, and about ~~400,000~~ 500,000 pounds per year of other crops. The resulting direct sales would be about ~~$1.4~~ $1.7 million per year. Indirect sales generated by the purchase of goods and services would be about ~~$1.5~~ $1.9 million per year. Thus, total direct-and-indirect sales would be about ~~$2.9~~ 3.6 million per year (with rounding), of

which about $3 million would be on Maui and $700,000 on Oʻahu. About ~~$500,000~~ $600,000 of consumption expenditures would be subject to the excise tax on final sales, and ~~$2.4~~ $3 million subject to the excise tax on intermediate sales. Profits from farm operations and indirect sales would be about ~~$300,000~~ $400,000, or possibly less.

Full development of the taro farms and other farms in East Maui that depend on stream flows protected under the CWRM D&O would result in about ~~14~~ 18 jobs and generate about ~~7~~ 8 indirect jobs, for a total of about ~~21~~ 26 jobs. The payroll is expected to reach about ~~$500,000~~ $600,000 for the direct jobs and ~~$800,000~~ $1 million for all direct and indirect jobs. The direct and indirect jobs provided will support an estimated ~~47~~ 58 residents living in about ~~20~~ 25 homes, most of whom would be on Maui.

These East Maui farmers will generate less than ~~$70,000~~ $80,000 per year in State taxes at full development. For the County, property taxes will total about ~~$100~~ $200 per year. The City and County of Honolulu will derive about ~~$300~~ $400 per year from the excise-tax surcharge.

Upcountry Maui - Agricultural Conditions

The soil ratings for Upcountry Maui (~~Land Capability Grouping NRCS,~~ ALISH, LSB) are provided in Section 4.1.2.

Upcountry Maui receives moderate sunshine, with average daily insolation ranging from less than 350 to 450 calories per square centimeter per day, although a small portion of Upcountry Maui receives 500 calories. KAP receives about 450 calories per square centimeter per day. Average annual rainfall in Upcountry Maui ranges from 15 to nearly 120 inches. KAP receives an average of less than 25 inches per year. At Kula, average temperatures range from the low 50s in the winter to the high 70s in the summer. Similar to Central Maui, the prevailing tradewinds in Upcountry Maui blow from a northeasterly direction. Occasional strong winds can cause crop damage if they are not protected by windbreaks.

Upcountry Maui has lands that are suitable for farming, but the general conditions are not as good as those in Central Maui. The farms are small and scattered, solar radiation is less, farms are farther from markets and shipping terminals, water is limited and expensive, and annual rents at the KAP are much higher than elsewhere in the State including lots to made available under the Mahi Pono farm plan ~~those planned for Central Maui~~ ($1,200 per acre in Upcountry Maui vs. $150 per acre under the Mahi Pono farm plan vs. $500 per acre for most State farm land and $350 per acre for large farm parcels on Oʻahu vs. $160 per acre for most State Agricultural Parks on Neighbor Islands).

a. Upcountry Maui: Agricultural Impacts of Interim Diversified Agricultural Operations (2017)

The EMI Aqueduct System supplies water to the MDWS Upcountry Water System Service Area to the Kamole-Weir WTP through the Wailoa Ditch, which covers approximately 61,500 acres. Approximately 32,500 acres are identified as being in agricultural use according to the County of Maui Real Property Tax records or State of Hawaiʻi Office of Planning. Land in diversified crops includes KAP, which is managed by the County of Maui Office of Economic Development and serviced by the EMI

Aqueduct System through the Hamakua Ditch, an extension of the Wailoa Ditch, to promote the development of diversified agriculture on the island of Maui. KAP lots are leased to 26 farmers who grow a variety of crops, including vegetables, turf grass, landscape nursery products, flowers, bananas, and dryland taro. The total farmland irrigated with water from the EMI Aqueduct System is about 1,250 acres (447 acres for KAP plus about 800 acres for other farms = 1,247 acres).

In 2017, the EMI Aqueduct System supplied about 2.86 mgd to the MDWS for Upcountry Maui, which is well below the long-term average of 7.1 mgd. ~~MDWS use of surface water from the EMI System was low in 2017 because heavy rainfall increased supplies from other County sources that depend on rainfall.~~ Combined with other water sources and after system losses, the MDWS delivered about 7.93 mgd to residents, farms, businesses and others. An estimated 3.16 mgd were used for agriculture. About 0.46 mgd were for crops at the KAP, however, 1.5 mgd had to be supplied by the EMI Aqueduct System to produce the 0.46 mgd used by the farmers. About 2.7 mgd were used for crops elsewhere in Upcountry Maui. The pastures in Upcountry Maui are not irrigated. Other farmers in Upcountry Maui rely on rainfall to water their crops.

In 2017, farmers at KAP and other farmers in Upcountry Maui who relied on water from the EMI System produced an estimated 12.5 million pounds of crops per year. Annual farm sales were about $12.5 million, and indirect sales were about $13.8 million. Total direct-plus-indirect sales were about $26.3 million per year, of which about $21.5 million were on Maui and about $4.8 million on O'ahu. About $2.7 million of consumption expenditures were subject to the excise tax on final sales, and about $23.7 million subject to the excise tax on intermediate sales. Rents paid to the County totaled about $500,000 per year. Profits from farm operations and indirect sales were an estimated $2.6 million per year.

During this timeframe, KAP farmers and other farms in Upcountry Maui who relied on water from the EMI Aqueduct System provided about 80 jobs and generated about 40 indirect jobs, for a total of about 120 jobs. The payroll was about $2.9 million for the direct jobs and $4.8 million for all direct and indirect jobs. The direct and indirect jobs would support an estimated 275 residents living in about 120 homes, with about 245 residents and 110 homes on Maui.

In 2017, the farms at KAP and other farms in Upcountry Maui that rely on water from the EMI Aqueduct System would generate about $45,000 per year in State taxes. For the County, property taxes plus rents paid to the County by farmers at the KAP totaled less than $54,000 per year. The City and County of Honolulu received about $2,000 per year from the excise-tax surcharge.

b. Upcountry Maui: Agricultural Impacts of the Proposed Action

A continuation of water supplied through the EMI Aqueduct System to serve Upcountry Maui, as planned under the Proposed Action, is projected to result in some 1,510 ~~1,520~~ acres of farmland being irrigated by that source in 2030.

A continuation of water delivered through the EMI Aqueduct System to MDWS is assumed as part of the Proposed Action. Therefore, it is anticipated that the 262-acre expansion of KAP would go forward. That land would have to be converted from fallow sugarcane fields to productive fields for diversified agriculture, with an estimated cost of $1.3 million. Related indirect sales are projected at $320,000 per year over a 5-year period. Thus, expenditures plus indirect sales are expected to average approximately $600,000 per year, and cumulative State tax revenues associated with this conversion would be approximately $180,000 ~~200,000~~.

Overall, farming in Upcountry Maui is expected to increase due to the KAP expansion. KAP farms and others in Upcountry Maui who will rely on water from the EMI Aqueduct System are projected to produce an estimated 15.1 million pounds of crops per year. Annual farm sales are expected to reach about $15.1 million, and indirect sales about $16.7 ~~13.4~~ million. Total direct-plus-indirect sales will be about $31.8 million per year, of which about $26 million will be on Maui and about $5.9 million on O'ahu. About $3.2 million of consumption expenditures would be subject to the excise tax on final sales, and about $28.6 million subject to the excise tax on intermediate sales. Rents paid to the County would total about $900,000 per year. Profits from farm operations and indirect sales are expected to reach about $3.2 million per year.

Employment will increase due to the KAP expansion. By 2030, farmers who rely on water from the EMI Aqueduct System are expected to provide about 100 jobs and generate about 50 indirect jobs, for a total of about 150 jobs. The payroll is expected to reach about $3.5 million for the direct jobs and $5.8 million for all direct and indirect jobs. The direct and indirect jobs provided will support an estimated 330 residents living in about 140 homes, with about 300 residents and 130 homes on Maui.

State taxes generated from Upcountry Maui farms that rely on water from the EMI Aqueduct System would generate about $54,000 per year in State taxes. For the County, property taxes plus rents paid to the County by farmers at the KAP would total about $70,000 ~~$85,000~~ per year. Most of the increase from 2017 would be due to the additional rental income from the anticipated KAP expansion.

Central Maui - Agricultural Conditions

The soil ratings for Central Maui (Land Capability Grouping NRCS, ALISH, LSB) are provided in Section 4.1.2. In response to comments on the DEIS, additional detail that was in Appendix I is now summarized below. The NRCS rates soils according to eight levels, ranging from the highest classification level "I" to the lowest level "VIII" which are defined as follows:

- Class I: few limitations that restrict their use.
- Class II: moderate limitations that reduce the choice of plants or require moderate conservation practices.
- Class III: severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Class IV: very severe limitations that reduce the choice of plants, require very careful management, or both.

- Class V: not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.
- Class VI: severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.
- Class VII: very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.
- Class VIII: limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife habitat, or water supply, or to esthetic purposes.

The estimated acreages for each class are as follows:

Table 4-18: Central Maui Agricultural Fields NRCS Soil Classes

Class	Area (Acreage) With Irrigation	Area (Acreage) Without Irrigation
Class I	4,449 (14.7%)	0
Class II	17,216 (56.8%)	1,644 (5.4%)
Class III	3,051 (10.1%)	5,233 (17.3%)
Class IV	2,629 (8.7%)	15,364 (50.7%)
Class V	0	0
Class VI	282 (0.9%)	5,386 (17.8%)
Class VII	2,642 (8.7%)	2,642 (8.7%)
Not Rated	33 (0.1%)	33 (0.1%)
Total	**30,302**	**30,302**

~~27,097 acres in Central Maui are considered "high-quality farmland" meaning rated I or II by NRCS. , Prime or Unique by ALISH, or A or B by the LSB~~. With irrigation, approximately 71.5 % of the fields are rated Class I or Class II. However, without irrigation, no lands are rated Class I and only about 5.4% are rated Class II.

The ALISH ratings system classifies land into three broad categories:

- Prime: agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment.
- Unique: agricultural land which is non-Prime agricultural land used for the production of specific high-value crops.
- Other: agricultural land which is non-Prime and non-Unique agricultural land that is important to the production of crops.

The estimated acreage for each category is as follows:

Table 4-19: Central Maui Agricultural Fields ALISH Ratings

Category	Area (Acres)
Prime	25,669 (84.7%)
Unique	0
Other	2,254 (7.4%)
Not Rated	2,378 (7.9%)
Total	**30,302**

It should be noted that ALISH ratings were developed in 1977 by the NRCS, UH College of Tropical Agriculture and Human Resources, and the DOA. The ratings above reflect the fact that the Central Maui agricultural fields were irrigated in 1977. With less water, less acreage would have been rated as Prime.

In 1967, the UH Land Study Bureau (LSB) developed an Overall Productivity Rating for Maui soils, which classifies soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest. It should be noted that these ratings reflect irrigation in 1967.

The estimated acreage for each category is as follows:

Table 4-20: Central Maui Agricultural Fields LSB Ratings

Category	Area (Acres)
A	24,128 (84.7%)
B	3,439 (11.3%)
C	1,443 (4.8%)
D	667 (2.1%)
E	438 (1.4%)
Not Rated	207 (0.7%)
Total	**30,302**

Approximately, 27,567 acres (90.9%) are considered to be high-quality agricultural lands (rated A or B). As mentioned above, these ratings were developed in 1967 reflecting the fact that these lands were being irrigated. Hence, ~~With~~ with less water available, less acreage would be rated as high-quality farmland.

Central Maui receives considerable sunshine, with average daily insolation ranging from slightly less than 450 calories per square centimeter per day in mauka areas, to over 500 calories near Pā'ia. This is comparable to other high-quality producing farms across the State. Average annual rainfall in Central Maui ranges from less than 15 inches per year in the southern part of the isthmus to over 50 inches in the north-eastern area of Central Maui. Most of this rainfall occurs during the winter rainy season (October through April), while the summer months (May through September) are hot and dry. Because of the low annual rainfall and/or seasonal rainfall, irrigation water is needed to grow crops in Central Maui. As mentioned above, with less water available for cultivation, less acreage would be rated as high-quality farmland. Average temperatures range from the low 60s (Fahrenheit) in the winter to the mid-80s

(Fahrenheit) in the summer. The mild temperatures are favorable for growing many crops. The prevailing tradewinds blow from a northeasterly direction across the isthmus and out to sea. Occasional strong winds can cause crop damage if they are not protected by windbreaks.

Farmers in Central Maui are well-situated to supply the small Maui island ~~Island~~ market. Compared to other farmers in State of Hawai'i, they can also compete reasonably well in supplying mainland markets, as long as their crops have long shelf-lives and ~~so~~ can be shipped by surface vessel. However, compared to farmers on O'ahu, they are at a disadvantage in supplying the Honolulu market. Furthermore, they are at a disadvantage in supplying mainland markets if their crops have short shelf-lives and ~~so~~ must be shipped by air. Also, farmers on Maui are at a disadvantage in competing against the low-cost producers who supply mainland markets. A major advantage of farming in the Central Maui agricultural fields is that the EMI Aqueduct System can deliver a large volume of surface water by gravity at a relatively low delivery cost.

Most of the water for irrigating crops must come from surface water. Upper fields can be irrigated only with surface water. Lower fields can be irrigated with a mix of surface water and brackish groundwater. Because of salinity, the use of brackish water on the lower fields is limited to about 30% of the water applied. Combining the upper and lower fields, the overall water split across all 30,000 acres would be approximately 80% surface water and 20% brackish groundwater water.

In summary, Central Maui has some of the best agricultural conditions in the State for farming, including a large area in a compact configuration, high-quality soils, high solar radiation, a location near markets and shipping terminals, and potentially ample water at low delivery costs (assuming a new Water Lease with a reasonable use fee), and for lessees rents that will be comparatively low.

a. Central Maui – Agricultural Impacts of Typical Sugar Cane Cultivation: 2006

HC&S grew sugarcane on fields in Central Maui from 1882 to 2016 (134 years). Over time, it grew to become the largest plantation in the islands, and it was the last Hawai'i sugar plantation to close. Its success was due to its large size and economies of scale, a compact configuration which reduced costs, favorable agronomic conditions (e.g., good soils and high solar radiation), and abundant low-cost water from the EMI System. Most of the HC&S fields were owned by A&B, but some were leased from the State and other entities. For the 2006 crop year, HC&S grew sugarcane on about 35,180 acres, of which about 29,430 acres were irrigated by the EMI Aqueduct System and brackish groundwater wells, and about 5,750 acres were irrigated with water from the West Maui Ditch System and brackish groundwater wells. Fields irrigated by the EMI Aqueduct System had about 12,800 acres (43.5%) in the upper fields irrigated only with surface water, and about 16,630 acres (56.5%) in the lower fields irrigated with a mix of surface water and brackish groundwater.

After system losses, the volume of water used to irrigate the 2006 sugarcane crop was about 143 mgd. About 112 mgd (78.3%) was surface water and 31 mgd (21.7%) was brackish groundwater. Gross water requirements (before system losses) were about 185 mgd (about 145 mgd of surface water and 40 mgd of brackish groundwater).

During this period (2006), HC&S produced about 145,200 tons of raw sugar, and sold sugar and energy to generate about $101 million in direct sales. The purchase of goods and services by HC&S and the families of HC&S employees generated indirect sales and, in turn, these suppliers generated more indirect sales by their purchases of goods and services. The indirect sales are estimated at about $91 million. Total direct-plus-indirect sales were about $191 million, of which about $160 million was on Maui and about $32 million on O`ahu. About $46 million of consumption expenditures were subject to the excise tax on final sales, and about $67 million subject to the excise tax on intermediate sales. About $140,000 per year was paid to the State to lease fields in Central Maui. Profits from sugar operations and indirect economic sales were an estimated $19 million.

In 2006, sugar operations generated about $5.9 million in State tax revenues and rental payments to the State. Most of the revenues were derived from excise taxes on consumption expenditures by families supported by the direct and indirect jobs that were provided, and personal income taxes paid by these same families. Tax revenues were low because the sale of the exported sugar was exempt from the excise taxes. Property taxes paid by HC&S to the County of Maui were about $50,000 per year. In 2006, the City and County of Honolulu derived no revenue from the excise-tax surcharge because it was not in effect that year.

b. Central Maui: Agricultural Impacts of Recent Sugar Cane Cultivation: 2008 to 2013

During this period there was only a modest change from the typical sugar scenario. The plantation was about 36,180 acres with about 30,320 acres irrigated with water from the EMI Aqueduct System. During this period water used to irrigate the sugarcane crop declined to 132 mgd. About 81 mgd (61.3%) was surface water and 51 mgd (38.7%) was brackish groundwater. The high amount of brackish groundwater decreased sugar yields, but maintained high levels of biomass for energy production. Gross water requirements (before system losses) were about 172 mgd including about 106 mgd of surface and about 67 mgd of brackish groundwater.

HC&S produced an average of about 136,300 tons of raw sugar per year (a decrease of 8.9 tons from 2006), and sold sugar and energy to generate average annual revenues of about $116 million in direct sales (an increase of about $15 million). Total direct-plus-indirect sales averaged nearly $220 million per year, of which about $183 million was on Maui and $36 million on O`ahu. About $37 million of consumption expenditures were subject to the excise tax on final sales, and about $103 million subject to the excise tax on intermediate sales. About $140,000 per year was paid to the State to lease fields in Central Maui. Profits from sugar operations and indirect sales were an estimated $22 million.

For the 2008-to-2013 period, sugar operations generated an average of about $5.1 million in State tax revenues and rental payments to the State. Property taxes paid by HC&S to the County of Maui were about $70,000 per year. The increase from 2006

was due to a higher tax rate. The City and County of Honolulu derived about $40,000 per year from the excise-tax surcharge.

c. Central Maui: Agricultural Impacts of Interim Diversified Agriculture Operations (2017)

Limited agricultural activities took place in Central Maui during this period, including 200 acres to grow the energy crop pongamia, and approximately 500 acres in unirrigated pasture. Less than 1 mgd was used to irrigate the pongamia. Negligible revenues were produced during this period.

This period generated about $30,000 in tax revenues. Property taxes paid by HC&S to the County of Maui were about $20,000 per year. Property taxes decreased because of the land was assessed at a lower value following the closure of sugar operations. The City and County of Honolulu derived negligible revenues from the excise-tax surcharge.

d. Central Maui: Agricultural Impacts of Proposed Action

Impacts from the Mahi Pono farm plan assuming ~~the~~ issuance of the Water Lease are measured in two phases. First, during the estimated 10-year development period, where the Central Maui fields get prepared and used for diversified agriculture. Second, the full operations period, which follows the development period and is when the Central Maui fields are in full operation under the Mahi Pono farm plan.

The farm plan will evolve over time based on a number of factors, including the available supply of surface water, experience which will be gained on crops that grow well in Central Maui, crops that are profitable, the size of the market for profitable crops, etc. Nevertheless, current estimations are that 80% of the Central Maui fields will be used for orchards, which reflect a long-term commitment to agriculture. About 800 acres would be used for community farms of 1, 5 and 10 acres. The solar farm(s) are ~~is~~ assumed to use approximately 250 acres. Mahi Pono plans on leasing approximately 2,050 acres to other farmers (including 800 acres for Community Farms, 500 acres for energy crops and 750 for other crops). Full development of the Mahi Pono farm plan would require an estimated 82 mgd of irrigation water after system losses. Gross water requirements, before system losses, would be about 107 mgd, which is a decline of 79 mgd from the 2006 sugarcane ~~sugar cane~~ crop year.

Proposed Action – Agricultural Impacts During Development Period

Implementation of the Mahi Pono farm plan would require converting former sugarcane lands to about 15,950 acres of cropland, 4,700 acres of irrigated pasture, and 9,100 acres of unirrigated pasture. The conversion is expected to take place over 10 years, to be followed by the full operations period of the farm plan. The conversion would require removing remaining sugarcane plants, adding amendments, planting windbreaks around fields, modifying field irrigation systems, installing fencing, planting crops, etc. The total cost for this conversion is estimated at about $89 million. Moreover, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As part of this

upgrade, Mahi Pono's irrigation engineering team is also implementing high-efficiency irrigation systems. The new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycling and re-using all water used in Mahi Pono's processing plants; and (3) integrating various live technology feeds to constantly monitor plant, soil, and tree health.

The farm plan also requires an estimated 319,000 square feet of building space for washing and packing areas, storage, etc. Construction is estimated at about $31.9 million.

Based on recently built or approved solar farms, the 250 acres for green energy are sufficient space for one or more solar farms having a combined capacity of about ~~a~~ 37.5 MW along ~~solar farm~~ with storage batteries costing about $93.8 million. The total development expenditure would be about $214.7 million, or an average expenditure of about $21.5 million per year assuming a 10-year development period.

Excluding imported construction materials (e.g., solar panels), the annual expenditures would be about $8.9 million for field preparations and about $12.6 million per year for building structures. These figures are used to estimate indirect sales. Development activities will generate indirect sales associated with supplying goods and services to the companies involved with the development, and to the families of those who work for these companies. In turn, the companies supplying goods and services, and the families of their employees, will purchase goods and services from other companies, and so on. These indirect sales will include sales by companies supplying agricultural goods (soil amendments, fencing, irrigation systems, etc.); rental of farm equipment; equipment repair; warehousing services; shipping and trucking services; etc. Indirect sales also include sales by grocery stores, drug stores, restaurants, service stations, beauty salons, medical providers, accountants, attorneys, insurance agents, etc. Based on State economic multipliers, these indirect sales are expected to average about $18.5 million per year. Thus, development expenditures plus indirect sales are expected to average about $39.9 million per year, of which about $33.5 million would be on Maui and about $6.5 on O'ahu. About $29.4 million of development and consumption expenditures would be subject to the excise tax on final sales, and about $10.5 million subject to the excise tax on intermediate sales. Profits on development activity and indirect sales would be about $4 million per year.

An average of 210 workers would be needed over the assumed 10-year development period to convert former sugarcane fields to fields for diversified crops and pasture, construct agricultural buildings, and install ~~a~~ one or more solar farms. Jobs would include equipment operators, soil specialists, irrigation specialists, planters, truck drivers, construction workers, supervisors, etc. Also, the various jobs would range over a variety of skill levels, including entry-level, semi-skilled, skilled, management, and professional positions. Most of these temporary jobs are expected to be filled by residents of Maui and other the islands. In addition to the direct jobs, about 120 indirect jobs would be generated by purchases of goods and services. Indirect jobs will include those at companies supplying farming equipment, irrigation systems, fencing, chemicals, building materials, repair services, etc. Other indirect jobs would include

those involved with supplying goods and services to families, and would range over a variety of skill levels.

Thus, direct-plus-indirect employment during the development period would average about 330 jobs, of which about 290 jobs would be on Maui and 40 jobs on Oʻahu. Actual employment would vary over time. The payroll during development would average about $8.8 million for the direct jobs and $14.5 million for all direct and indirect jobs. During the development period, the direct and indirect jobs would support an estimated 730 residents living in about 310 homes, of which about 640 residents and 280 homes would be on Maui.

The hiring of workers will be spread over a number of years as the Mahi Pono farm plan is implemented. Assuming 10 years to reach full operations, direct employment will increase by approximately 80 jobs per year, while total direct and indirect jobs on Maui will increase by approximately 100 jobs per year.

Most jobs are expected to be filled by former sugarcane workers, skilled workers from Maui and other islands, recent graduates of agricultural programs at Hawaiʻi high schools and colleges, and unskilled workrs who would receive on-the-job training. In its first 18 months of existence, Mahi Pono hired 200 workers, all of whom were living on Maui when hired.

Based on past hirings, nearly all future employees are expected to come from Maui. Attracting workers should be easier than in the recent past due to many residents being unemployed due to the economic effect of the COVID-19 pandemic (Plasch, 2020).

~~The~~ Mahi Pono's conversion of the Central Maui farmlands from sugarcane to diversified agriculture and green energy would generate an average of about $1.9 million per year in State taxes, for a 10-year cumulative total of about $18.6 million. However, due to the State subsidy provided to developers of solar farms ($500,000 per 1 MW of generating capacity), the State tax revenues from development minus the energy subsidy would result in a cumulative loss of about $100,000 (with rounding). Given the nature of Hawaiʻi's tax system, the County of Maui would derive negligible tax revenues from the anticipated development activity. Over the 10-year development period, the City and County of Honolulu would derive cumulative excise-tax surcharges of about $60,000.

Proposed Action – Agricultural Impacts During Full Operations.

At full development, the Mahi Pono farm plan would result in a substantial amount of crop production, including about 8 million pounds per year from the community farm ~~Community Farm~~, 321 million pounds per year from orchards, and 9 million pounds per year of tropical fruits, plus production from row crops, annual crops, and energy crops. To the extent economically feasible, Mahi Pono and other farmers on its land will grow food crops for the Hawaiʻi market. However, the Hawaiʻi market is too small to use all of the farm products expected to be produced on the Central Maui agricultural fields, and thus some export is necessary. Currently, Hawaiʻi farmers use about 15,000 acres to supply about one third of the fresh fruits, vegetables and melons consumed in

Hawai'i (this does not include nuts or coffee). Self-sufficiency is low because of low-cost imports from the mainland.

Annual sales are expected to reach about $155.9 million. The pastures would support a cattle herd of about 7,300 cow-and-calf animal units (au), produce over 4,300 calves per year, and generate revenues of about $4.8 million per year. Thus, total farm sales would be about $160.7 million per year, of which an estimated $104.4 million (65%) would be Hawai'i sales and $56.2 million export sales (35%).

Based on recently built or approved solar farms, the solar farm(s) would generate about 32.5 ~~82,100~~ MW of electricity per year, with revenues of about $8.2 million per year paid by MECO to the solar-farm operator. Combined farm and energy revenues would reach about $168.9 million per year in direct sales (exceeding the 2006 revenues from sugar production of $101 million, and the $116 million average for the 2008-to-2013 period). Purchases of goods and services by farmers and the families of employees would generate indirect sales and, in turn, these suppliers would generate more indirect sales by their purchase of goods and services. The indirect sales are estimated at about $160.7 million per year. Total direct-plus-indirect sales would be about $329.5 million, of which about $273.8 million would be on Maui and about $56.2 million on O`ahu.

About $24.9 million of consumption expenditures would be subject to the excise tax on final sales, and about $248.2 million subject to the excise tax on intermediate sales. Rental income from leasing land to other farmers and to an energy company would be about $1 million per year. Profits from farm operations, energy operations, and indirect sales would be about $33 million.

At full development, farm employment is expected to reach about 790 jobs (about 160 more jobs than provided by sugar operations in 2006). The jobs would be typical of those provided by diversified-crop farming and ranching; e.g., managing soils and pests, operating and maintaining irrigation systems, planting crops, pruning trees, harvesting crops, sorting and washing crops, packing crops, trucking crops to markets and shipping terminals, moving cattle among pastures, maintaining fences, marketing, accounting, etc. The increase in employment would be gradual, with most jobs filled by former sugarcane workers, skilled workers from Maui and other islands, recent graduates of agricultural programs at Hawai'i high-schools and colleges, and unskilled workers who would receive on-the-job training.

The purchase of goods and services by farmers and ranchers, and by the families of their employees, would generate an estimated 350 indirect jobs. Indirect jobs would include those at companies providing agricultural supplies and equipment, office supplies and equipment, repair services, trucking services, veterinarian services, etc. Other indirect jobs would include those involved with supplying goods and services to employees and their families. Thus, direct-plus-indirect employment would totaled about 1,140 jobs, with about 1,000 jobs on Maui. Both the direct and indirect jobs would range over a variety of skill levels, including entry-level, semi-skilled, skilled, and management positions. The payroll would be about $28.5 million for the direct jobs and $45.3 million for all direct and indirect jobs. The direct and indirect jobs would support

an estimated 2,550 residents living in about 1,100 homes, with about 2,290 residents and 1,010 homes on Maui.[20]

The State will enjoy significant tax revenues when the farm plan is in full operation. The farm plan operations are estimated to generate $4.5 million in State tax revenues by 2030. Property taxes paid to the County would be about $800,000 per year. The City and County of Honolulu would derive about $140,000 per year from the excise-tax surcharge.

4.8 Recreational Uses and Park Facilities

A range of recreational uses and park facilities are located within the areas affected by the Proposed Action. The following describes such existing uses and facilities in relation to the three geographic areas where the amount of water from the License Area may affect such uses and facilities.

East Maui

The County's Department of Parks and Recreation operates and maintains several parks and recreational facilities within East Maui in the vicinity of the License Area, include the following: 4th Marine Division Memorial Park, Alfred Boteilho Sr. Gymnasium and Pā'ia Park, H.A. Baldwin Park, Ha'ikū Park and Community Center, Ho'okipa Beach Park, Lower Pā'ia Park, Pā'ia Community Center, Rainbow Park, and the Ulumalu Arena.

The State of Hawai'i DLNR, Division of Forestry and Wildlife through its Nā Ala Hele Hawai'i Trail and Access System maintains the Waikamoi Ridge Trail and the Ke'anae Arboretum Walk within the License Area. In addition, through its Division of State Parks, DLNR also operates and maintains the Kaumahina State Wayside, Pua'a Ka'a State Wayside, and Wailuā Valley State Wayside located along Hana Highway, also known in this section as the Hāna Belt Road. All of the State waysides and lookouts are outside of the License Area except for the Kaumahina State Wayside, which is within the License Area (See Figure 4-40 ~~4-37~~). The Hāna Highway itself, which meanders along the coastline makai of and, in some places, through portions of the License Area, is also an immensely popular sightseeing route with spectacular coastal and mauka view. Maintained by the State of Hawai'i Department of Transportation, the roadway has many shoulder areas that are used as pull outs for sightseeing. One of the more impressive views of the Ke'anae peninsula is from the Ke'anae-Wailuā Lookout.

Waikamoi Ridge Trail is a ½ mile loop trail just off the side of Hāna Highway. The trail is positioned at the far eastern edge of the Waikamoi Preserve, which is home to a mix of indigenous and introduced species and offering hikers many lookouts along the trail. However, the trail does not have views of any waterfalls or streams. The Ke'anae Arboretum Walk is a 1/8 mile paved walkway from Hāna Highway that is alongside Pi'ina'au Stream on historicleveled terraces built for taro cultivation. Pi'ina'au Stream is subject to the CWRM D&O and is ordered to be fully restored with no diversions.

[20] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about $18.4 million in sales, decrease by 93 jobs, and a decrease in payroll by $3.63 million.

Kaumahina State Wayside is within the License Area located along Hāna Highway offering views of the northeast Maui coastline. The nearest stream to Kaumahina State Wayside is Ha'ipua'ena Stream, which is located approximately .25 miles to the east. This stream was ordered for limited diversions under ~~designated as "Public Use Stream" in~~ the CWRM D&O (CWRM D&O at 268).

Pua'a Ka'a State Wayside is just off of Hāna Highway as well. This wayside offers views of some waterfalls that are from Pua'aka'a Stream, a tributary to Kopili'ula Stream, which is subject to the CWRM D&O. Kopili'ula Stream along with its tributary, Pua'aka'a Stream, is ordered to have limited diversions ~~and is designated as a "Habitat Stream"~~ under the CWRM D&O (CWRM D&O at 268).

Wailua Valley State Wayside is lookout just off of Hāna Highway, offering views of Ke'anae Valley and Ko'olau Gap in Haleakalā's rim. In the distance, in the valley, the wayside offers a vantage point of waterfalls that feed into the valley. This wayside is located in the vicinity of Wailuānui Stream, which also feeds Waikani Falls, which is subject to the CWRM D&O. Wailuānui Stream is ordered to be fully restored under the CWRM D&O.

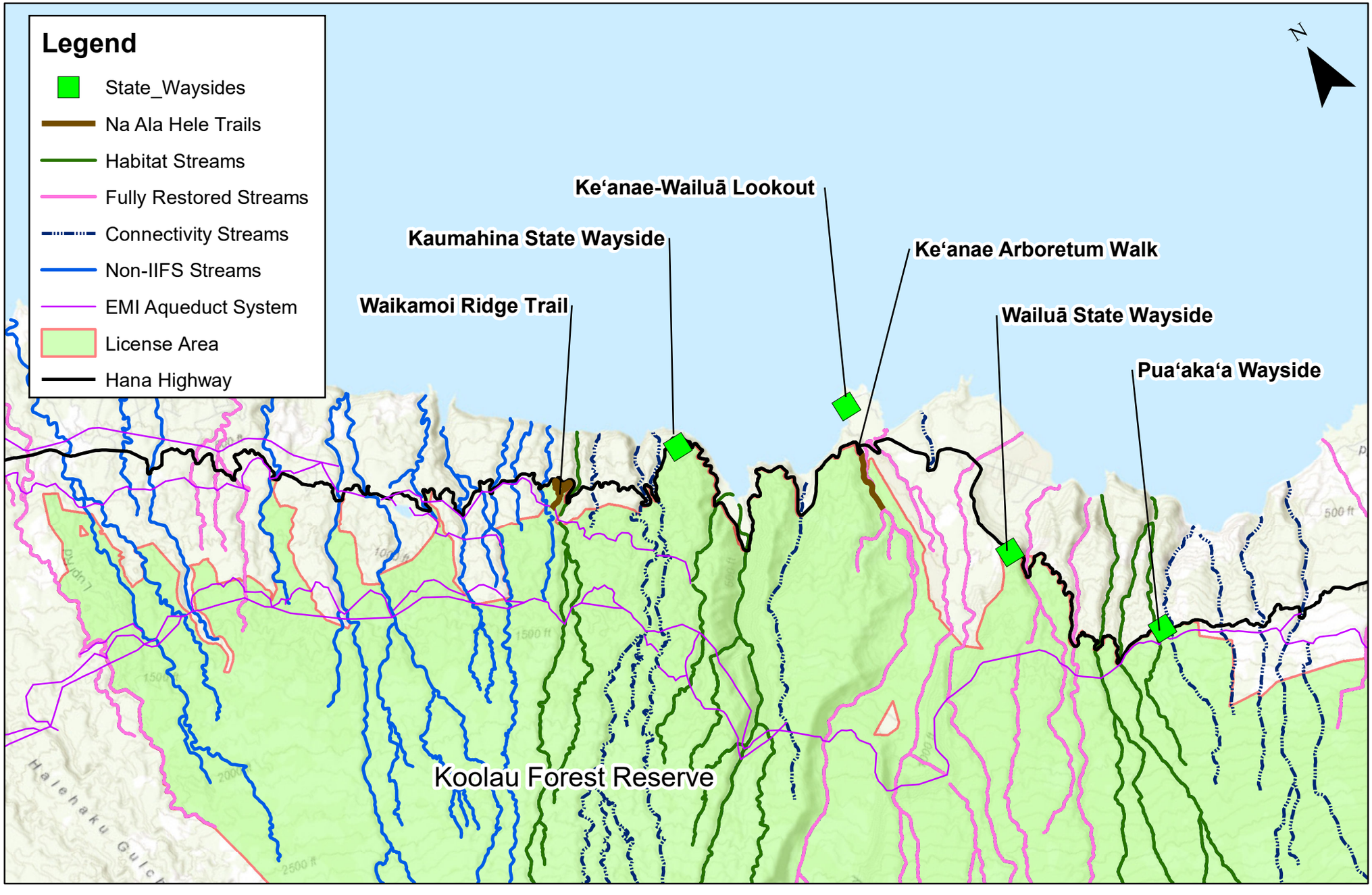
Ke'anae-Wailuā Lookout is located off of Hāna Highway on Ke'anae Road offering views of the Ke'anae peninsula and is makai of the Ke'anae Arboretum Walk. This lookout is near a historic taro cultivation site that is still utilized today and is in the vicinity of Pi'ina'au Stream which enters the ocean just east of the lookout and is ordered for full restoration.

Twin Falls is partially within the License Area. The upper falls are within the License Area but the area that is frequently visited is outside the License Area. It is noted that participants in the SIA noted that the Twin Falls trails and other area trails are subject to overgrown landscaping and flash flood conditions.

The YMCA operates Camp Ke'anae just below the License Area on the Ke'anae Peninsula located at mile marker 16.5 on the Hāna Highway.

In response to DEIS comments regarding additional recreational facilities in the East Maui region the YMCA offers camping facilities, a grass game field, and a full size indoor gymnasium/basketball/volleyball court and covered outdoor seating. Moreover, Camp Ke'anae is adjacent to several kalo patches that use waters from Pi'ina'au Stream, which has been ordered for full restoration. CWRM D&O at 269.

The Garden of Eden Arboretum is also just below the License Area which opened up to the public in 1996. The Arboretum features over 700 botanically labeled speciments, 2.5 miles of trail, access to Puohokamoa Waterfall, an art gallery, and a café. The arboretum is nestled between Ha'ipua'ena and Puohokamoa Streams, both of which were set as "Connectivity Streams" by CWRM.



Source: ESRI, State OP, & Akinaka

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FIGURE 4 40 4-37

RECREATIONAL MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KEʻANAE, HONOMANŪ, AND HUELO LICENSE AREAS

The Ko'olau Forest Reserve Hunting Unit encompasses portions of the Huelo, Honomanū, ~~and~~ Ke'anae, and Nāhiku portions of ~~within~~ the License Area (See Figure 4-41 ~~4-38~~). The Hunting Unit is administered the DLNR, Division of Forestry and Wildlife. To hunt within the License Area, hunters must obtain a license from the DLNR and an EMI Permit / Waiver. Hunting grounds are limited to one hunting party per hunting area, as regulated by the DLNR. Hunters enter the hunting unit every Saturday and Sunday, as well as holidays observed by EMI. Prior to entering, hunting parties must sign in with the license number obtained from the DLNR, and upon exiting must log in any game that are taken. Access to the hunting grounds is managed by EMI through eight existing EMI access roads. Hunting is permitted year round. Hunting parties may enter the License Area by vehicular access, however, must traverse by foot in most areas.

Hiking is also a permitted recreational use within the License Area~~, and is limited to hiking clubs~~. Access to the License Area for hiking is acquired through a Hiking Waiver from EMI. Generally ~~Only~~ two hiking clubs currently enter the License Area lands approximately four to six times a year; the Sierra Club Maui Group and Mauna Ala Hiking Club. They enter on foot, and are guided by a club hiking expert with a manageable number of people. However, individual hikers are also permitted to enter the License Area and are subject to the same requirements as the hiking clubs.

Other recreational uses are not permitted on the License Area for safety reasons, but trespassing and unpermitted access for hiking, gathering, and illegal hunting does occur on these State lands. It should be noted that in the past people have used the EMI Aqueduct System as a recreational resource and unfortunately have died as a result. The EMI Aqueduct System is not a recreational resource. As discussed in response to DEIS comments, EMI has taken many steps to promote ditch safety on Maui, including conducting a safety audit of the EMI Aqueduct System using local and national experts which resulted in a program of ditch improvements (e.g., fencing, physical barriers, signage) in an effort to help prevent future incidents. Safety grates have been installed on all siphons. EMI also intensified its existing school presentation programs, giving in person slide presentations about the EMI Aqueduct System and the dangers of playing in it. EMI initiated a program of print and radio safety ads, focused around school vacation periods. EMI also created the EMI Safety Program, partnering with eight youth clubs across Maui to conduct an annual "Play Hard, Play Safe" campaign, that includes an EMI Safety Selfie contest, that serves to increase Maui youth's awareness of the dangers of playing in the ditches. Notwithstanding these efforts, trespassing cannot be completely controlled.

It was noted by DEIS commenters that many of the East Maui communities utilize several of the streams for their own personal recreational use. The streams mentioned included Hanahana (also known as Hanawana), Ho'olawa, Mokupapa, Honokalā, Honopou, and Huelo. For clarification, Honokalā Stream is outside the License Area and is not subject to the CWRM D&O, nor is it diverted by the EMI Aqueduct System. Ho'olawa, Mokupapa, and Hanahana streams are non-petitioned streams within the License Area and it is assumed that these will continue to be diverted by the EMI Aqueduct System. Both Honopou and Huelo are petitioned streams within the License Area and were ordered for full flow restoration and therefore will not be diverted under the Proposed Action.

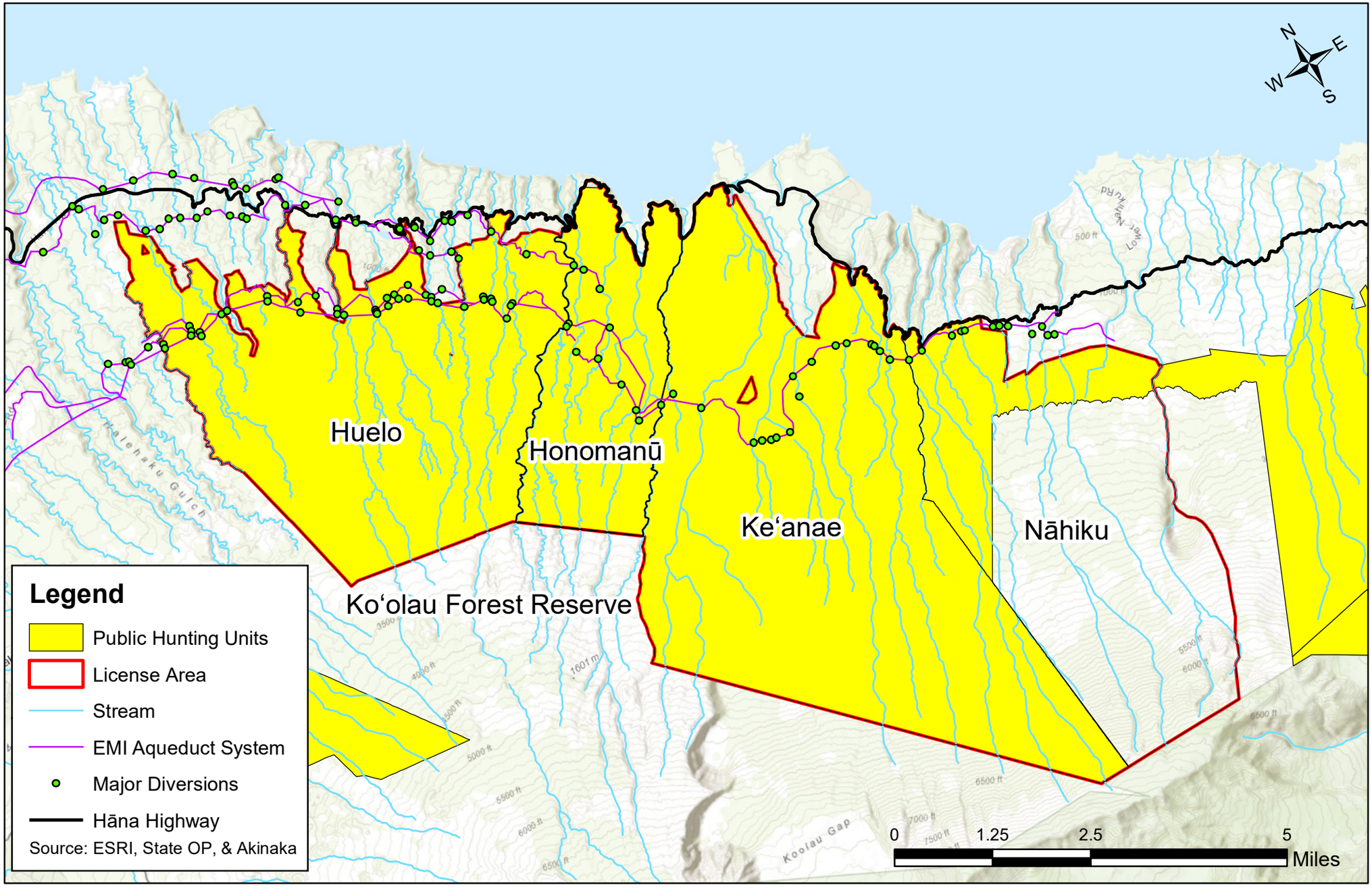

FIGURE 4-41 ~~FIGURE 4-38~~

KOʻOLAU FOREST RESERVE HUNTING UNIT MAP

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KEʻANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

The *Hawaii Stream Assessment A Preliminary Appraisal of Hawaii's Stream Resources* (1990) conducted by the Hawai'i Cooperative Park Service Unit does not list Honokalā or Mokupapa streams. The assessment ranks Ho'olawa Stream as having significant recreation opportunities, offering hiking, swimming, and scenic views. The assessment ranks Hanawana Stream as having moderate recreational opportunities offering hiking and scenic views.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System.

In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on recreational uses and park facilities in the East Maui are anticipated.

In general, the permitted recreational activities (hunting and hiking) in the License Area are not dependent upon the volume of water flowing in the streams. Nevertheless, with an increase in base streamflow, the subjective experience of individuals participating in hunting or hiking could be enhanced by the aesthetic of increased stream flows. In the lower reaches of streams below the License Area, streams with higher base flow would enhance recreational sightseeing, swimming and fishing/gathering activities. Increased streamflow could also impact the physical safety of those entering streams as streamflow could potentially be more turbulent. However, streams with lower base flow may have limited recreational opportunities. Specifically, those streams that are diverted by the EMI Aqueduct System may offer fewer recreational opportunities as compared to a fully undiverted state.

The waysides and parks along Hāna Highway in East Maui will benefit aesthetically by the increased streamflows ordered by the CWRM D&O for the streams they are associated with, as discussed previously, and may also result in an increase of recreational use of the streams such as swimming or fishing. The Proposed Action must be in compliance with the CWRM D&O so the beneficial effects on recreation should not be altered by implementation of the Proposed Action.

However, as mentioned previously, the revocable permits that the BLNR approved for the year 2020, as well as the year 2021, removed the Hanawī NAR from the License Area under the revocable permits. Thus, it is anticipated that the BLNR may remove the Hanawī NAR and/or other lands within the License Area from the eventual scope of the Water Lease under the Proposed Action. This could have a positive impact on recreational opportunities and resources within the License Area, as it is presumed that a modified License Area would allow for more public access as discussed in detail in Section 3.2.2.2, and comparatively in Section 3.4.

Upcountry Maui

The County's Department of Parks and Recreation operates and maintains several parks and recreational facilities within Upcountry Maui, which include the following: The Eddie Tam Memorial Center, Hāliʻimaile Park, Harold Rice Park, Kēōkea Park, Kula Community Center and Tennis Courts, Mayor Hannibal Tavares Community Center & Upcountry Pool, New Kula Ball Field, Old Kula Center, Sun Yet Sen Park, and the Waiakoa Gymnasium. Many of these facilities include irrigated landscaping restrooms, showers, water fountains, and pools that are supplied with water delivered through the EMI Aqueduct System.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on recreational uses and park facilities in the region are anticipated as the amount of water that has been used to service these facilities is anticipated to remain close to current levels. In the Proposed Action, however, because the CWRM D&O requires maintenance of base flow in certain streams, the amount of water that can be diverted when streams are naturally running low would be reduced. This would likely occur during seasonally drier summer months. If the shortage is prolonged, water conservation measures may be required. Imposition of such measures could become more frequent and last longer.

Central Maui

There are no parks or permitted recreational activities, including hunting, within the agricultural fields in Central Maui. The County's Department of Parks and Recreation operates and maintains several parks and recreational facilities within Central Maui, in the vicinity of the Central Maui agricultural fields, including the following: Kahului Community Center, Kahului Park, Kamaliʻi Park, and Baldwin Park. Several golf courses are also located in the vicinity of Central Maui, including the King Kamehameha Golf Club, Dunes at Maui Lani Golf Course, and Maui Country Club. As noted in a comment letter to the DEIS, also located in the region is Maui Raceway Park which operates out of a 220-acre facility managed by the County of Maui. There are also several public and private pools that serve the communities in the area. Water derived from the EMI Aqueduct System is not used for any recreational facilities in Central Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the continued transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No

significant impacts on recreational uses and park facilities in the Central Maui region are anticipated.

4.9 Visual Resources

Maui's visual resources are important to the ~~state's~~ State's tourism industry and the quality of life enjoyed by the State's residents. The island's visual resources include a broad range of natural and developed areas and a tremendous variety of land uses, water bodies, and vegetation types. These visual resources also include urbanized areas that range from small rural towns to the largest city of Kahului.

East Maui

Several scenic view planes can be found within the vicinity of the License Area. Specifically, the License Area is located along the slopes of Haleakalā in East Maui, and affords views of the ocean to the north and the peak of Haleakalā to the south. The scenic drive along the Hāna Highway was recognized in 2000 when President Clinton designated the Hāna Millennium Legacy Trail. The following year it was listed in the National Register of Historic Places. The drive along Hāna Highway is notable for views of waterfalls, including those in streams flowing out of the License Area. The highway also features waysides, lookouts and trails discussed Section 4.7.1. Several commenters during the public review of the DEIS discussed seeing scenic vistas, cascading waterfalls, and stream flow become more prevalent over the recent past years, since the cessation of sugarcane activites in Central Maui. Several of the commenters have also seen an increase in road traffic due to an increase in daily visitor to the East Maui region. Although data is not available on number of visitors to East Maui, it is noted that the years since sugarcane cultivation halted has also coincided with record numbers of visitor arrivals to the State of Hawai'i and island of Maui. Between 2017 and 2019, data from the State of Hawai'i, Department of Business, Economic Development, and Tourism indicates that visitor arrivals to Maui have increased from 2.4 million visitors to 3.1 million visitors. These figures are from a period prior to the COVID-19 pandemic. The CWRM D&O recognized the following streams as having opportunities for scenic views based on the Hawai'i Stream Assessment (1990): Waikamoi, Puohokamoa, Haʻipuaʻena, Honomanū, Nuaʻailua, Piʻinaʻau, ʻŌhiʻa, Waiokamilo, Wailuānui, West Wailuāiki, East Wailuāiki, Kopiliʻula, Waiohue, Hanawī, and Makapipi streams.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. It should be noted that aesthetic and scenic values are considered by the CWRM in setting instream flow standards and were considered by the CWRM in establishing the IIFS under the CWRM D&O. "When setting IIFS, the information that is considered in connection with aesthetic values such as waterfalls and scenic waterways is the presence of scenic views, waterfalls and whether there is tourism in the area." (CWRM D&O, FOF 70) "Aesthetics is a multi-sensory experience

related to an individual's perception of beauty. As a subjective value, aesthetics cannot be quantitatively determined. Elements, such as waterfalls and cascading plunge pools that appeal to an observer's visual and auditory senses." (CWRM D&O, FOF 71). No significant impacts on visual resources in the region are anticipated because no new construction or land alteration is planned for the License Area. However, in the short-term, measuring from the current time, where diversions are lower due to reduced, from a historic perspective, but growing ~~the lack of~~ agricultural activity in Central Maui, against the time when Mahi Pono's diversified agriculture needs begin to use the maximum amount of water permitted, there will be a decrease in stream flows and waterfalls that can be viewed along Hāna Highway. However, these changes ~~this expected decrease from the current baseline~~ must be considered in a historical context as well: the impacts to such visual resources under the Proposed Action will be far less than the impacts over the years of sugarcane operations when vastly more water was diverted from East Maui than is planned under the Proposed Action.

Upcountry Maui

Many scenic viewplanes are found within Upcountry Maui. Specifically, Upcountry Maui extends from the northern shores of Ha'ikū to near Makena. It affords views of the ocean to the north and south, the central isthmus and Mauna Kahalawai to the west, and the peak of Haleakalā to the east.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on visual resources in the Upcountry Maui region are anticipated because no new activities of a significant nature are associated with the Proposed Action. Moreover, any activities that may or may not take place within Upcountry Maui are beyond the control and scope of the applicant and are not within the scope of the proposed Water Lease.

Central Maui

Central Maui's visual resources consist mainly of agricultural plains and old sugar plantations. Specifically, Central Maui is located just west of the northern portion of Upcountry Maui. It boasts the view planes of the ocean to the north and south, Mauna Kahalawai to the west, and Haleakalā to the east. When sugar was being cultivated, the agricultural fields would provide a pastoral seasonally green backdrop. Since sugar is harvested on a two-year cycle, most of the fields would be green during the growing season and at least half would be green during harvest. As sugar shut down ~~statewide~~ Statewide, the Central Maui fields closed the final chapter of the industry, providing a last look back at a history that spanned 138 years in Hawai'i. Subsequently, fallow fields offer a more arid scene of pioneer species, mostly weeds, invading the agricultural fields which are generally brown in color and are not aesthetically attractive. In addition to cultivating approximately 20,650 acres of green open space in the form of farms and irrigated pastures, Mahi Pono proposes to construct approximately 319,000 square feet

of building space related to its agricultural operations such as washing and packing areas, storage, etc. The processing facilities will be located within a half-mile from the former HC&S Sugar Mill. The height of these proposed structures will not exceed the height of the former HC&S Sugar Mill, and will be in compliance with the County of Maui Zoning Code. The Mahi Pono farm plan also proposes approximately 250 acres of "green energy," such as for solar farm(s).

Impacts and Mitigation Measures

The Proposed Action will result in the transitions of the agricultural fields formerly in sugarcane operation to diversified agriculture operations. Currently, a majority of the fields are fallow and minimal, but increasing, agricultural activities are occurring. The visual resources are anticipated to shift to diversified agriculture, increasing the scenic beauty of Central Maui as the agricultural fields will return to a cultivated state. As discussed by participants in the SIA, the greenery of Central Maui is an integral part of what makes Maui special, and is appreciated when driving along the coast and on mauka – makai highways, and when flying overhead.

Any structures associated with the Mahi Pono farm plan will not exceed the height of the existing HC&S Sugar Mill, which is approximately 30 feet. Viewplanes and visual resources will not be significantly affected.

Regarding the "green energy" portion of the Mahi Pono farm plan, there could be glint / glare impacts associated with solar farms. Mahi Pono will need to consult with the Federal Aviation Administration (FAA) which requires technical assessments in the interest of safety for the Kahului Airport. Depending on the proximity and the size of the solar farms, a glint / glare assessment may need to be conducted in conjunction with the technical assessments required by the FAA.

4.10 Air Quality

The State of Hawai'i DOH, Clean Air Branch, monitors the ambient air quality in the State for various gaseous and particulate air pollutants. The U.S. Environmental Protection Agency (EPA) has set National Ambient Air Quality standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter. Hawai'i has also established a ~~state~~ State ambient air standard for hydrogen sulfide related to volcanic activity on Hawai'i Island. The primary purpose of the ~~statewide~~ Statewide monitoring network is to measure ambient air concentrations of these pollutants and ensure that these air quality standards are met.

In general, air quality throughout Maui is good, with prevalent tradewinds during most of the year facilitating dispersion and dilution of potential pollutants. Traffic congestion does not occur at a scale that would raise concerns for carbon monoxide accumulation along heavily travelled roadways, even during the calmest wind conditions. Much of the particulate matter emissions that affect air quality on the island of Maui originate from area sources, including agricultural activities on Central and Upcountry Maui. Such activities, however, do not currently reach the scale of former sugar growing operations which, in addition to soil disturbance while working the fields, included cane burning prior to harvesting. More recently, however, wildfires in

Central Maui on fallow fields formerly in sugar cultivation, have generated intense smoke and dust over relatively short periods of time until they have been extinguished.

Impacts and Mitigation Measures

East Maui

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on air quality in the East Maui region are anticipated because the use of surface water through the EMI Aqueduct System does not generate air pollution directly or indirectly, as the EMI Aqueduct System is gravity fed system.

Upcountry Maui

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on air quality in the Upcountry Maui region are anticipated as the Proposed Action would not require the construction of any new water service facilities by the MDWS. Therefore, there would be no associated dust generation, emissions by construction-related vehicles or stationary equipment such as emergency generators.

When the County prepares ~~water service is provided to~~ the planned 262-acre expansion of the KAP, grading and grubbing work prior to cultivation will disturb soils generating dust and emissions from construction vehicles. Such activities are subject to HAR, Section 11-60.1-33, Fugitive Dust, which states, in part: "11-60.1-33(a): No person shall cause or permit visible fugitive dust to become airborne without taking reasonable precautions." And, Section 11-60.1-33(b): "...no person shall cause or permit the discharge of visible fugitive dust beyond the property lot line on which the fugitive dust originates." It will be incumbent on the County to comply with these regulations during the preparation of the expansion area and during its operation; any activities that take place in Upcountry Maui are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

Under the Proposed Action, the regional air quality is expected to improve over historical conditions due to the termination of sugarcane burning practices. However,

the transition to diversified agriculture may affect air quality from an increase in equipment emissions and in the very short-term, from dust from uncultivated land.

Diversified agricultural activities would be subject to HAR, Section 11-60.1-33, Fugitive Dust, which states, in part: "11-60.1-33(a): No person shall cause or permit visible fugitive dust to become airborne without taking reasonable precautions." And, Section 11-60.1-33(b): "...no person shall cause or permit the discharge of visible fugitive dust beyond the property lot line on which the fugitive dust originates. Given the expanse of the agricultural fields in Central Maui, extra precaution must be exercised near its boundaries. Particularly in these areas, mitigation measures will include keeping fallow land to a minimum, using cover crops to minimize exposed soil and limiting vehicular speed during plowing activities and while traveling onsite. Also, water will be used to minimize dust during activities such as grading and grubbing, any gathered soil will be stabilized, any loading for soil will minimize the drop distance, and soil transport will use water or soil covering to control dust. Moreover, as previously mentioned, the Mahi Pono farm team, as well as its lessees, follow BMPs approved by the DOH, NRCS, the EPA, and other governmental agencies in controlling dust and erosion associated with its farming activities.

4.11 Noise

Noise levels are measured in units called decibels, a numeric system expressed on a logarithmic scale. Since the human ear does not perceive all pitches or frequencies equally, noise levels are adjusted, or weighted to correspond to human hearing. This adjusted unit is known as the A-weighted decibel, or dBA. In a rural area with no major roads nearby, noise levels would average around 50 dBA, whereas an urban area near a major arterial roadway would average around 70 dBA.

East Maui

The License Area encompasses predominantly undeveloped State Land Use Conservation District lands, with no industrial sources of noise.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts from noise in the East Maui region are anticipated.

Upcountry Maui

Upcountry Maui is a rural community that emits small scale noise from agriculture, cars, and equipment.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts from noise in the Upcountry Maui region are anticipated. Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

Currently, minimal, but increasing, agricultural operations are occurring within the agricultural fields within Central Maui emitting less noise than was the case under past sugarcane operations.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts from noise in the Central Maui region are anticipated, however, when the Mahi Pono farm plan is fully implemented, the Central Maui fields will have more activity than current levels, possibly resulting in some increase in noise levels from current conditions.

Compared to past sugar operations, however, diversified agricultural equipment and transportation vehicles will generally be smaller and quieter than those that were used to efficiently harvest a monocrop. The system of internal cane haul roads, which will be used for diversified agricultural, help to keep transportation noise away from public areas. Due to the expansive fields in Central Maui, only a few areas are close to noise sensitive uses such as residences. The nearest school, Pukalani Elementary, is a half mile away, and health care facilities are two or more miles away. Diversified agricultural activities conducted near residential areas will be mitigated by confining them to daylight hours and avoiding weekends and holidays.

4.12 Hazardous Materials

A hazardous material is generally characterized as any item or agent (physical, chemical, or biological) which has the potential to cause harm to humans, animals, or the environment, either independently or through interaction with other factors. Toxic Materials are specific hazardous materials identified in regulations. Hazardous wastes are specifically defined or determined as such based on their ignitability, corrosiveness, reactivity, and toxicity. The

potential impacts hazardous materials and waste have on human health and the environment are largely dependent upon their types, quantities, toxicities, and management practices.

Hazardous wastes may take the form of a solid, liquid, contained gas, or semi-solid. In general, any combination of wastes that poses a substantial present or potential hazard to human health or the environment that has been discarded or abandoned is a hazardous waste.

EPA and Hawai'i universal waste regulations streamline hazardous waste management standards for ~~federally-designated~~ Federally-designated "universal wastes," which include: batteries, pesticides and mercury-containing materials. Universal wastes are considered hazardous, however, they are subject to less restrictive waste disposal regulations than for hazardous wastes.

Operations of the EMI Aqueduct System for the Proposed Action do not involve construction or ground disturbing activities, and do ~~does~~ not involve the use of materials and processes that involve chemical agents or materials typical to construction that could be considered hazardous.

East Maui

EMI personnel use ~~federally~~ Federally regulated herbicides to maintain the trails and access roads used for the maintenance of the EMI Aqueduct System.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on or from hazardous materials in the region are anticipated as the Proposed Action does not involve any the use of any hazardous materials, except for the continued use herbicides in accordance with their labels and in compliance with ~~state~~ State and ~~federal~~ Federal regulations in connection with the continued maintenance of the EMI Aqueduct System. Moreover, in January of 2020 EMI committed to foregoing using Round-Up to maintain the EMI Aqueduct System and any trails and access roads.

Upcountry Maui

Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface

water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on or from hazardous materials in the Upcountry Maui region are anticipated as the Proposed Action does not involve any the use of any hazardous materials in Upcountry Maui.

Central Maui

For over a century, sugarcane operations were conducted in the agricultural fields in Central Maui. To maintain sugarcane throughout the years various chemicals were used to maintain and manage crops, maintain equipment and for fuel. A survey of soils across the agricultural fields in Central Maui ~~Mai~~ conducted by Mahi Pono as part of their due diligence investigations did not identify any residues of concern. All required remediation measures have or will be implemented.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on or from hazardous materials in the region are anticipated. Any use of agricultural chemicals for diversified agriculture will be in strict compliance with Federal ~~federal~~ and State regulations and Mahi Pono will exercise due care to prevent the release of fuels, lubricants and other hazardous materials used in their operations, and utilize BMPs in its ~~their~~ agricultural operations approved by the DOH, NRCS, EPA, DOA, and various other governmental agencies as applicable to the use of chemicals. Several commenters during the DEIS phase raised concerns about the types of fertilizers and pesticides that would be used in conjunction with the development of the Mahi Pono farm plan. It should be noted that since January 2020 Mahi Pono has committed to foregoing the use of Round-Up and other glyphosate-based products within the Central Maui agricultural fields. Moreover, the DOA's Pesticide Branch also provides regulatory oversight over Mahi Pono's pesticide use. In accordance with this oversight, records of pesticide use must kept and made available to the Pesticide Branch upon request at any time. In addition, Act 45 which was passed by the 2018 Hawai'i Legislature and effective on January 1, 2019 required that all Certified Applicators of RUP submit a report of the RUP that were applied each year.

4.13 Traffic

East Maui

The primary thoroughfare in East Maui is Hāna Highway, which is a 64.4 mile-long stretch of Hawai'i Routes 36 and 360 that connects Kahului to Hāna. As a part of the EMI Aqueduct System, there is a system of access roads and trails that are used to access the License Area and maintain the EMI Aqueduct System by EMI personnel.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on traffic in the East Maui region are anticipated. However, as mentioned previously, the revocable permits that the BLNR approved for the year 2020, as well as the year 2021, removed the Hanawī NAR from the License Area under the revocable permits. Thus, it is anticipated that the BLNR may remove the Hanawī NAR and/or other lands within the License Area from the eventual scope of the Water Lease under the Proposed Action. This would result in an increase in pedestrian foot traffic within the License Area, as it is presumed that a modified License Area would allow for more public access as discussed in detail in Section 3.2.2.2.

Upcountry Maui

Upcountry Maui has several thoroughfares. Haleakalā Highway (Hwy 37) is the major entry route into the region. Other primary roads are Baldwin Avenue (Hwy 390), which links Pāʻia to Makawao, Makawao Avenue (West Hwy 365), which connects Makawao to the Haleakalā Highway, and Kaupakalua Road (East Hwy 365) which stretches from Makawao to Haʻikū, just before Hāna Highway.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on traffic in the Upcountry Maui region are anticipated. Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

The Central Maui agricultural fields have an internal roadway network comprised of unpaved “cane haul” roads with limited crossings of public roadways. Until the end of sugar cultivation in 2016, there were three primary traffic signalized crossings being used, two along Haleakalā Highway at North Firebreak Road and Keahua Road; and, one along Mokulele Highway. During the sugarcane harvest season, these traffic signals operated to allow free traffic flow along the highway until crossing signals were activated by HC&S vehicles, primarily large trucks, involved with sugar operations. Other secondary crossings of public roadways occurred at unsignalized crossings on Baldwin Avenue and Pulehu Road. All off-road farm equipment

and the majority of light passenger vehicle traffic, however, utilized the internal roadway network.

During the sugarcane planting and harvesting season, which occurred between March and December, daily harvested cane deliveries by large cane haulers to Pu'unēnē averaged approximately 125 trips. These trips were evenly spread out over a 24-hour period, seven days a week using the internal field roadway network.

The planting operations required 30 semi-truck trailer trips between the seed fields, the seed treatment facility in Pu'unēnē, and the field that was being planted. These trips were spaced out between 6:00 am and 10:00 pm, Monday through Saturday. Harvesting and farm equipment was transported via semi-truck and lowboy trailer as fields were completed, all mostly within the internal field roadway network.

Field and farm workers were transported to their assigned areas by light vehicles in order to coordinate manpower requirements. Generally, this traffic occurred between 7:00 am and 3:30 pm daily with peak movement at the beginning and end of the period. As such, there were approximately 80 vehicles that would have been involved during this transport, again, mostly using the internal field roadway network.

Workers at the HC&S Sugar Mill in Pu'unēnē commuted to one of five designated employee parking lots, the largest located at the corner of Hansen Road and Pu'unēnē Avenue. Table 4-21 ~~4-9~~, estimates the number of vehicles in the employee parking areas by time and day of the week as an indication of vehicle traffic demand attributable to mill workers.

Table 4-21 ~~4-9~~ Central Maui Traffic

	6:00 AM	2:00 PM	10:00 PM
Sunday	100	80	60
Monday	400	100	60
Tuesday	400	100	60
Wednesday	400	100	60
Thursday	400	100	60
Friday	400	100	60
Saturday	200	80	60

(Source: A&B)

Since the closure of sugar operations in 2016, there has been little traffic on the field roadway network, mainly consisting of Mahi Pono vehicles accessing the fields.

Impacts and Mitigation Measures

Traffic generation for diversified agricultural operations contrasts sharply against the large-scale monocrop sugar operations. Whereas the scale of sugar operations was massive and highly coordinated, diversified agriculture involves a multitude of smaller scale operations that are dispersed over time according to specific crop requirements.

Unlike a monocrop, diversified crops would not necessarily share the same time frame for planting, tending, harvesting, processing and distribution. Therefore, traffic associated with those activities would be much more dispersed seasonally, over the work week and on a daily basis. Moreover, such traffic would largely be using an internal roadway network that was designed to minimize conflicts by vehicles used in sugar operations with the public roadway system.

At full operation, Mahi Pono expects to have some 790 farm employees. This compares to approximately 640 for HC&S. It is not certain if Mahi Pono's distribution of employees between the fields and a processing center near the former sugar mill in Pu'unēnē ~~Puunene~~ will be similar to former sugar employees between the fields and the mill. But, the expanse of the fields and the internal roadway system to the mill suggests that the impacts to public roads will not be significant.

Therefore, it is anticipated that traffic associated with the proposed diversified agricultural operations in Central Maui will not adversely affect peak-hour traffic conditions on public roadways. Nevertheless, should any traffic conflicts or traffic volume concerns on public roadways by diversified agricultural operations be identified in the future, measures can be taken to assess and address such concerns. Such measures may include signal timing adjustments to establish a minimum time between activation of signals stopping traffic along public streets or the addition of turning lanes.

4.14 Public Services and Facilities

4.14.1 Police, Fire, and Medical Services

East Maui

Police: Law enforcement services for the License Area are provided by the State of Hawai'i Division of Conservation and Resources Enforcement. The general region outside of the License Area is served by the County Police Department's headquarters in Wailuku and the Department's East Maui Patrol.

Fire: Fire protection service for the License Area is provided by the State of Hawai'i Division of Forestry and Wildlife. The general region is also served by the County Department of Fire Control's Makawao and Pā'ia Stations, which are located 6-7 miles east and south east of the proposed License Area, respectively.

Medical Services: Maui Memorial Medical Center is the only major medical facility on the island and services the East Maui region. Acute, general, and emergency care services are provided by this 196-bed facility, while other medical and dental offices and practices are located nearby in Upcountry Maui, in Pukalani, and Makawao, as well as in Hāna. Emergency ambulance and air evacuation stations are located in both Makawao and in Hāna.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface

water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of DHHL. No significant impacts on public services in the region are anticipated as the Proposed Action will not generate the need for additional police, fire, medical services.

Upcountry Maui

Police: Law enforcement services for Upcountry Maui are provided by Maui Police Department. Upcountry Maui is located approximately 13 miles from the Maui Police Department's headquarters in Wailuku.

Fire: Fire protection service for Upcountry Maui is provided by the Maui Country Fire Department. The general region of Upcountry Maui is serviced by the Makawao and Kula Fire Stations.

Medical Services: Maui Memorial Medical Center and Kula Hospital are ~~is~~ the only major medical facilities ~~facility~~ on the island and service ~~services~~ the Upcountry Maui region. Acute, general, and emergency care services are provided by the Maui Memorial Medical Center ~~this~~ 196-bed facility as well as the Kula Hospital, while other medical and dental offices and practices are located in Upcountry Maui. Emergency ambulance and air evacuation stations are located in both Makawao and in Hāna.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on public services in the region are anticipated as the Proposed Action will not generate the need for additional police, fire, or medical services.

When water service is provided to the planned 262-acre expansion of the KAP, and the County undertakes the grading and grubbing work prior to cultivation, that will be accomplished by earth moving equipment that will be delivered to the site using public roads. At that time police services may be required. When the expansion becomes operational, service requirements may be needed, similar to services made available ~~currently provided~~ for the existing KAP ~~may increase demand for these services~~. However, any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

Police: Law enforcement services for Central Maui are provided by Maui Police Department. Central Maui is located in the patrol area of Maui Police Department's headquarters in Wailuku.

Fire: Fire protection service for Central Maui is provided by the Maui Country Fire Department. The general region of Central Maui is serviced by the Wailuku, Kahului, and Pā'ia Fire Stations. Additionally, water from the EMI Aqueduct System is used to support fire suppression needs in and around the Pu'unēnē mill area and adjacent properties.

Medical Services: Maui Memorial Medical Center ~~is~~ and Kula Hospital are the only major medical facility on the island and services the Central Maui region. Acute, general, and emergency care services are provided by this 196-bed facility, while other medical and dental offices and practices are located in Central Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on public services in the region are anticipated as the Proposed Action will not generate the need for additional services. The Proposed Action will allow for the continuation ~~resumption~~ of the relationship with the Maui County Fire Department which allows its ~~their~~ use of water from the various reservoirs within the agricultural fields to fight fires.

4.14.2 Education

East Maui

The State of Hawai'i Department of Education operates ten schools in the proximity of East Maui, including five elementary schools, two middle schools, two high schools, and one charter school. Public schools servicing the region include Pā'ia Elementary School, Hāna Elementary School, Makawao Elementary School, Pukalani Elementary School, Ha'ikū Elementary School, Ke'anae School, Samuel Enoka Kalama Intermediate School, Hāna Intermediate & High School, and King Kekaulike High School.

There are a total of nine private schools that serve the region, including Kamehameha Schools Maui, Doris Todd Memorial Christian School, Clearview Christian Girls School, Seabury Hall, St. Joseph School, Haleakalā Waldorf School, Horizons Academy, Maui Ocean Academy, and Montessori of Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with CWRM D&O and any

reservations in favor of DHHL. No significant impacts on education in the region are anticipated.

Upcountry Maui

The State of Hawaiʻi Department of Education operates 11 schools in the proximity of Upcountry Maui, including six elementary schools, two middle school, two high schools, and one charter school. Public schools servicing the region include Pāʻia Elementary School, Hāna Elementary School, Makawao Elementary School, Haʻikū Elementary School, Pukalani Elementary School, Keʻanae School, Kula Elementary School, Samuel Enoka Kalama Intermediate School, Hāna Intermediate & High School, and King Kekaulike High School.

There are a total of nine private schools that serve the region, including Kamehameha Schools Maui, Doris Todd Memorial Christian School, Clearview Christian Girls School, Seabury Hall, St. Joseph School, Haleakalā Waldorf School, Horizons Academy, Maui Ocean Academy, and Montessori of Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on education in the region are anticipated. Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

The State of Hawaiʻi Department of Education operates 11 schools in the proximity of Central Maui, including six elementary schools, two middle school, two high schools, and one charter school. Public schools servicing the region include Pāʻia Elementary School, Hāna Elementary School, Makawao Elementary School, Haʻikū Elementary School, Pukalani Elementary School, Keʻanae School, Kula Elementary School, Samuel Enoka Kalama Intermediate School, Hāna Intermediate & High School, and King Kekaulike High School.

There are a total of nine private schools that serve the region, including Kamehameha Schools Maui, Doris Todd Memorial Christian School, Clearview Christian Girls School, Seabury Hall, St. Joseph School, Haleakalā Waldorf School, Horizons Academy, Maui Ocean Academy, and Montessori of Maui.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a

diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on education in the region are anticipated. Moreover, among other things, Mahi Pono intends to provide agricultural plots for research and offer an internship program for high school and college students.

4.14.3 Solid Waste Collection and Disposal

With the closure of the Makawao Landfill, all solid wastes generated on the island of Maui are transported to either the Central Maui Landfill in Pu'unēnē, or the Hāna Landfill in Hāna.

East Maui

Solid waste generated in East Maui would be transported to Hāna Landfill in Hāna.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the lessee to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on solid waste collection and disposal in the region are anticipated as the Proposed Action will not generate any solid waste.

Upcountry Maui

Solid Waste generated in Upcountry Maui is transported to the Central Maui Landfill in Pu'unēnē due to the closure of the Makawao Landfill.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on solid waste collection and disposal in the region are anticipated as the Proposed Action will not generate any solid waste. However, any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

Solid Waste generated in Central Maui is transported to the Central Maui Landfill in Pu'unēnē.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on solid waste collection and disposal in the region are anticipated as the Proposed Action will not generate any solid waste.

4.15 Infrastructure and Utilities

4.15.1 Water System

East Maui

The most extensive infrastructure system in East Maui is the EMI Aqueduct System which spans the State-owned License Area and extends beyond it at Honopou Stream to Māliko Stream where the last stream diversion is located. It consists of approximately 388 separate intakes, 24 miles of ditches, and 50 miles of tunnels, as well as numerous small dams, six major reservoirs, intakes, pipes, 13 inverted siphons and flumes. Beyond Māliko Stream, the EMI Aqueduct System ~~system~~ enables the delivery of ~~delivers~~ collected flows to Upcountry Maui and ~~then~~ to Central Maui where it transitions to the Central Maui Field Irrigation System. Section 1.1.1 illustrates and describes the history of the EMI Aqueduct System.

During full sugar cultivation in 2008, the cost to operate the EMI Aqueduct System ~~system~~ was estimated to be $1.8M per year (Munekiyo Table 4). Since the closure of sugar, the cost has been approximately $1.6 ~~1.5~~M per year due to adjustments required to reduce flow and more recently to implement the CWRM D&O. It is projected that maintenance costs will return to a more stable condition with the Proposed Action at approximately $2.2 ~~1.4~~M per year, which is comparable to the five year period preceding the closure of sugar.

A portion of the Nāhiku community, a settlement located below the Nāhiku and Ke'anae portions of the License Area, is served by the MDWS directly through the EMI's West Makapipi Tunnel 2 (Well No. 4806-07) (also known as the Nāhiku Tunnel), a development tunnel located on EMI land directly adjacent to the Koolau Ditch. As noted in Section 2.1.3.3, per a 1973 Memorandum of Understanding, as amended, MDWS, can draw only up to 20,000 gallons of water per twenty-four hour day to serve the Nāhiku community. EMI continues to deliver water to the MDWS for the Nāhiku community pursuant to the agreement. However, that water delivery is premised upon EMI's continued receipt of permits or a lease from the State BLNR. Even though the agreement provides the MDWS a right to up to 20,000 gpd per twenty-four hour day, EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). ~~Aqueduct System via a development tunnel in the Koolau Ditch near Makapipi Stream. The tunnel draws up 20,000 to 45,000 gallons per day, dependent on weather, directly from the EMI Aqueduct System.~~ The area is at a lower elevation where the water system has sufficient pressure for residential service. A more detailed description of this service is provided in Section 2.1.2.3.

Impacts and Mitigation Measures

No significant adverse impacts to the EMI Aqueduct System and the Nāhiku Water System ~~water system~~ are anticipated from the Proposed Action as diversions are removed or modified in the EMI Aqueduct System to comply with the CWRM D&O. ~~and to convey the amount of water required to supply the MDWS in Upcountry Maui and to Central Maui agricultural fields as they are converted from fallow conditions to diversified agriculture. In the long-term, the~~ MDWS service to Nāhiku would be similar to current conditions.

Upcountry Maui

The MDWS operates and maintains the "Upcountry Maui Water System" which services the communities of Kula, Pukalani, Makawao Haʻikū, Hāliʻimaile, Waiakoa, Kēōkea, Waiohuli, ʻUlupalakua, Kanaio, Olinda, ʻŌmaʻopio, Kula Kai, and Pūlehu. In Upcountry Maui, the MDWS serves customers' water needs for both domestic (approximately 60% of use) and agricultural (approximately 40% of use), including the agricultural users at the KAP.

The Upcountry Maui Water System relies on three surface water sources, which accounts for approximately 80-90 percent (13 mgd) of water delivered through the system (CWRM FOF 800, p. 211, 2018). One of the three surface water sources is delivered directly by the EMI Aqueduct System, through the Wailoa Ditch. Average daily use by the MDWS from the Wailoa Ditch is 7.1 mgd, which includes water processed by the Kamole-Weir WTP and non-potable water for the KAP, which is fed by the Hamakua Ditch, an extension of the Wailoa Ditch ~~receives water from Reservoir 40~~. A more detailed description of this service is provided in Section 2.1.3.1.

Impacts and Mitigation Measures

No significant adverse impacts on the Upcountry Maui Water System are anticipated from the Proposed Action as diversions are removed or modified in the EMI Aqueduct System to comply with the CWRM D&O and to convey diverted flows out of the License Area. It can be assumed that the Proposed Action would provide a secondary beneficial impact to Upcountry Maui as it would allow for continued water delivery from the EMI Aqueduct System to the MDWS Upcountry Maui Water System to meet water demands. In the long-term, as diversified agriculture grows in Central Maui, the amount of water that the CWRM D&O allows to be diverted may be insufficient to meet all demands during periods of drier weather during the summer months. Because the CWRM D&O requires that base flow to be kept in certain streams, during drier weather when streamflow is low, flows may not reach a volume at which diversion would be permitted. If prolonged, this shortage could require mandatory conservation measures to be implemented, as they have in the past. Such measures, however, could be required more frequently and last longer than in the past. The effects of climate change could exacerbate this impact. However, this impact is not a result of the implementation of the Proposed Action. Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

Irrigation water for diversified agriculture in the Central Maui agricultural fields is discussed in Section 2.1.4. As mentioned previously, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System in Central Maui (i.e. Distribution from Kamole-Weir WTP to the agricultural fields and also within those fields). As part of this upgrade, Mahi Pono's irrigation engineering team is also implementing high-efficiency irrigation systems. These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycling and re-using all water used in Mahi Pono's processing plants; and (3) integrating various live technology feeds to constantly monitor plant, soil, and tree health, thereby making a more sustainable use of the water resources. There is no ~~other~~ domestic or agricultural water service provided in Central Maui by the MDWS using water from the EMI Aqueduct System.

Impacts and Mitigation Measures

Impacts of the Proposed Action and alternatives on the availability of irrigation water for diversified agriculture in the Central Maui agricultural fields are discussed in Section 2.1.4. There are beneficial impacts arising from Mahi Pono's planned improvements to the Central Maui Field Irrigation System as it relates to water usage. Since ~~there is no other usage of water from the EMI Aqueduct System in~~ the Central Maui public water systems, no impacts associated with the Proposed Action ~~or alternatives~~ are anticipated.

4.15.2 Wastewater System

East Maui

There are no County operated wastewater disposal facilities in the East Maui region. Individual wastewater disposal needs in the area are currently addressed either by cesspools, septic tanks or individual wastewater treatment systems.

Impacts and Mitigations

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on wastewater systems in the region are anticipated.

Upcountry Maui

There are no County operated wastewater disposal facilities in the Upcountry Maui region. Individual wastewater disposal needs in the area are currently addressed either by cesspools, septic tanks or individual wastewater treatment systems.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI

Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on wastewater systems in the region are anticipated. Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

There are no County operated wastewater disposal facilities in the Central Maui ~~region~~ agricultural fields. However, the Puʻunēnē Mill facility has a private system which is connected to the County wastewater system in the region. Individual wastewater disposal needs in the area are currently addressed either by cesspools, septic tanks or individual wastewater treatment systems. Except for HC&D's (HC&D is also known Amerson) facility restrooms, none ~~None~~ of these systems use water from the EMI Aqueduct System. Currently, most workers in the Central Maui agricultural fields use porta potties and this is expected to continue through full impmentation of the Mahi Pono farm plan, as the need and number of porta potties is largely dependent on planting / harvesting schedules.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. It is anticipated that all proposed water used in the office and processing facilities associated with the Mahi Pono farm plan (except for restrooms) will be recycled and re-used as part of Mahi Pono's Central Maui Field Irrigation System. Any limited needs for restroom facilities (which is projected to be even less than the prior uses during sugar cultivation and processing), may be served by transmission lines to the County wastewater system and/or by connecting to the Puʻunēnē Mill facility, if permitted. As such, no ~~No~~ significant impacts on wastewater systems in the region are anticipated.

4.15.3 Electrical System

East Maui

Electrical service to communities in East Maui, where available, is provided by the Maui Electric Company (MECO). The MDWS relies on this service to treat and supply water derived from the EMI West Makapipi Tunnel 2 (Well No. 4806-07) (also known as the Nāhiku Tunnel), a development tunnel located on EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System~~ to supply domestic water to a portion of the Nāhiku community.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, and allows the lessee or its permittees, to maintain and repair existing access roads and trails used as part of the EMI Aqueduct System. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on electrical systems in the region are anticipated.

Upcountry Maui

Electrical service to Upcountry Maui, where available, is provided by the Maui Electric Company (MECO). The MDWS relies on this service at the Kamole Weir WTP to process water derived through the Kamole-Weir from the EMI Aqueduct System.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will enable the continuation ~~continue~~ the conveyance of water to the MDWS to meet the domestic and agricultural demands of Upcountry Maui. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on electrical systems in the region are anticipated. Any activities that take place in Upcountry Maui, related to the proposed Water Lease or otherwise, are beyond the scope of this EIS as they are beyond the control of the applicant.

Central Maui

There are two hydroelectric facilities that utilize water derived from the EMI Aqueduct System. One is located in the area historically known as Kaheka Village, and the other at Pāʻia. Currently, only Kaheka Hydroelectric plant is generating at a low load to fulfill house power demand for the office buildings, well security systems and well motor heaters. Excess generation is supplied to the utility grid ~~with no compensation~~.

Generating hydroelectric power is a non-consumptive use of water and the water can subsequently be used for agricultural purposes after flowing through the hydroelectric facilities. Kaheka and Pāʻia Hydroelectric Plants generate power to supply the many drip irrigation systems, groundwater well pumps, and facility/tenant buildings through a private 62-mile transmission grid throughout the Central Maui agricultural fields.

The Central Maui agricultural fields also have the ability to access power from MECO.

The Water Lease will allow the continued use of surface water for hydroelectric generation at the Kaheka and Pāʻia plants.

Impacts and Mitigation Measures

The Proposed Action is limited to the issuance of the Water Lease for the subject License Area, which would enable the applicant to continue operation of the EMI Aqueduct System that has been in operation for over a century. The Proposed Action continues the use of the EMI Aqueduct System ~~system~~ for the transport of surface water, which will allow for the transition of the agricultural fields in Central Maui to a diversified agriculture operation. The farm plan contemplated in relation to the Proposed Action includes ~~a~~ solar farm(s) to generate 37.5 MW ~~mW~~ of clean energy to be provided to the MECO grid and/or for Mahi Pono's farm operations. Although Mahi Pono does not intend to rely on MECO power, Mahi Pono intends to retain a connection to the MECO grid in any event, and that connection would support back up and off-peak power needs, if needed. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on electrical systems in the region are anticipated.

4.16 Interim Historic Uses

For the interim period, prior to full implementation of the Mahi Pono farm plan (projected in 2030), limited amounts of water will continue to be provided to areas outside of the Central Maui agricultural fields that have historically received water from the EMI Aqueduct System. The amount of water supplied to these uses has varied over the years, ranging on average between 2008 to 2013 at approximately 0.41 mgd, and since 2017 at approximately 1.1 mgd.

These historic uses include water for pasture, livestock, non-profit irrigation and fire suppression at/around the Pu'unēnē Mill area, including for non-profits and a federal post office, as well as for related uses around the County's Central Maui landfill (quarry, composting, and construction landfill for purposes such as restrooms, dust control). See Appendix S, from DLNR November 2020 staff report. These limited quantities of water facilitate, in an economic and efficient way, additional agricultural uses, as well as community, commericial and industrial uses. In the long-term, at the point of full implementation of the Mahi Pono farm plan, these uses are not anticipated to be supplied with surface water authorized under the proposed Water Lease. The expectation is that all water authorized under the Water Lease would be used to support Mahi Pono's diversified agricultural plan and related operations (less amounts due to the MDWS and DHHL).

4.17 Secondary and Cumulative Impacts

HAR Section 11-200-2 **Definitions and Terminology** provides the following definitions for impacts to be assessed under an EIS.

"Secondary impact" or "secondary effect" or "indirect impact" or "indirect effect" means effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

"Cumulative impact" means the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative

impacts can result from individually minor but collectively significant actions taking place over a period of time.

4.17.1 Secondary Impacts

The secondary impacts of the Proposed Action primarily relate to developing diversified agriculture in Central Maui, including the economic and social impacts of diversified agriculture, delivering water to MDWS for the Upcountry Maui Water System, including KAP and the 262-acre KAP expansion, as well as the Nāhiku community, and job creation on Maui's broader economy and the County's tax revenues. These impacts are summarized in Section 4.7 Socio-Economic Characteristics based on a detailed evaluation in the Economic and Fiscal Impact Study (See Appendix H) report, the Agricultural and Related Economic Impacts (Appendix I) report, and the Social Impact Assessment (See Appendix G.

4.17.2 Cumulative Impacts

4.17.2.1 Cumulative History

The cumulative impact of the Proposed Action can be regarded as an additive impact overlaid on more than 100 years of history during which the EMI Aqueduct System was developed to provide water for the development of a sugar industry in Central Maui as well as for the later development of Upcountry Maui. This FEIS ~~DEIS~~ summarizes the pertinent history in Chapters 1 ~~I~~ and 2, Section 4.5 summarizing the Archaeological LRFI (Appendix E) report, and Section 4.6 summarizing the CIA (Appendix F), as a basis for understanding the events that have shaped the existing environmental conditions described in Chapter 4. In addition, the following studies document the pertinent history related to the sugar industry in Maui and the EMI Aqueduct System and how they have shaped existing environmental conditions:

- The Archaeological LRFI (See Appendix E) report discusses the historic context of the Proposed Action and the greater East Maui region;
- The CIA (See Appendix F) also provides a historic context and documents cultural resources and practices recalled by cultural informants within and in the vicinity of the License Area;
- The HSA (See Appendix D) documents the various characteristic components of the EMI Aqueduct System that provide the historic context for the functioning system; and
- The SIA (See Appendix G), which discusses history in a context for understanding the current perceptions of people from the community, including their perceptions of the recent involvement of Mahi Pono, and the continuation of diverting surface water from East Maui streams.

The cumulative history of the natural environment is reflected in the following studies:

- The Terrestrial Flora and Fauna Technical Report (See Appendix C), which describes the present composition of flora and fauna in the License Area and the agricultural fields of Central Maui that reflect the history of how they have been changed by human activity; and,

- The Assessment of the Environmental Impact of Stream Diversions on 33 East Maui Streams[21] using the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) Model (See Appendix A) report which, likewise, documents the existing and potential for stream habitats of East Maui ~~as they have been shaped by human activity~~.

4.17.2.2 The CWRM D&O

The cumulative impact of the Proposed Action on the existing environment will include its compliance with the CWRM D&O. Through the D&O, the CWRM ordered:

- Full restoration of flow in the following streams to taro growing areas or for community and non-municipal domestic uses: Honopou, Huelo (Puolua), Hanehoi, Piʻinaʻau, Palauhulu, Waiokamilo, Wailuānui, West Wailuāiki,[22] ~~ʻŌhiʻa,/Waianu, Kualani~~, Waiohue and Makapipi. (CWR D&O at 268-269) ~~(COL 138)~~. These streams are identified as "kalo and community streams", and have historically supported significant kalo cultivation.[23]
- Restoration of the following streams restored to a minimum H_{90} level: ~~Piʻinaʻau, Wailuānui,~~ Honomanū, Punalaʻu, Waikamoi, ~~Nuaʻailua,~~ East Wailuāiki, and Kopiliʻula~~, and Waiohue~~. Restoration of these streams should allow the stream species to flourish and reproduce, benefiting not only the natural environment but also allowing for better opportunity for the exercise of traditional and customary native Hawaiian rights. (COL 131).
- ~~Full restoration of West Wailuāiki Stream and Honomanū Stream. West Wailuāiki presents a unique research opportunity to collect valuable information regarding the impact of full restoration of a stream versus habitat restoration H_{90}. Honomanū Stream, despite having several diversions on it, has a high biological rating with a potential for high natural habitat gains with the restoration of flow to the dry reaches. Full restoration would be for the segment of stream below the Lower Kula Ditch diversion. (COL 136).~~
- Provision of a wetted pathway providing connectivity for the movement of instream biota~~.~~ within Kapāʻula, Paʻakea, Puaʻakaʻa, Puohakamoa, Haʻipuaʻena, Nuaʻailua, Waiaʻaka, and Hanawī.

The following studies, as summarized the DEIS in Chapter 4, address the cumulative impacts of the CWRM D&O and the Proposed Action:

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[21] The DEIS identified ~~identifies~~ 37 streams associated with the License Area (See Section 1.1.4.2 of the DEIS). 36 streams were identified in the CWRM D&O associated with the License Area. Two of these streams, Kualani and ʻŌhiʻa streams were not included in Trutta's HSHEP model as they were not diverted by the EMI Aqueduct System and Palauhulu Stream is considered a tributary of Piʻinaʻau Stream and thus was combined with Piʻinaʻau Stream. In the DEIS stage, Puakea Stream was assumed to be an individual stream. However, it has since been determined that Puakea is in fact a tributary to Paʻakea Stream. Hence, it was assessed in the HSHEP model. The version of the report included herein as Appendix A in the DEIS errounously stated that "Puakea Stream was not mentioned in the CWRM D&O and therefore was not assessed in the HSHEP model. That statement was incorrect. ~~was not mentioned in the CWRM D&O and therefore was not assessed in the HSHEP model. This resulted in 33 distinct streams impacted by the EMI Aqueduct System.~~

[22] West Wailuāiki presents a unique research opportunity to collect valuable information regarding the impact of full restoration of a stream versus habitat restoration H_{90}. CWRM D&O COL 135.

[23] CWRM D&O COL 138 also identified ʻŌhiʻa, Waianu, and Kualani as supportive of taro growing or other community uses. however, none of those streams have ever been diverted by the EMI Aqueduct System, as they are located below the EMI Aqueduct System. see CWRM D&O FOF 58.

- The impacts of streamflow restoration as a cumulative impact upon the existing biological habitat conditions of the streams are addressed by the Assessment of the Environmental Impact of Stream Diversions on 33 East Maui Streams[24] using the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) Model (See Appendix A) report.
- The cultural effects of the CWRM D&O and the Proposed Action are discussed in the CIA report.
- The agricultural economic effect of the Proposed Action taking into account the CWRM D&O to restore the kalo streams are assessed in the East Maui Water Lease: Agricultural and Related Economic Impacts report (See Appendix I).

4.17.2.3 Objectives of the Proposed Action

Beyond the impacts of the CWRM D&O, awarding the Water Lease, as described in the Proposed Action, would cumulatively add impacts related to the achievement of its following stated objectives:

- Preserve and maintain the EMI Aqueduct System, including its access roads and trails.
- Continue to meet domestic and agricultural water demands in the MDWS Upcountry Maui Service Area, including KAP and the 262-acre KAP expansion.
- Continue to provide water for agricultural purposes in Central Maui (specifically, to allow for the full transition of fields previously used for sugarcane cultivation into new, diversified agricultural uses).
- Continue to serve community water demands in Nāhiku.

The cumulative impacts of achieving these objectives include the direct and secondary impacts summarized in Chapter 4 of the FEIS ~~DEIS~~ and discussed in detail in the following studies:

- Archaeological LRFI, CIA and the HSA reports discuss the preservation of the EMI Aqueduct System and protection of cultural resources in the License Area.
- The East Maui Water Lease: Agricultural and Related Economic Impacts report and the Economic and Fiscal Impact Study (See Appendix H) report discuss the economic impacts of continuing to meet domestic and agricultural water demands in Upcountry Maui and Nāhiku as well as the provision of water to the agricultural fields in Central Maui to transition its ~~their~~ use from sugar cultivation to diversified agriculture.
- The SIA discusses the perceived social impacts of continuing to meet domestic and agricultural water demands in Upcountry Maui and Nāhiku as well as the provision of

[24] The DEIS identified ~~identifies~~ 37 streams associated with the License Area (See Section 1.1.4.2 of the DEIS). 36 streams were identified in the CWRM D&O associated with the License Area. Two of these streams, Kualani and 'Ōhi'a streams were not included in Trutta's HSHEP model as they were not diverted by the EMI Aqueduct System and Palauhulu Stream is considered a tributary of Pi'ina'au Stream and thus was combined with Pi'ina'au Stream. In the DEIS stage, Puakea Stream was assumed to be an individual stream. However, it has since been determined that Puakea is in fact a tributary to Pa'akea Stream. Hence, it was assessed in the HSHEP model. The version of the report included herein as Appendix A in the DEIS errounously stated that "Puakea Stream was not mentioned in the CWRM D&O and therefore was not assessed in the HSHEP model. That statement was incorrect. ~~was not mentioned in the CWRM D&O and therefore was not assessed in the HSHEP model. This resulted in 33 distinct streams impacted by the EMI Aqueduct System.~~

water to the agricultural fields in Central Maui to transition its ~~their~~ use from sugar cultivation to diversified agriculture.

4.17.2.4 Other Cumulative Impacts

As for reasonably foreseeable actions that, with the Proposed Action, could cumulatively affect the environment, there are none that would affect the amount of water that can be diverted by the EMI Aqueduct System nor are there any foreseeable new or foreseeable alternative uses of water from the EMI Aqueduct System. The EIS does discuss the DHHL's reservation for of water rights sufficient to support current and future homestead needs pursuant to HRS § 171-58(g) in Section 2.1 as well as the use of water by the expanded KAP.

4.18 Summary of Direct, Secondary and Cumulative Impacts

The Proposed Action is the award of a 30-year Water Lease. The lessee will conduct or authorize:

- Management of the diversion of water by the EMI Aqueduct System consistent with the CWRM D&O, thereby establishing how much water will remain in the Petitioned ~~IIFS~~ and Non-Petitioned ~~non-IIFS~~ streams that have historically been diverted and how much water may be diverted for other uses; and,
- EMI access to maintain the EMI Aqueduct System;

The direct, secondary, and cumulative effects of the Proposed Action and the sections of the DEIS in which the impacts are discussed include:

- Direct ~~Impacts~~ impacts are the impacts to the natural environment as a result of changes in streamflow in the License Area - Section 4.2.1 Surface Waters, 4.2.3 Coastal Waters, 4.2.2 Groundwater, and Sections 4.4.1 and 4.4.2 Flora and Fauna.
- Direct ~~Impacts~~ impacts also involve the impacts to those who would use water from the ~~IIFS~~ License Area streams, ~~including~~ for traditional agriculture as well as traditional cultural resources and practices related to streamflow in the ~~IIFS~~ License Area streams – Section 4.6 Cultural Resources and Practices – as well as recreational users of the License Area or in the vicinity of the License Area (Section 4.8 Recreational Users and Park Facilities), in part depending upon the ultimate geographical extent of the License Area approved by BLNR.
- Secondary ~~Impacts~~ impacts are the impacts to consumers of water from the EMI Aqueduct System as served by the MDWS, including residential and agricultural uses in Upcountry Maui ~~and Nāhiku~~ – Section ~~3~~ 4.15.1 Water System.
- Secondary impacts are impacts to MDWS customers within Nahiku whose continued water service is contingent upon the Proposed Action (Water Lease) or continued revocable permits.
- Secondary ~~Impacts~~ impacts are the impacts of using water from the EMI Aqueduct System to develop diversified agriculture in Central Maui – Section 4.7 Socio-Economic Characteristics and Section 4.4 Flora and Fauna.
- Cumulative impacts are the impacts of diverting East Maui stream water through the EMI Aqueduct System for the Proposed Action over the long-term, which will be similar to the existing environmental conditions that are described in Chapter 4, as a result of the EMI Aqueduct System's diversion of water from the License Area streams for over a century, but under the Proposed Action the permitted diversion amounts will be less

than what was historically diverted from those streams due to the flow restoration requirements under the CWRM D&O.

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Chapter 5:

Relationship to Land Use Plans,
Policies, and Controls

5. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

This section discusses the relationship of the Proposed Action to State and County land use plans, policies, and controls. Some of the land use plans, policies, and guidelines are in tabular form, and are addressed with text and/or the following letter code:

S = Supportive, NS = Not Supportive, N/A = Not Applicable

5.1 State Land Use Plans and Policies

5.1.1 Hawai'i State Plan

The Hawai'i State Plan, Chapter 226, HRS, as amended, provides goals, objectives, policies, and priorities for the State. The purpose of the Hawai'i State Plan is to set forth a plan that shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State; provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state, and county activities. The State Plan is divided into three sections. Part 1 is Overall Theme, Goals, Objectives and Policies. Part 2 is Planning Coordination and Implementation. Part 3 is Priority Guidelines. The Proposed Action's consistency with applicable goals, objectives and policies of Part 1 is discussed in Table 5-1, and an assessment of conformance with Part 3 is discussed in Table 5-2. Part 2 of the State Plan, which primarily covers internal government affairs, is not addressed.

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
§226-4 State goals. In order to ensure, for present and future generations, those elements of choice and mobility that ensure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:			
(1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations.	**X**		
(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.	**X**		
(3) Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.	**X**		
Discussion: The Proposed Action will support the State of Hawai'i economy by providing an opportunity to markedly strengthen Hawai'i's agricultural sector with a viable diversified agricultural operation that provides significant employment and revenue. It also will allow for the continued conveyance of water to the MDWS to support Upcountry Maui residents, businesses and farms, as well as the Nāhiku community, by providing domestic and agriculture water to meet the needs of present usage, although current latent demand and any future growth will require alternative sources and infrastructures. Having the Central Maui farmlands in productive diversified agriculture should enhance the desired physical environment by providing a wide, contiguous area of green open space.			
§226-5 Objective and policies for population.			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(a) It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter. To achieve the population objective, it shall be the policy of this State to:			
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.	X		
(2) Encourage an increase in economic activities and employment opportunities on the Neighbor Islands consistent with community needs and desires.	X		
(3) Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.	X		
(4) Encourage research activities and public awareness programs to foster an understanding of Hawai'i's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawai'i's population.			X
(5) Encourage federal actions that will promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			X
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			X
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.	X		
Discussion: The Proposed Action will support the objectives and policies of the State for population. The Water Lease will allow for the continued transition of approximately 30,000 acres of former sugarcane ~~sugar cane~~ land in Central Maui to diversified agriculture. The proposed diversified agriculture operation will contribute toward achieving the State's goal of increasing food self-sufficiency to reduce dependence on oversea sources. Moreover, putting the Central Maui agricultural fields back into operation will increase economic activities and employment opportunities for the population by creating more jobs on the island of Maui. Overall, having the Central Maui lands remain in agriculture will help maintain the rural socio-economic lifestyle on Maui, enjoyed by so many. ~~The~~ EMI ~~Aqueduct System is a resource that~~ provides water to communities in East Maui as well as Upcountry Maui. It delivers water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Upcountry Maui Water System is the second largest on the island and the County anticipates the population dependent on the water system will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. Issuing the Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan for population growth as there are insufficient alternative water sources and infrastructure to meet present and future demands (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). ~~The EMI Aqueduct System conveys water directly to the~~ The Nāhiku community receives its water through MDWS via the EMI ~~Aqueduct System's~~ West Makapipi Tunnel 2, Well No. 4806-07 also known as the Nāhiku Tunnel. According to the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020), the water conveyed from the ~~EMI Aqueduct System~~ West Makapipi Tunnel 2, Well No. 4806-07 serves about 43 water meters currently, and there is sufficient source to accept new water meter service applications to meet future demands of the community.			
§226-6 Objectives and policies for the economy--in general. (a) Planning for the State's economy in general shall be directed toward achievement of the following objectives: (1) Increased and diversified employment opportunities to achieve full employment, increased income			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
and job choice, and improved living standards for Hawai'i's people. (2) A steady growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands. (b) To achieve the general economic objectives, it shall be the policy of this State to:			
(1) Promote and encourage entrepreneurship within Hawai'i by residents and nonresidents of the State.	X		
(2) Expand Hawai'i's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.			X
(3) Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.	X		
(4) Transform and maintain Hawai'i as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.	X		
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawaii.	X		
(6) Seek broader outlets for new or expanded Hawai'i business investments.	X		
(7) Expand existing markets and penetrate new markets for Hawai'i's products and services.	X		
(8) Assure that the basic economic needs of Hawai'i's people are maintained in the event of disruptions in overseas transportation.	X		
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.			X
(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai'i's small scale producers, manufacturers, and distributors.	X		
(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.	X		
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawaii.	X		
(13) Foster greater cooperation and coordination between the public and private sectors in developing Hawai'i's employment and economic growth opportunities.	X		
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.	X		
(15) Maintain acceptable working conditions and standards for Hawai'i's workers.	X		
(16) Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and non-discrimination measures.			X
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.	X		
(18) Encourage businesses that have favorable financial multiplier effects within Hawai'i's economy, particularly with respect to emerging industries in science and technology.	X		

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(19) Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.	X		
(20) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.	X		
(21) Foster a business climate in Hawai'i- including attitudes, tax and regulatory policies, and financial and technical assistance programs-that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			X

Discussion: The Proposed Action will support the objectives and policies of the State for the economy – in general.

The Proposed Action will allow for the continued conveyance of water to supply the agricultural fields in Central Maui to support a new diversified agriculture farming model. ~~Currently, the fields are mostly fallow~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are and not being utilized to their full potential.[1] The continued reopening ~~Reopening~~ the land for farming would provide employment opportunities and expand the agriculture sector of Maui's economy. Irrigating the fields in Central Maui, a region with very little rainfall, would also restore scenic greenery to the region as the land will be in cultivation rather than fallow.

Moreover, Mahi Pono's diversified agriculture operation will aid in achieving the State's goal of doubling local food production by the year 2020.[2] In the event of a major catastrophe, limiting overseas supplies, this diversified agriculture initiative could help supply the State with significant amounts of food. Mahi Pono will export product that exceeds the Hawai'i market.

In the process of doing so, Mahi Pono's operations can offer opportunities for numerous secondary economic benefits—offering entrepreneurship opportunities for value-added agricultural products whether in retail or food establishments, welcoming innovative methods and approaches for the cultivation of agricultural products, expanding markets for Hawai'i-grown products, providing construction activity for needed facilities, setting the foundation for agricultural cooperatives for farmers, providing jobs directly and indirectly for all segments of Hawai'i's population, especially on a neighbor island where employment opportunities can be limited.

Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services, thus supporting entrepreneurship by residents and assisting small scale producers, manufacturers, and distributors. Mahi Pono also intends to lease some of its property to other agricultural organizations.

The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan, as well as make sound investments, for growth as there are insufficient alternative water sources and infrastructure to meet present and future demands currently.

The EMI West Makapipi Tunnel 2 (Well No. 4806-07) (also referred to as the "Nāhiku Tunnel), a development tunnel located on EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System also~~ conveys water directly to the Nāhiku community. The Water Lease ~~will allow for the continued operation of the EMI Aqueduct System, which in turn~~ will ensure that Nāhiku has a reliable source of potable water for domestic needs. This will allow the County to adequately plan, as well as make sound investments, for growth.

[1] As discussed in Section 2.1.4, as of November 2020, Mahi Pono projected that that by the end of the calendar year 2021, it could be cultivating the following within Central Maui 4,920 acres in orchard crops, including lemons, limes, oranges, avocadoes, coffee, macadamia nuts; 633 acres in row crops; 102 acres in tropical fruits; 12,000 acres in cattle operations.

[2] According to the Aloha Dashboard (accessed December 2020), the State of Hawai'i produced 104,635,130 pounds of food in 2018 which is significantly less than the previous five years (2013-2017) (approximately 180,000,000 pounds). Hence, it can be assumed that the State is not on track to hit this target and improvement is needed.

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
§226-7 Objectives and policies for the economy--agriculture. (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives: (1) Viability of Hawaii's sugar and pineapple industries. (2) Growth and development of diversified agriculture throughout the State. (3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being To achieve the agriculture objectives, it shall be the policy of this State to:			
(1) Establish a clear direction for Hawaii's agriculture through stakeholder commitment and advocacy.	X		
(2) Encourage agriculture by making the best use of natural resources.	X		
(3) Provide the governor and the legislature with information and options needed for prudent decision-making for the development of agriculture.	X		
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.	X		
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai'i's economy.	X		
(6) Seek the enactment and retention of federal and state legislation that benefits Hawai'i's agricultural industries.			X
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawai'i's food producers and consumers in the State, nation, and world.	X		
(8) Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.	X		
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			X
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.	X		
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.	X		
(12) In addition to the State's priority on food, expand Hawai'i's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.	X		
(13) Promote economically competitive activities that increase Hawai'i's agricultural self-sufficiency, including the increased purchase and use of Hawaii-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.	X		
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture			X
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			X
(16) Facilitate the transition of agricultural lands in economically non-feasible agricultural production to economically viable agricultural uses.	X		

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko iʻa, māla, and irrigated loʻi, and growth of traditional Hawaiian crops, such as kalo, ʻuala, and ʻulu.	**X**		
(18) Increase and develop small-scale farms.	**X**		
Discussion: The Proposed Action will support the objectives and policies of the State for the economy – agriculture. The Proposed Action will enable ~~for~~ the continued conveyance of water to continue to support the conversion of Central Maui agricultural fields ~~currently fallow lands~~ to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. Re-establishing these 30,000 acres of the land in farming would provide employment opportunities and significantly expand the agriculture sector of Maui's economy, as well as for the State of Hawaiʻi. ~~Currently the agricultural land is mostly fallow with initial start-up diversified agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities and planned cultivation of the entire Central Valley may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive and viable diversified agricultural operation. Moreover, the diversified agriculture operation will aid in achieving the State's goal of doubling local food production by 2020. In the event of a major catastrophe limiting overseas food supplies, this diversified agriculture initiative could supply the State with significant amounts of food. Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services, thus supporting entrepreneurship by residents and assisting small scale producers, manufacturers, and distributors. Mahi Pono also intends to lease some of its property to other agricultural organizations and provide plots for research and offer an internship program for high school and college students. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. Presently, the MDWS serves the KAP with non-potable water from diversions of the same streams that serve the Kamole-Weir WTP ~~Water Treatment Plant~~ through the Hamakua Ditch, an extension of the Wailoa Ditch. KAP currently consists of 31 farm lots, ranging in size from ~~7~~ 10 to 30 ~~29~~ acres, for a total of approximately 445 acres, supporting 26 farmers, and is planned to expand by 262 acres. Issuance of the Water Lease would ensure that KAP, and the planned expansion, have a reliable source of water to meet its water demands.			
§226-8 Objective and policies for the economy--visitor industry. (a) Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaiʻi's economy. (b) To achieve the visitor industry objective, it shall be the policy of this State to:			
(1) Support and assist in the promotion of Hawaiʻi's visitor attractions and facilities.			**X**
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaiʻi's people.			**X**
(3) Improve the quality of existing visitor destination areas by utilizing Hawaii's strengths in science and technology.			**X**
(4) Encourage cooperation between the public and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			**X**

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.			X
(6) Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.			X
(7) Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.			X
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.			X
Discussion: The Proposed Action does not include facilities or improvements that would directly affect the visitor industry of this area of Hawai'i. However, Maui's green Central Valley and rural ambiance have often been noted as assets for attracting visitors to Maui.			
§226 9 Objective and policies for the economy--federal expenditures. (a) Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawai'i's economy. (b) To achieve the federal expenditures objective, it shall be the policy of this State to:			
(1) Encourage the sustained flow of federal expenditures in Hawai'i that generates long-term government civilian employment.			X
(2) Promote Hawaii's supportive role in national defense, in a manner consistent with Hawaii's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawaii's economy.			X
(3) Promote the development of federally supported activities in Hawai'i that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai'i's environment.			X
(4) Increase opportunities for entry and advancement of Hawai'i's people into federal government service.			X
(5) Promote federal use of local commodities, services, and facilities available in Hawai'i.			X
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawai'i.			X
(7) Pursue the return of federally controlled lands in Hawai'i that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			X
Discussion: The Proposed Action will not include federal expenditures to provide for a water conveyance system.			
§226-10 Objective and policies for the economy--potential growth and innovative activities. (a) Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawai'i's economic base. (b) To achieve the potential growth activity objective, it shall be the policy of this State to:			
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaii's economy, including but not limited to	X		

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors.			
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawai'i through the export of services or products or substitution of imported services or products.			X
(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements.	X		
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity.	X		
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus.			X
(6) Expand Hawai'i's capacity to attract and service international programs and activities that generate employment for Hawai'i's people.			X
(7) Enhance and promote Hawai'i's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.			X
(8) Accelerate research and development of new energy-related industries based on wind, solar, ocean, and underground resources and solid waste.			X
(9) Promote Hawai'i's geographic, environmental, social, and technological advantages to attract new economic activities into the State.	X		
(10) Provide public incentives and encourage private initiative to attract new industries that best support Hawai'i's social, economic, physical, and environmental objectives.			X
(11) Increase research and the development of ocean related economic activities such as mining, food production, and scientific research.			X
(12) Develop, promote, and support research and educational and training programs that will enhance Hawai'i's ability to attract and develop economic activities of benefit to Hawai'i.			X
(13) Foster a broader public recognition and understanding of the potential benefits of new, growth oriented industry in Hawai'i.			X
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaii's social, economic, physical, and environmental objectives.			X
(15) Increase research and development of businesses and services in the telecommunications and information industries.			X
(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation			X
(17) Recognize and promote health care and health care information technology as growth industries.			X
Discussion: The Proposed Action will support the objectives and policies of the State for the economy – potential growth and innovative activities.			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
The issuance of the Water Lease under the Proposed Action will allow for the continued conveyance of water to the agricultural fields in Central Maui to support Mahi Pono's proposed diversified agriculture operation. Approximately ~~23,000~~ 22,000 acres of the agricultural land in Central Maui are designated as IALs to the State, of which the majority is classified as "Prime Agricultural Land" by the ALISH rating system. ~~However, currently the majority of the agricultural land in Central Maui is fallow.~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. The Proposed Action would allow for the land to continue to be put back into full cultivation. A viable agricultural operation of the scale and diversity as proposed by Mahi Pono will provide numerous opportunities for innovative approaches in both the cultivation of the agricultural products and value-added activities. Mahi Pono also intends to provide plots for research and offer an internship program for high school and college students thus encouraging entrepreneurship in innovative activity. Additionally, Mahi Pono is committing land to the production of solar energy for its own use and the public utility system.			
§226-10.5 Objectives and policies for the economy--information industry. (a) Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawai'i as a leader in broadband and wireless communications and applications in the Pacific Region. (b) To achieve the information industry objective, it shall be the policy of this State to:			
(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai'i and between Hawai'i and the world, and make high speed communication available to all residents and businesses in Hawaii			X
(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawai'i to accommodate future growth and innovation in Hawaii's economy.			X
(3) Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawaii.			X
(4) Encourage mainland- and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawaii, using technology to communicate with their headquarters, offices, or customers located out-of-state.			X
(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry.			X
(6) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.			X
(7) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the information industry.			X
(8) Foster a recognition of the contribution of the information industry to Hawaii's economy.			X
(9) Assist in the promotion of Hawai'i as a broker, creator, and processor of information in the Pacific.			X
Discussion: The Proposed Action will not affect the telecommunications and information technology industries.			
§226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources. (a) The land-based, shoreline, and marine resources objectives are:			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(1) Prudent use of Hawai'i's land-based, shoreline, and marine resources. (2) Effective protection of Hawai'i's unique and fragile environmental resources. (b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:			
(1) Exercise an overall conservation ethic in the use of Hawai'i's natural resources.	X		
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.	X		
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.	X		
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.	X		
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.	X		
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.	X		
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			X
(8) Pursue compatible relationships among activities, facilities, and natural resources.	X		
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.			X

Discussion: The Proposed Action will support the objective and policies for the physical environment – land-based, shoreline, and marine resources.

The CWRM D&O was purposefully designed to increase the practical knowledge of stream flows and native habitat restoration. The CWRM D&O establishes a quantity of water that must remain in each stream. Each stream that was part of the East Maui IIFS petitions was evaluated individually for their potential for instream and non-instream use. Instream uses include the maintenance of habitat and ecosystems, recreational opportunities, aesthetic values, navigation, instream power generation, maintenance of water quality, among others. The CWRM D&O ensures a balance of instream and non-instream use of the surface water resources in East Maui. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action is not contrary to the CWRM D&O, and will exercise a conservation ethic in use of the State's natural resources, and will ensure compatibility between land-based activities and natural resources and ecological systems.

An objective of the Proposed Action is to maintain and continue the operation of the EMI Aqueduct System. The EMI staff will be trained by qualified individuals on appropriate conduct and measures to take within the License Area during future maintenance work. This will encourage the protection of the rare and endangered plant and animal species and habitats native to Hawai'i that have been identified in the region. The EMI Aqueduct System will be maintained in a way that is compatible with the existing environment and natural resources in the region.

Moreover, the Central Maui Field Irrigation System ~~EMI Aqueduct System in Central Maui~~ has historically contributed to groundwater recharge through ~~attributed to~~ approximately 22.7% of system losses ~~on the Central Maui side of the EMI Aqueduct System~~. This loss provides a significant amount of groundwater recharge to the Central Maui aquifers. System losses includes water used in Central Maui for reservoirs, fire protection, dust control, and hydroelectric uses.

Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing ~~designing a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation ensures conservation of Hawai'i's natural resources.			
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources. (a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources (b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:			
(1) Promote the preservation and restoration of significant natural and historic resources.	X		
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.	X		
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	X		
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.	X		
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.			X
Discussion: The Proposed Action will support the objectives and policies for the physical environment – scenic, natural beauty, and historic resources. The EMI Aqueduct System has been in existence for over a century, and is eligible to be placed on the NRHP under National Register Criterion C, as an extensive engineering design that exemplifies the characteristics, technology, and pattern of features common to irrigation ditch systems in Hawai'i. The Proposed Action will allow for the continued maintenance of the EMI Aqueduct System. The issuance of the Water Lease will allow for the continued conveyance of water to the agricultural fields in Central Maui. Irrigating the fields in Central Maui, a region with very little natural rainfall, would also promote the scenic beauty of the region and preserve existing vistas, as the land will be in cultivated green space rather than remaining fallow or being developed. Moreover, the CWRM D&O ordered that certain streams, designated as "kalo and community streams", will be fully restored, protecting those special areas that depend upon these streams. These streams support communities that depend upon kalo cultivation, an element of Hawai'i's cultural heritage. Other streams in the East Maui region that were subject to the IIFS will have less water diverted, than what was historically diverted, enhancing and promoting the scenic beauty in the vicinity of those streams and restoring natural habitats. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action will not be contrary to the CWRM D&O, and is aligned with the State's objective and policies for the physical environment – scenic, natural beauty, and historic resources.			
§226-13 Objectives and policies for the physical environment--land, air, and water quality. (a) Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives: (1) Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources. (2) Greater public awareness and appreciation of Hawai'i's environmental resources. (b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(1) Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.			X
(2) Promote the proper management of Hawai'i's land and water resources.	X		
(3) Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.	X		
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.	X		
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.			X
(6) Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.			X
(7) Encourage urban developments in close proximity to existing services and facilities.	X		
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.	X		

Discussion: The Proposed Action will support the objectives and policies for the physical environment – land, air, and water quality.

The water source for the EMI Aqueduct System comes from East Maui streams. ~~25~~ 24 streams or tributaries that are diverted by the EMI Aqueduct System in the License Area were subject to the CWRM D&O. The CWRM D&O established the IIFS in an attempt to properly manage the surface water for habitat restoration, instream uses, offstream uses, scenic value, and recreational opportunities. Should the Water Lease be issued under the Proposed Action, surface water diversions will be required to be in compliance with the CWRM D&O.

The issuance of the Water Lease will allow for the continued conveyance of water from the EMI Aqueduct System to the agricultural fields in Central Maui. This will allow Mahi Pono to continue to transition the agricultural fields in Central Maui to a diversified agriculture farming model. Without the issuance of the Water Lease, the majority of the agriculture fields in Central Maui will presumably remain in a fallow, uncultivated state until a sufficient amount of water is available. If the Central Maui lands are left in an uncultivated state for a prolonged period of time, it will increase wind-blown erosion adversely impacting the air quality of the surrounding area (CWRM, at iv, 2018) and reduce recharge of the Central Maui aquifers underlying the agricultural fields.

The issuance of the Water Lease will allow for the continued conveyance of water from the EMI Aqueduct System to the MDWS, which in turn provides water to Upcountry Maui ~~and the Nāhiku community.~~ The County anticipates the Upcountry Maui population, which is dependent on the Upcountry Maui Water System, will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. Issuing the Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan for population growth as there are a lack of alternative water sources and infrastructure to meet present and future demands. This will encourage future urban developments in Upcountry Maui to accommodate growth in proximity to the existing water services and facilities with a reliable source of water. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community, which, through the MDWS, draws water from EMI's land through EMI's West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located on EMI land directly adjacent to the Koolau Ditch.

Additionally,notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is implementing ~~designing~~ ~~a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health thus promoting the proper management of Hawai'i's land and water resources.

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
A stream and ocean water chemistry assessment was conducted by ~~Sea Engineering, Inc. (~~SE~~)~~ and ~~Marine Research Consultants, Inc. (~~MRC~~)~~ in 2018 (Appendix B). In general, no significant impacts on coastal water in the region are anticipated. The study concluded that the effects of stream water on marine waters is minor in these habitats owing to the naturally occurring rapid and intense mixing.			
§226-14 Objective and policies for facility systems--in general[3]. (a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, sustainable development, climate change adaptation, sea level rise adaptation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives. (b) To achieve the general facility systems objective, it shall be the policy of this State to :			
(1) Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.			X
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.			X
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	X		
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			X
(5) Identify existing and planned state facilities that are vulnerable to sea level rise, flooding impacts, and natural hazards.			X
(6) Assess a range of options to mitigate the impacts of sea level rise to existing and planned state facilities.			X
Discussion: The Proposed Action will support the objectives and policies for facility systems – in general. The issuance of the Water Lease~~]~~ will allow for the continued conveyance of water from the EMI Aqueduct System to the MDWS, which in turn provides water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community~~. The Upcountry Maui Water System relies on 80-90% of its water from three surface water sources. One of the three surface water sources is delivered by the EMI Aqueduct System through the Wailoa Ditch, which is treated at the Kamole-Weir WTP ~~Water Treatment Plant~~. The average daily use by the MDWS from the EMI Aqueduct System is 7.1 mgd, which accounts for a major portion of the water supplied to the Upcountry Maui Water System. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community, which, through the MDWS, draws water from EMI's land through EMI's West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch. The Nāhiku community draws ~~between 20,000 to 45,000 gallons of~~ water daily directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), a development tunnel located EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System from the Ko'olau Ditch through a development tunnel~~. Without the issuance of the Water Lease, the EMI Aqueduct System would only be able to divert water derived from privately owned lands (approximately 30% of water in License Area) plus the 4.37 mgd from the privately owned lands between Honopou Stream and Māliko Gulch, resulting in a vast reduction of water available for agricultural uses in Central Maui and thereby ~~may be left in an inoperable state,~~ leaving Upcountry Maui ~~and the Nāhiku community~~ without a reliable source of domestic and agricultural water. The costs to develop alternative sources of water would result in higher rates for all the MDWS customers, as the MDWS' rates are island-wide and do not distinguish by geographical area or water system.			

[3] Please note that the addition to the text is pursuant to Act 178 effective July 1, 2021.

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
§226-15 Objectives and policies for facility systems--solid and liquid wastes. (b) Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives: (1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes. (2) Provision of adequate sewerage facilities of physical and economic activities that alleviate problems in housing, employment, mobility, and other areas. (c) To achieve solid and liquid waste objectives, it shall be the policy of this State to:			
(1) Encourage the adequate development of sewerage facilities that complement planned growth.			X
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			X
(3) Promote research to develop more efficient and economical treatment and disposals of solid and liquid wastes.			X
Discussion: The Proposed Action will not involve State facility systems related to solid and liquid wastes. However, it is anticipated that all proposed water used in the office and processing facilities associated with the Mahi Pono farm plan (except for restrooms) will be recycled and re-used as part of Mahi Pono's Central Maui Field Irrigation System. Currently, most workers in the Central Maui agricultural fields use porta potties and this is expected to continue through full impmentation of the Mahi Pono farm plan, as the need and number of porta potties is largely dependent on planting /harvesting schedules.			
§226-16 Objective and policies for facility systems--water. (a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities. (b) To achieve the facility systems water objective, it shall be the policy of the State to:			
(1) Coordinate development of land use activities with existing and potential water supply.	X		
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			X
(3) Reclaim and encourage the productive use of runoff water and waste water discharges.	X		~~X~~
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	X		
(5) Support water supply services to areas experiencing critical water problems.	X		
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.	X		~~X~~
Discussion: The Proposed Action will support the objectives and policies for facility systems – water. The issuance of the Water Lease will allow for the continued conveyance of water from the EMI Aqueduct System to the MDWS, which in turn provides water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community~~. The Upcountry Maui Water System relies on 80-90% of its water from three surface water treatment plants, which makes the system extremely vulnerable to droughts and presents a challenge to the MDWS. For decades, the			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
Upcountry region has experienced voluntary and mandatory water use restrictions imposed on residential and agricultural users during droughts, primarily during dry season, often negatively impacting the productivity of the farmers. One of the three surface water sources is delivered by the EMI Aqueduct System through the Wailoa Ditch, which is treated at the Kamole-Weir WTP ~~Water Treatment Plant~~. The average daily use by the MDWS from the EMI Aqueduct System is 7.1 mgd, which accounts for a major portion of the water supplied to the Upcountry Maui Water System. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community. The Nāhiku community receives water directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System via a development tunnel in the Koʻolau Ditch. The tunnel draws 20,000 to 45,000 gallons per day, dependent on weather, directly from the EMI Aqueduct System~~. EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). The water serves about approximately 43 water meters located along Nāhiku Road. One meter is classified as an agricultural use while all the others are classified as single-family use. Without the issuance of the Water Lease, the EMI Aqueduct System would only be able to divert water derived from privately owned lands (approximately 30% of water in License Area) plus the 4.37 mgd from the privately owned lands between Honopou Stream and Māliko Gulch, resulting in a vast reduction of water available for agricultural uses in Central Maui and thereby ~~may be left in an inoperable state,~~ leaving Upcountry Maui, ~~and the Nāhiku community~~ without a reliable source of water. Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono will promote water conservation in private industry in that it expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is implementing ~~designing a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health thus assisting in improving, efficiency and capabilities of water systems for agricultural use.			
§226-17 Objectives and policies for facility systems--transportation. (a) Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives: (1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods. (2) A statewide transportation system consistent with planned growth objectives throughout the State (b) To achieve the transportation objectives, it shall be the policy of this State to:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter.			X
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives.			X
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties.			X
(4) Provide for improved accessibility to shipping, docking, and storage facilities.			X
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs.			X

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities.			X
(7) Encourage a variety of carriers to offer increased opportunities and advantages to inter-island movement of people and goods.			X
(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs.			X
(9) Encourage the development of transportation, systems and programs which would assist statewide economic growth and diversification.			X
(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i's natural environment.			X
(11) Encourage safe and convenient uses of low-cost, energy-efficient, non-polluting means of transportation.			X
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives.			X
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.			X
Discussion: The Proposed Action will not involve facility systems related to transportation.			
§226-18 Objectives and policies for facility systems—energy. (a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all: (1) Dependable, efficient, and economical statewide energy and telecommunication systems capable of supporting the needs of the people. (2) Increased energy self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation; (3) Greater diversification of energy generation in the face of threats to Hawaii's energy supplies and systems; (4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and (5) Utility models that make the social and financial interests of Hawaii's utility customers a priority. (b) To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand (c) To further achieve the energy objectives, it shall be the policy of this State to:			
(1) Support research and development as well as promote the use of renewable energy sources.			X
(2) Ensure a sufficient supply of energy to enable power systems to support the demands of growth.			X
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits.	X		
(4) Promote all cost-effective conservation of power and fuel supplies through measures, including:	X		

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(A) Development of cost-effective demand-side management programs; (B) Education; (C) Adoption of energy-efficient practices and technologies; and (D) Increasing energy efficiency and decreasing energy use in public infrastructure.			
(5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies.			X
(6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies.			X
(7) Promote alternate fuels and transportation energy efficiency.			X
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications.	X		
(9) Support actions that reduce, avoid, or sequester Hawaii's greenhouse gas emissions through agriculture and forestry initiatives.	X		
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects.			X
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources.			X
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii.			X
Discussion: The Proposed Action will support the objectives and policies for facility systems related to energy. The EMI Aqueduct System operates completely by gravity and requires no power or fuel source. At the same time, it is also capable of generating clean power by dropping water from one ditch, through a hydropower generating plant, and into a lower ditch, thus simultaneously transporting water for use and generating electricity. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Without the Proposed Action, the EMI Aqueduct System may not be able to serve the needs of MDWS for Upcountry Maui, and a replacement source of water will be necessary to make up the deficit, likely one that consumes more energy (such as groundwater wells, which require pumping). Additionally, water would not be available to irrigate the Central Maui agricultural fields to any significant degree, resulting in significantly less agriculture than is currently planned and a reduced ability to sequester greenhouse gases on Maui through agriculture. Additionally, Mahi Pono is committing land to the production of solar energy for its own use and the public utility system. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure.			
§226-18.5 Objectives and policies for facility systems--telecommunications. (a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people. (b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand. (c) To further achieve the telecommunications objective, it shall be the policy of this State to:			
(1) Facilitate research and development of telecommunication systems and resources.			X

Table 5-1: The Hawaiʻi State Plan Part I	S	NS	N/A
(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunication planning.			X
(3) Promote efficient management and use of existing telecommunication systems and services.			X
(4) Facilitate the development of education and training of telecommunication personnel.			X
Discussion: The Proposed Action will not involve facility systems related to telecommunications.			
§226-19 Objectives and policies for socio-cultural advancement--housing. (a) Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives: (1) Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more rental and for sale affordable housing is made available to extremely low-, very low-, lower-, moderate-, and above moderate-income segments of Hawaii's population. (2) The orderly development of residential areas sensitive to community needs and other land uses. (3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawaii's people. (b) To achieve the housing objectives, it shall be the policy of this State to:			
(1) Effectively accommodate the housing needs of Hawaiʻi's people.			X
(2) Stimulate and promote feasible approaches that increase affordable rental and for sale housing choices for extremely low-, very low-, lower-, moderate-, and above moderate-income households.			X
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.			X
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			X
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.			X
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			X
(7) Foster a variety of lifestyles traditional to Hawaiʻi through the design and maintenance of neighborhoods that reflect the cultures and values of the community.			X
(8) Promote research and development of methods to reduce the cost of housing construction in Hawaiʻi.			X
Discussion: The Proposed Action will not affect the objectives and policies for socio-cultural advancement related to housing.			
§226-20 Objectives and policies for socio-cultural advancement--health.			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(a) Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives: (1) Fulfillment of basic individual health needs of the general public. (2) Maintenance of sanitary and environmentally healthful conditions in Hawai'i's communities. (3) Elimination of health disparities by identifying and addressing social determinants of health. (b) To achieve the health objectives, it shall be the policy of this State to:			
(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			X
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			X
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			X
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			X
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			X
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement			X
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			X
Discussion: The Proposed Action will not affect the objectives and policies for socio-cultural advancement related to health, but it is noted that the Water Lease will allow for the continued provision of water from EMI to MDWS for the Upcountry Maui Water System, which provides water to the Kula hospital.			
§226-21 Objective and policies for socio-cultural advancement--education. (a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations. (b) To achieve the education objective, it shall be the policy of this State to:			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.	X		
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.			X
(3) Provide appropriate educational opportunities for groups with special needs.			X
(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.			X
(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.			X

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.	X		
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			X
(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.			X
(9) Support research programs and activities that enhance the education programs of the State.			X
Discussion: The Proposed Action supports the objective ~~of~~ and policies for socio-cultural advancement related to education. Among other things, Mahi Pono intends to provide agricultural plots for research and offer an internship program for high school and college students.			
§226-22 Objective and policies for socio-cultural advancement--social services. (a) Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being. (b) To achieve the social services objective, it shall be the policy of this State to:			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.			X
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			X
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawaii's communities			X
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			X
(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			X
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			X
Discussion: The Proposed Action will not affect the objectives and policies for socio-cultural advancement related to social services.			
§226-23 Objective and policies for socio-cultural advancement--leisure. (a) Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations. (b) To achieve the leisure objective, it shall be the policy of this State to:			
(1) Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			X
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			X

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			X
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			X
(5) Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.	X		
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			X
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai'i's people.			X
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			X
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawai'i's population to participate in the creative arts.			X
(10) Assure adequate access to significant natural and cultural resources in public ownership.	X		
Discussion: The Proposed Action will support the objectives and policies for socio-cultural advancement related to leisure. The Ko'olau Forest Reserve Hunting Unit encompasses portions of the License Area. The Hunting Unit is administered the DLNR, Division of Forestry and Wildlife. To hunt within the License Area, hunters must obtain a license from the DLNR and an EMI Permit/Waiver. Hunting grounds are limited to one hunting party per hunting area, as regulated by the DLNR. Hunters enter the hunting unit every Saturday and Sunday, as well as holidays observed by EMI. Prior to entering, hunting parties must sign in their license number they obtained from the DLNR, and log in any game that are taken. Access to the hunting grounds is managed by EMI through eight existing EMI access roads. Hunting is permitted year round. Hunting parties may enter the License Areas by vehicular access, however, must traverse by foot in most areas. Hiking is also a permitted recreational use within the License Area, and is limited to hiking clubs and individuals. Access to the License Area lands for hiking is acquired through a Hiking Waiver from EMI. ~~Only~~ Generally, only two hiking clubs currently enter the License Area lands approximately four to six times a year; the Sierra Club Maui Group and Mauna Ala Hiking Club. They enter on foot, and are guided by a club hiking expert with a manageable number of people Other recreational uses are not permitted on the License Area lands for safety reasons. The Proposed Action would allow EMI staff to continue to manage appropriate access into the License Area so that the public may continue to use and enjoy the License Area's recreational and natural resources. Moreover, although an established procedure does not exist, EMI has never denied access to anyone seeking access into the License Area for cultural purposes.			
§226-24 **Objective and policies for socio-cultural advancement--individual rights and personal well-being.** (a) Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations. (b) To achieve the individual rights and personal wellbeing objective, it shall be the policy of this State to:			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			X

Table 5-1: The Hawaiʻi State Plan Part I	S	NS	N/A
(2) Uphold and protect the national and state constitutional rights of every individual.			X
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			X
(4) Ensure equal opportunities for individual participation in society.			X
Discussion: The Proposed Action will not affect the objectives and policies for socio-cultural advancement related to individual rights and personal well-being.			
§226-25 Objective and policies for socio-cultural advancement--culture. (a) Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaiʻi's people. (b) To achieve the culture objective, it shall be the policy of this State to:			
(1) Foster increased knowledge and understanding of Hawaiʻi's ethnic and cultural heritages and the history of Hawaiʻi.			X
(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the life styles of Hawaiʻi's people and which are sensitive and responsive to family and community needs.	X		
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community life styles in Hawaiʻi.			X
(4) Encourage the essence of the aloha spirit in people's daily-activities to promote harmonious relationships among Hawaiʻi's people and visitors.			X
Discussion: The Proposed Action will support the objectives and policies for socio-cultural advancement related to culture. A recent action taken by the CWRM ordered full restoration for 10 streams. These streams are categorized as "Kalo and Community Streams" and were restored due to the streams historically supporting and currently supporting communities for taro cultivation. The Proposed Action will be in compliance with the CWRM D&O. Earthplan prepared a report to assess the social impacts of the Proposed Action (See Appendix G). The report found that certain community members felt that the modification or removal of several diversion structures to complete the restoration of diverted streams designated for full flow as part of the CWRM D&O would have positive social value for East Maui. Stream restoration would address physical mitigation and support cultural and food gathering practices by increasing kalo production. The Proposed Action will be in compliance with the CWRM D&O. Additionally, measures recommended by CSH in their CIA include continued monitoring and public reporting of stream flow volumes through maintenance and upgrades to the existing system of optical encoders with float tape and data loggers within the EMI Aqueduct System, notification and appropriate training of any persons required to enter the License Area as part of the Proposed Action regarding the potential for discovery of undocumented cultural sites and the procedures for reporting such finds, and for the facilitation of access via an appropriate access policy and procedure for cultural practitioners who wish to enter the License Area to practice their traditional and customary Native Hawaiian rights in accordance with applicable law. Consistent with the spirit and intent of the process surrounding cultural impact assessments, CSH also recommends that any further amendments to the Proposed Action and its potential impacts on the identified cultural resources, practices, and beliefs be fully vetted with the potentially affected community by engaging relevant stakeholders in discussion.			
§226-26 Objectives and policies for socio-cultural advancement--public safety. (a) Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives: (1) Assurance of public safety and adequate protection of life and property for all people.			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances. (3) Promotion of a sense of community responsibility for the welfare and safety of Hawai'i's (b) To achieve the public safety programs objectives, it shall be the policy of this State to:			
(1) Ensure that public safety programs are effective and responsive to community needs.	X		
(2) Encourage increased community awareness and participation in public safety programs.			X
(c) To achieve the public safety programs objectives, it shall be the policy of this State to:			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			X
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			X
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			X
(d) To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war related, natural, or technological disasters and civil disturbances at all times.	X		
(2) Enhance the coordination between emergency management programs throughout the State.			X
Discussion: The Proposed Action will support the objectives and policies for socio-cultural advancement – public safety. On the agricultural fields in Central Maui, there are a number of reservoirs, in which a portion of the water conveyed from the EMI Aqueduct System is stored ~~in~~. A&B had, and Mahi Pono now has a working relationship with the Maui County Fire Department and in times of need the Maui County Fire Department can draw water from the storage to fight fires. Additionally, water from the EMI Aqueduct System is used to support fire suppression needs in and around the Pu'unēnē mill area and adjacent properties. The long-term average daily use by the MDWS from the EMI Aqueduct System has been 7.1 mgd (CWRM, FOF 551, 2018), which accounts for a major portion of the water supplied to the Upcountry Maui Water System. Nāhiku draws ~~up 20,000 – 45,000 gallons of~~ water daily directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System from the Ko'olau Ditch through a development tunnel~~. EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). Should fires ever breakout in these areas, the water conveyed from the EMI Aqueduct System can be tapped into to fight the fires.			
§226-27 Objectives and policies for socio-cultural advancement--government. (a) Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives: (1) Efficient, effective, and responsive government services at all levels in the State. (2) Fiscal integrity, responsibility and efficiency in the state government and county governments.			

Table 5-1: The Hawai'i State Plan Part I	S	NS	N/A
(b) To achieve the government objectives, it shall be the policy of this State to:			
(1) Provide for necessary public goods and services not assumed by the private sector.			X
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.			X
(3) Minimize the size of government to that necessary to be effective.			X
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawai'i.			X
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.			X
(6) Provide for a balanced fiscal budget.			X
(7) Improve the fiscal budgeting and management system of the State.			X
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			X
Discussion: The Proposed Action will not affect the objectives and policies for socio-cultural advancement related to government.			

PART III. PRIORITY GUIDELINES

Part III of the Hawai'i State Plan establishes the overall priority guidelines to address areas of statewide concern. Under HRS § 226-102, "The State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation."

Table 5-2: The Hawai'i State Plan Part III	S	NS	N/A
§226-103 Economic priority guidelines. (a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai'i's people and achieve a stable and diversified economy:			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.			X
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			X
(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			X
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			X
(5) Streamline the building and development permit and review process, and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where public health, safety, and welfare would not be adversely affected.			X

Table 5-2: The Hawaiʻi State Plan Part III	S	NS	N/A
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaiʻi's small-scale producers, manufacturers, and distributors.	X		
(7) Continue to seek legislation to protect Hawaiʻi from transportation interruptions between Hawaiʻi and the continental United States.			X
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics: (a) An industry that can take advantage of Hawaiʻi's unique location and available physical and human resources. (b) A clean industry that would have minimal adverse effects on Hawaiʻi's environment. (c) An industry that is willing to hire and train Hawaiʻi's people to meet the industry's labor needs. (d) An industry that would provide reasonable income and steady employment.	X		
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawaiʻi business.	X		
(10) Enhance the quality of Hawaiʻi's labor force and develop and maintain career opportunities for Hawaiʻi's people through the following actions: (a) Expand vocational training in diversified agriculture, aquaculture, and other areas where growth is desired and feasible. (b) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities. (c) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired. (d) Promote career opportunities in all industries for Hawaiʻi's people by encouraging firms doing business in the State to hire residents. (e) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on-the-job training opportunities. (f) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.	X		
(b) Priority guidelines to promote the economic health and quality of the visitor industry:			
(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawaiʻi's residents and visitors.			X
(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provides for adequate shoreline setbacks and beach access.			X
(3) Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			X
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaiʻi's significant natural, scenic, historic, and cultural resources.			X
(5) Develop and maintain career opportunities in the visitor industry for Hawaiʻi's people, with emphasis on managerial positions.			X
(6) Support and coordinate tourism promotion abroad to enhance Hawaiʻi's share of existing and potential visitor markets.			X
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			X

Table 5-2: The Hawai'i State Plan Part III	S	NS	N/A
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			X
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			X
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawai'i.			X
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			X
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.	X		
(2) Assist in providing adequate, reasonably priced water for agricultural activities.	X		
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.	X		
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.	X		
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawai'i's agricultural community			X
(6) Seek favorable freight rates for Hawai'i's agricultural products from interisland and overseas transportation operators.			X
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.	X		
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.	X		
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			X
(e) Priority guidelines for water use and development:			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.	X		
(2) Encourage the improvement of irrigation technology and promote the use of non-potable water for agricultural and landscaping purposes.	X		
(3) Increase the support for research and development of economically feasible alternative water sources.			X
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			X
(f) Priority guidelines for energy use and development:			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.	X		
(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.	X		
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			X
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.			X
(g) Priority guidelines to promote the development of the information industry:			
(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawaii.			X

Table 5-2: The Hawai'i State Plan Part III	S	NS	N/A
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			X
(3) Encourage the development of small businesses in the information field such as software development; the development of new information systems, peripherals, and applications; data conversion and data entry services; and home or cottage services such as computer programming, secretarial, and accounting services.			X
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			X
(5) Encourage research activities, including legal research in the information and telecommunications fields.			X
(6) Support promotional activities to market Hawaii's information industry services.			X
(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			X

Discussion: The Proposed Action supports the Economic Priority Guidelines.

The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion of the Central Maui agricultural fields ~~currently fallow lands~~ to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. Re-establishing these 30,000 acres of the land in farming would provide employment opportunities and significantly expand the agriculture sector of Maui's economy, as well as for the State of Hawai'i. ~~Currently the agricultural land is mostly fallow with initial start-up diversified agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities and planned cultivation of the entire Central Valley may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive and viable diversified agricultural operation.

Moreover, the diversified agriculture operation will aid in achieving the State's goal of doubling local food production. In the event of a major catastrophe, limiting overseas supplies, this diversified agriculture initiative, because of its ultimate goal, could help supply the State with significant amounts of food.

Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services, thus supporting entrepreneurship by residents and assisting small scale producers, manufacturers, and distributors. Mahi Pono also intends to lease some of its property to other agricultural organizations and provide plots for research and offer an internship program for high school and college students.

Local farmers have expressed interest in planting kalo on a community farming block, and Mahi Pono has had discussions with various people regarding utilizing certain Native Hawaiian farming practices. Mahi Pono has learned and intends to employ the practice of planting ulu trees to use as shade for cattle, and is open to other practices, although Mahi Pono itself does not intend to grow kalo.

Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing ~~designing a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with

Table 5-2: The Hawai'i State Plan Part III	S	NS	N/A
adequate water to accommodate present and future needs. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Additionally, Mahi Pono is committing land to the production of solar energy for its own use and the public utility system. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. Presently, the MDWS serves the KAP with non-potable water from diversion of the same streams that serve the Kamole-Weir WTP ~~Water Treatment Plant~~ through the Hamakua Ditch, an extension of the Wailoa Ditch. KAP currently consists of 31 farm lots, ranging in size from ~~7~~ 10 to 30 ~~29~~ acres, for a total of approximately 445 acres, supporting 26 farmers, and is planned to expand by 262 acres. Issuance of the Water Lease would ensure that KAP, and the planned expansion, have a reliable source of water to meet its water demands.			
§226-104 Population growth and land resources priority guidelines.			
(a) Priority guidelines to effect desired statewide growth and distribution:			
(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.	X		
(2) Manage a growth rate for Hawai'i's economy that will parallel future employment needs for Hawai'i's people.	X		
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.			X
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.			X
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			X
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.	X		
(7) Support the development of high technology parks on the neighbor islands.			X
(b) Priority guidelines for regional growth distribution and land resource utilization:			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	X		
(2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.	X		
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.	X		
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			X
(5) In order to preserve green belts, give priority to state capital improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a non-contiguous new urban core.			X
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.	X		
(7) Pursue rehabilitation of appropriate urban areas.			X

Table 5-2: The Hawai'i State Plan Part III	S	NS	N/A
(8) Support the redevelopment of Kaka'ako into a viable residential, industrial, and commercial community.			X
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	X		
(10) Identify critical environmental areas in Hawai'i to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.	X		
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.	X		
(12) Utilize Hawai'i's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	X		
(13) Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.	X		

Discussion: The Proposed Action supports the Population Growth and Land Resources Priority Guidelines.

The Water Lease will allow for the continued transition of approximately 30,000 acres of former sugarcane ~~sugar cane~~ land in Central Maui to diversified agriculture. The proposed diversified agriculture operation will contribute toward achieving the State's goal of increasing food self-sufficiency to reduce dependence on oversea sources. Moreover, putting the Central Maui agricultural fields back into operation will increase economic activities and employment opportunities for the population by creating more jobs on the island of Maui.

Irrigating the agricultural fields in Central Maui, a region with very little natural rainfall, would maintain existing open space and preserve existing vistas, as the land will be in cultivated green space rather than remaining fallow or being developed. Overall, having the Central Maui lands remain in agriculture will help maintain the rural socio-economic lifestyle on Maui, enjoyed by so many.

~~The~~ EMI ~~Aqueduct System is a resource that~~ provides water to communities in East Maui as well as Upcountry Maui. It delivers water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Upcountry Maui Water System is the second largest on the island and the County anticipates the population dependent on the water system will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan for population growth as there are insufficient alternative water sources and infrastructure to meet present and future demands (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).

~~The EMI Aqueduct System conveys water directly to the~~ The Nāhiku community receives water, through MDWS, via the EMI ~~Aqueduct System's~~ West Makapipi Tunnel 2, Well No. 4806-07, also known as the Nāhiku Tunnel. According to the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020), the water conveyed from the West Makapipi Tunnel 2 ~~EMI Aqueduct System~~ serves about 43 water meters currently, and there is sufficient source to accept new water meter service applications to meet future demands of the community.

The Proposed Action and the issuance of a Water Lease will also include a requirement that a watershed management plan ~~Watershed Management Plan~~ be developed and implemented for East Maui as discussed in Section 2.1. In addition, EMI was a founding member of the EMWP and continues to be an active member.

§226-105 Crime and criminal justice Priority guidelines in the area of crime and criminal justice:			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			X

Table 5-2: The Hawai'i State Plan Part III	S	NS	N/A
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			X
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			X
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			X
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			X
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			X
Discussion: The priority guidelines related to crime and criminal justice are not applicable to the Proposed Action.			
§226-106 Affordable housing Priority guidelines for the provision of affordable housing:			
(1) Seek to use marginal or non-essential agricultural land and public land to meet housing needs of low and moderate-income and gap-group households.			X
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			X
(3) Improve information and analysis relative to land availability and suitability for housing.			X
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawai'i's low and moderate-income households, gap-group households, and residents with special needs.			X
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawai'i's people for the purchase of initial owner-occupied housing.			X
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			X
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			X
(8) Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.			X
Discussion: The priority guidelines related to the provision of affordable housing are not applicable to the Proposed Action.			
§226-107 Quality education. Priority guidelines to promote quality education:			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement.			X
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs.			X
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force.			X
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision-making responsibilities.			X
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for: (A) The electronic exchange of information; (B) Statewide electronic mail; and			X

Table 5-2: The Hawaiʻi State Plan Part III	S	NS	N/A
(C) Access to the Internet. Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives.			
(6) Pursue the establishment of Hawaiʻi's public and private universities and colleges as research and training centers of the Pacific.			X
(7) Develop resources and programs for early childhood education.			X
(8) Explore alternatives for funding and delivery of educational services to improve the overall quality of education.			X
(9) Strengthen and expand educational programs and services for students with special needs.			X
Discussion: The priority guidelines related to promoting quality education are generally not applicable to the Proposed Action. However, Mahi Pono intends to provide agricultural plots for research and offer an internship program for high school and college students.			
§226-108 Sustainability. Priority guidelines and principals to promote sustainability:			
(1) Encouraging balanced economic, social, community, and environmental priorities.	X		
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State.	X		
(3) Promoting a diversified and dynamic economy.	X		
(4) Encouraging respect for the host culture.	X		
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations.	X		
(6) Considering the principles of the ahupuaʻa system.			X
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawaiʻi.	X		
Discussion: The Proposed Action supports the Priority Guidelines and principles supporting sustainability. Diversified agriculture creates varied farming landscapes, increases opportunities for local products, and provides possibilities for a variety of scales, from small family ranches and farms to corporate agricultural operations. The Proposed Action would also support food self-sufficiency for the island community by ensuring a reliable and accessible food supply, thereby creating viable diversified agriculture and agricultural products that cater to local markets and eateries and support local farmers and ranchers. Moreover, in reference to setting the IIFS, the CWRM stated: *The Commission first evaluated each stream individually, looking at their flow characteristics, instream uses, habitat restoration potential for fish and other stream animals, recreation opportunities, and scenic values. We then looked at all of the affect streams in an integrated manner with consideration for the overall ecological ramifications of our decision. We used those factors to align instream flow standards with our public trust responsibilities.* The CWRM then considered offstream uses and weighed the importance of those uses against instream uses. In addition to the recognized public trust use for drinking water, the CWRM acknowledged the importance of diversified agriculture in Central Maui for both food sustainability and for ecological reasons. The Proposed Action will be in compliance with the CWRM D&O.			

Table 5-2: The Hawaiʻi State Plan Part III	S	NS	N/A
§226-109 Climate change adaption. Priority guidelines for climate change adaption:			
(1) Ensure that Hawaii's people are educated, informed, and aware of the impacts climate change may have on their communities.			X
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies.			X
(3) Invest in continued monitoring and research of Hawaii's climate and the impacts of climate change on the State.			X
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change.			X
(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change.			X
(6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments.			X
(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options.			X
(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities.			X
(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans.			X
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.			X
Discussion: The Priority Guidelines related to climate change adaptation are not applicable to the Proposed Action. In general, the Proposed Action will maintain existing conditions, in compliance with the CWRM D&O and any reservations in favor of the DHHL. No significant impacts on climate in the region are anticipated. Moreover, the exact nature of how the climate will change and impacts from any changes is unknown. As research into this area continues, there will be increased knowledge of the most effective ways to focus efforts toward adaptive strategies for climatic changes. ~~New information will continually need to be incorporated within future assessments to identify where efforts should be focused when developing adaption strategies to climatic changes.~~ Climate change could result in lower rainfall and thus lower levels of streamflow. Notwithstanding, compliance with the IIFS under the CWRM D&O will be required. Hence less flow would be available for the EMI Aqueduct System to divert, which in turn means less water for MDWS and less water to irrigate the Central Maui agricultural fields.			

5.1.2 State Functional Plans

The Hawaiʻi State Plan directs appropriate State agencies to prepare Functional Plans which address statewide needs, problems, and issues, and recommend policies and actions to mitigate those problems. The Functional Plans are prepared to further define and implement statewide goals, objectives, policies, and priority guidelines contained in the Hawaiʻi State Plan. Thirteen Functional Plans were prepared to implement the State Plan provisions in the areas of agriculture,

conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, and transportation.

Table 5-3: Hawai'i State Functional Plans	S	NS	N/A
1 **Agricultural State Functional Plan (1991)**			
Purpose: Continued viability of agriculture throughout the State	X		
Discussion: The Proposed Action will support the Agriculture State Functional Plan. The Proposed Action will allow for the development of the agricultural fields in Central Maui into a diversified agricultural operation with irrigated and unirrigated cattle pasture and a broad range of food and non-food crops for local consumption and export, including orchard crops (citrus, macadamia nuts, beverage crops, etc.), tropical fruits, row crops, annual crops, energy crops, and grass-fed cattle. At full production, 30,000 acres of Central Maui agricultural fields will be in productive diversified agriculture, resulting in significant volumes of food products that will be marketed both locally and out-of-state, putting more Hawai'i-branded agricultural products on the market, and expanding agricultural industries in Hawai'i. In addition, Mahi Pono plans to lease some of its land to other farmers at favorable terms, including relatively low rents for long-term periods.			
2 **Conservation Lands State Functional Plan (1991)**			
Purpose: Addresses issues of population and economic growth and its strain on current natural resources; broadening public use of natural resources while protecting lands and shorelines from overuse; additionally, promotes the aquaculture industry	X		
Discussion: The Proposed Action will affect the Conservation Lands State Functional Plan. The Proposed Action encompasses three different regions that may potentially be impacted on the island of Maui: East Maui, Central Maui, and Upcountry Maui. The License Area (East Maui) is entirely in the Conservation State Land Use District. Conservation District lands contain important natural resources essential to the preservation of the State's fragile natural ecosystems and the sustainability of the State's water supply. Thus, the intent is to conserve, protect, and preserve these lands through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare. The Proposed Action is consistent with the intent and uses allowed in the Conservation District as set forth by the State Land Use Law, Chapter 205, HRS.			
3 **Education State Functional Plan (1989)**			
Purpose: Improvements to Hawai'i's educational curriculum, quality of educational staff, and access to adequate facilities			X
Discussion: The Education State Functional Plan is not applicable to the Proposed Action.			
4 **Employment State Functional Plan (1990)**			
Purpose: Improve the qualifications, productivity, and effectiveness of the State's workforce through better education and training of workers as well as efficient planning of economic development, employment opportunities, and training activities.	X		
Discussion: The Proposed Action will support the Employment State Functional Plan. The issuance of the Water Lease will allow for the conversion of the agricultural fields in Central Maui to a diversified agricultural operation. The continued reopening ~~Reopening~~ up the agricultural fields for cultivation would increase employment directly and indirectly for the island of Maui and the State. It is projected that approximately 790 jobs			

Table 5-3: Hawai'i State Functional Plans	S	NS	N/A
would be created from the implementation of the Proposed Action at full operation, plus an additional 350 indirect jobs, and the period preceding full operation is expected to generate some 326 direct and indirect jobs. Actual employment would vary over time.			
5 **Energy State Functional Plan (1991)**			
Purpose: Lessen the reliance on petroleum and other fossil fuels in favor of alternative sources of energy so as to keep up with the State's increasing energy demands while also becoming a more sustainable island state; achieving dependable, efficient, and economical statewide energy systems	**X**		
Discussion: The Proposed Action will support the Energy State Functional Plan. As part of the Proposed Action, about 250 acres will be used for green energy, which would be sufficient space for one or more solar farms with a combined capacity of about ~~a~~ 37.5 MW ~~mW solar farm~~ with storage batteries. Additionally the Proposed Action will include the production of energy crops and would allow for the continued operation of two hydroelectric generation facilities. Therefore the proposed solar farm(s) and energy crops and hydroelectric facilities will help to reduce the State's reliance on fossil fuels.			
6 **Health State Functional Plan**			
Purpose: Improve the health care system by providing for those who do not have access to private health care providers; increasing preventative health measures; addressing 'quality of care' elements in private and public sectors to cut increasing costs.			**X**
Discussion: The Health State Functional Plan is not applicable to the Proposed Action.			
7 **Higher Education Functional Plan (1984)**			
Purpose: Prepare Hawai'i's citizens for the demands of an increasingly complex world through providing technical and intellectual tools.			**X**
Discussion: The Higher Education Functional Plan is not applicable to the Proposed Action.			
8 **Historic Preservation State Functional Plan (1991)**			
Purpose: Preservation of historic properties, records, artifacts and oral histories; provide public with information/education on the ethnic and cultural heritages and history of Hawai'i.			**X**
Discussion: The Proposed Action will support the Historic Preservation State Functional Plan. No significant impacts to historic resources are anticipated for the Proposed Action. The Central Maui agricultural fields are heavily disturbed from over 100 years of sugarcane operations. While previous archaeological surveys throughout Maui County have documented numerous historic properties within gulches that extend through current and former agricultural fields, the Mahi Pono agricultural activities will not expand beyond the existing fields and the established plow zone. The Proposed Action will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with chance of resulting damage, nor neglect resulting in deterioration or destruction. The Proposed Action does not include ground disturbance within the License Area. In connection with this EIS, a CIA ~~Cultural Impact Assessment~~ and Archaeological LRFI report ~~Literature Review and Field Inspection Report~~ were prepared by CSH ~~Cultural Surveys Hawai'i~~, and a Historic Structure Assessment was prepared by Mason Architect, Inc. to assess the historic significance of the EMI Aqueduct System. As such, the Proposed Action, through this EIS process, is consistent with the Historic Preservation State Functional Plan.			
9 **Housing State Functional Plan (1989)**			

Table 5-3: Hawai'i State Functional Plans	S	NS	N/A
Purpose: Provide affordable rental and for-sale housing; increase homeownership and amount of rental housing units; acquiring public and privately-owned lands for future residential development; maintain a statewide housing data system.			**X**
Discussion: The Housing State Functional Plan is not applicable to the Proposed Action.			
10 **Human Services State Functional Plan (1991)**			
Purpose: Refining support systems for families and individuals by improving elderly care, increasing preventative measures to combat child/spousal abuse and neglect; providing means for 'self-sufficiency'.			**X**
Discussion: The Human Services State Functional Plan is not applicable to the Proposed Action.			
11 **Recreation State Functional Plan (1991)**			
Purpose: Manage the use of recreational resources via addressing issues: (1) ocean and shoreline recreation, (2) mauka, urban, and other recreation, (3) public access to shoreline and upland recreation areas, (4) resource conservation and management, (5) management of recreation programs/facilities/areas, and (6) wetlands protection and management.	**X**		
Discussion: The Proposed Action will not significantly affect the Recreation State Functional Plan. In general, the permitted recreational activities (hunting and hiking) in the License Area are not dependent upon the volume of water flowing in the East Maui streams. Nevertheless, with an increase in base streamflow, the subjective experience of individuals participating in hunting or hiking could be enhanced by the aesthetic of increased stream flows. In the lower reaches of streams below the License Area, streams with higher base flow would enhance recreational sightseeing, swimming and fishing/gathering activities. Increased streamflow could also impact the physical safety of those entering streams as well as their health if it increases their exposure to waterborne pathogens. The waysides and parks along Hāna Highway in East Maui will benefit aesthetically as increased streamflow have been ordered by the CWRM D&O, as discussed previously, and may also result in an increase of recreational use of the streams such as swimming or fishing. The Ko'olau Forest Reserve Hunting Unit encompasses portions of the License Area. The Hunting Unit is administered the DLNR, Division of Forestry and Wildlife. To hunt within the License Area, hunters must obtain a license from the DLNR and an EMI Permit/Waiver. Hunting grounds are limited to one hunting party per hunting area, as regulated by the DLNR. Hunters enter the hunting unit every Saturday and Sunday, as well as holidays observed by EMI. Prior to entering, hunting parties must sign in their license number they obtained from the DLNR, and log in any game that are taken. Access to the hunting grounds is managed by EMI through eight existing EMI access roads. Hunting is permitted year round. While hunting parties may enter the License Areas by vehicular access, most areas area must then be traversed by foot. Hiking is also a permitted recreational use within the License Area, and is limited to hiking clubs and individuals. Access to the License Area lands for hiking is acquired through a Hiking Waiver from EMI. ~~Only~~ Generally, only two hiking clubs currently enter the License Area lands approximately four to six times a year; the Sierra Club Maui Group and Mauna Ala Hiking Club. They enter on foot, and are guided by a club hiking expert with a manageable number of people. Other recreational uses are not permitted on the License Area lands for safety reasons. Issuance of the Water Lease under the Proposed Action would allow EMI staff to continue to manage appropriate access into the License Area so that the public may continue to use and enjoy the License Area's recreational and natural resources.			
12 **Tourism State Functional Plan (1991)**			
Purpose: Balance tourism/economic growth with environmental and community concerns; development that is cognizant of the limited land and water resources of the islands; maintaining friendly relations between tourists and community members; development of a			**X**

Table 5-3: Hawai'i State Functional Plans	S	NS	N/A
productive workforce and enhancement of career and employment opportunities in the visitor industry			
Discussion: The Tourism State Functional Plan is not applicable to the Proposed Action.			
13 **Transportation State Functional Plan (1991)**			
Purpose: Development of a safer, more efficient transportation system that also is consistent with planned physical and economic growth of the state; construction of facility and infrastructure improvements; develop a transportation system balanced with new alternatives; pursue land use initiatives which help reduce travel demand			**X**
Discussion: The Transportation State Functional Plan is not applicable to the Proposed Action.			

5.1.3 State Land Use District

The State Land Use Law, Chapter 205, HRS, establishes an overall framework of land use management whereby all lands in the State of Hawai'i are classified into one of four land use districts: Urban District, Agricultural District, Conservation District, and Rural District. The State Land Use Commission (LUC) is responsible for preserving and protecting Hawai'i's lands and encouraging those uses to which lands are best suited.

Discussion:
The Proposed Action encompasses three different regions that may potentially be impacted on the island of Maui: East Maui, Central Maui, and Upcountry Maui.

The License Area is entirely in the Conservation State Land Use District (See Figure 5-1). Specifically, the majority of the License Area is located within the "Protective" subzone of the Conservation District while portions are within the "Limited" and "Resource" subzones (See Figure 5-2). Conservation District lands contain important natural resources essential to the preservation of the State's fragile natural ecosystems and the sustainability of the State's water supply. Therefore, the intent is to conserve, protect, and preserve these lands through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare. Conservation Districts include areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish, and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space areas whose existing openness, natural condition, or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept, and also include areas for geothermal resources exploration and geothermal resources development. Land use regulations in the Conservation District are administered by the BLNR under Hawai'i Administrative Rules. No use except a nonconforming use shall be made within the Conservation District unless the use is in accordance with the HARs. The objective of the Protective subzone of the Conservation District is to protect valuable natural and cultural resources in designated areas such as restricted watersheds, marine, plant, and wildlife sanctuaries, significant historic, archeological, geological, and volcanological features and sites, and other designated unique areas pursuant to HAR § 13-5-11. The objective of the Limited subzone of the Conservation District is to limit uses where natural conditions suggest constraints

on human activities. The Limited subzone shall encompass land susceptible to floods and soil erosion, and land necessary for the protection of the health, safety, and welfare of the public by reason of the land's susceptibility to natural hazards and other designated land uses pursuant to HAR §13-5-12. The objective of the Resource subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas. This subzone shall encompass lands necessary for providing future parkland, and lands presently used for National, State, County, or private parks; lands suitable for growing and harvesting of commercial timber or other forest products; lands suitable for outdoor recreational uses such as hunting, fishing, hiking, camping, and picnicking; and other land uses pursuant to HAR § 13-5-13. The proposed License Area contains the Hanawī NAR[4] as well as the Koʻolau Forest Reserve which are discussed further in detail below in Section 5.1.5 and 5.1.6.

The majority of the approximately 30,000-acre Central Maui agricultural fields are in the Agricultural State Land Use District (See Figure 5-3 ~~5-2~~). Some portions of the agricultural fields in Central Maui are also in the Urban State Land Use District. However, those portions in the Urban State Land Use District will be used for agricultural purposes and and are associated with the Proposed Action. One objective of the Proposed Action is for the continued conveyance of water to the agricultural fields in Central Maui. Permissible uses in the Agricultural District are set forth in Chapter 205 and include, among other uses, activities or uses as characterized by the cultivation of crops, crops for bioenergy, orchards, forage, the raising of livestock, forestry and farming activities or uses related to animal husbandry, game and fish propagation, and some renewable energy options.

The EMI Aqueduct System also delivers water to Upcountry Maui to meet domestic and agricultural demands. Upcountry Maui includes lands within all four State Land Use District, with the majority being within the Agricultural District (See Figure 5-4 ~~5-3~~). The Urban District generally includes lands characterized by "city-like" concentrations of people, structures, streets, urban level of services and other related land uses, and also includes vacant areas foreseeable urban growth. Jurisdiction for this District lies primarily with the counties.

The Rural District is composed primarily of small farms intermixed with low-density residential lots with a minimum size of one-half acre. Jurisdiction over Rural Districts is shared by the LUC and county governments.

The Proposed Action is consistent with the intent and uses allowed in the four State Land Use Districts as set forth by the State Land Use Law, Chapter 205, HRS.

[4] The revocable permits for the year 2020 and the year 2021 removed the Hanawī NAR from the License Area. Thus, it is anticipated that the BLNR may remove the Hanawī NAR from the License Area.

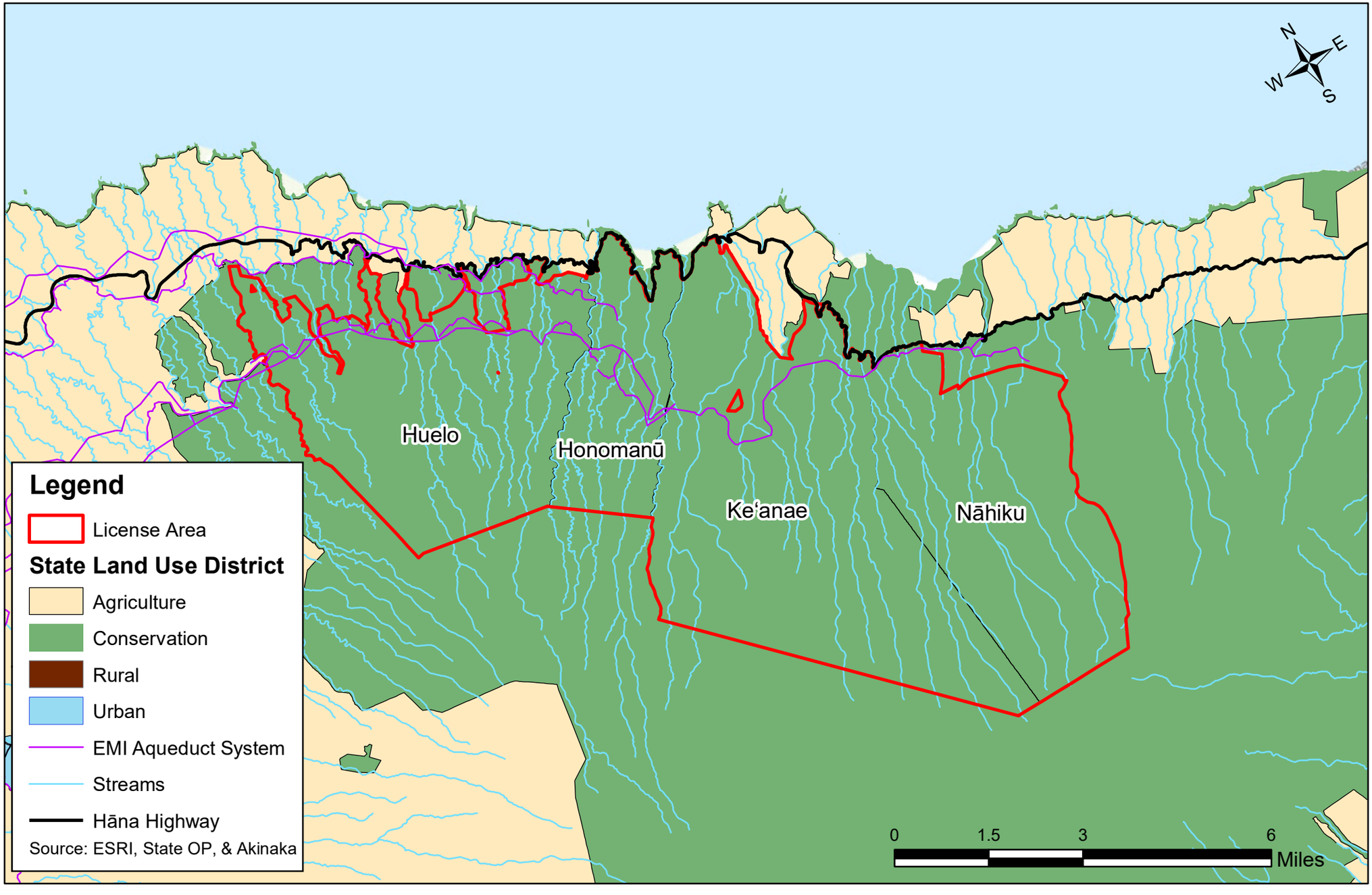
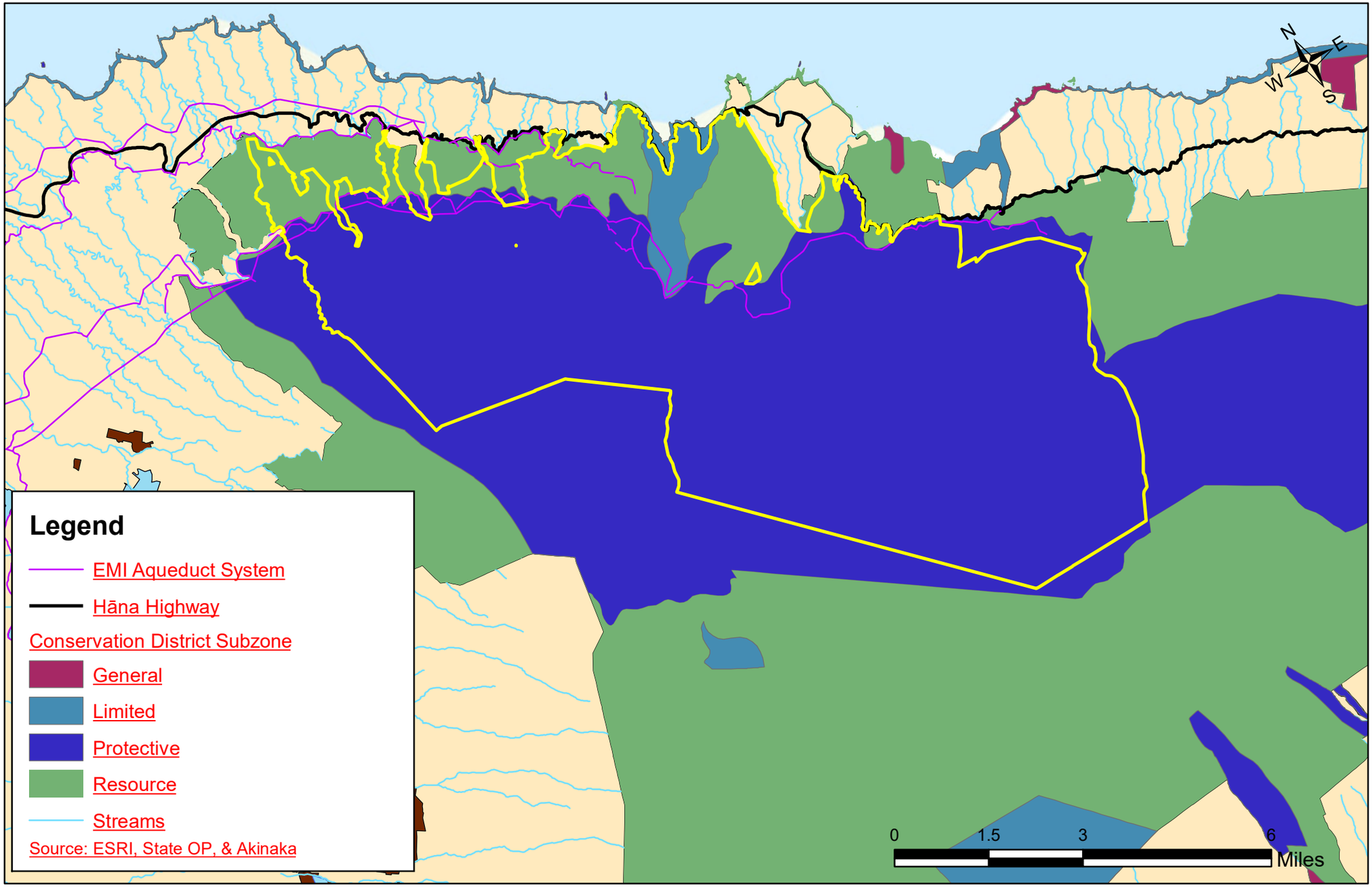


FIGURE 5-1

East Maui State Land Use District Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KEʻANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION



WILSON OKAMOTO CORPORATION

FIGURE 5-2

East Maui Conservation District Subzone Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

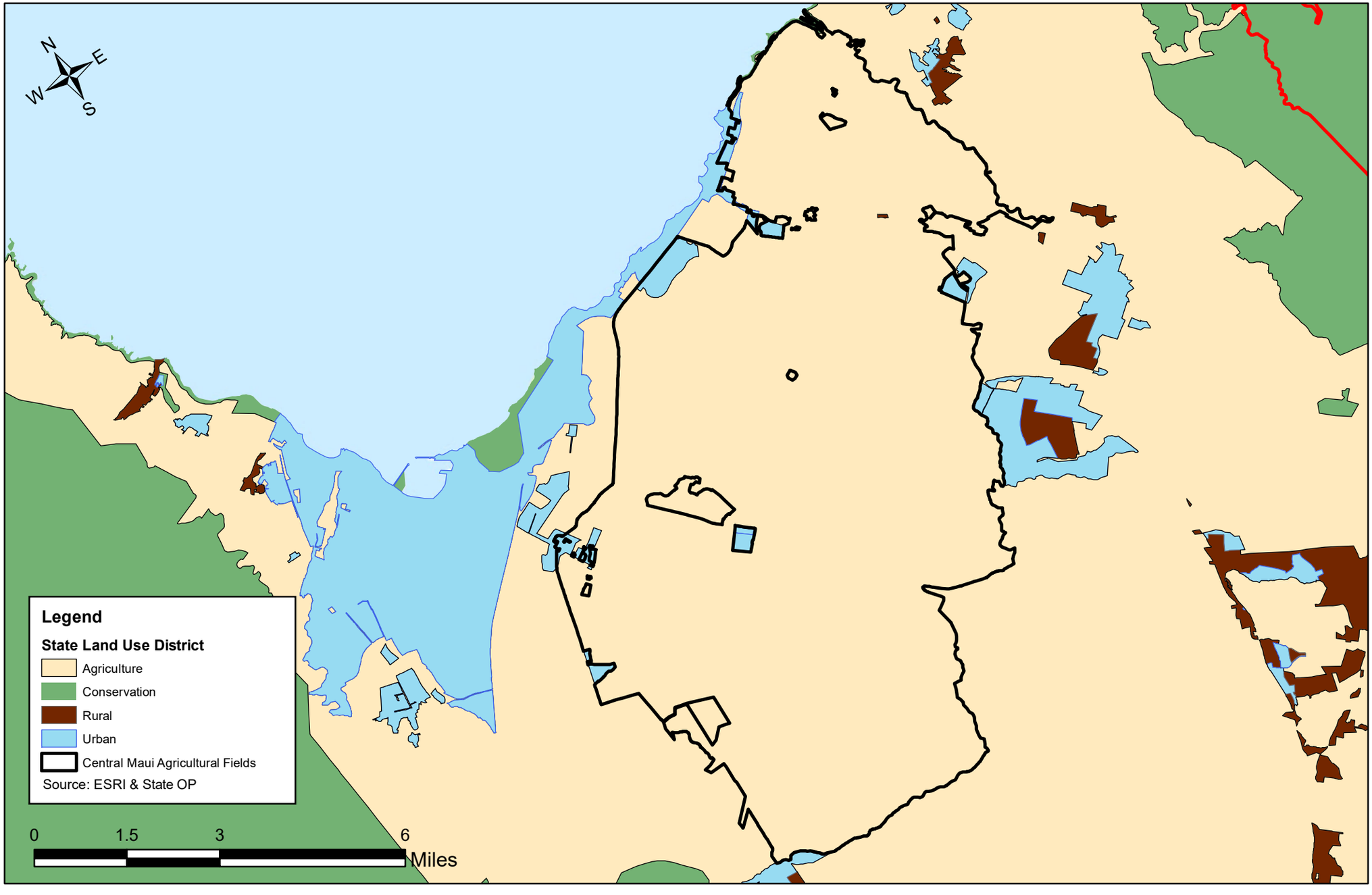


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FIGURE 5-3 ~~FIGURE 5-2~~

Central Maui State Land Use District Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

FIGURE 5-4 ~~FIGURE 5-3~~

Upcountry Maui State Land Use District Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

5.1.4 Important Agricultural Lands

Under Article XI, Section 3, of the Constitution of Hawai'i, the State is required to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands. HRS Chapter, 205, ~~sections~~ § 205-41 through § 205-52, provides for the designation of ~~Important Agricultural Lands (~~IAL~~)~~. As stated in HRS Chapter 205: "The objective for the identification of important agricultural lands is to identify and plan for the maintenance of a strategic agricultural land resource base that can support a diversity of agricultural activities and opportunities that expand agricultural income and job opportunities and increase agricultural self-sufficiency for current and future generations."
IAL designation facilitates the long-term dedication of lands for future agricultural use so long as there is a sufficient supply of water to allow for profitable farming.

IAL is defined as lands that: "(1) Are capable of producing sustained high agricultural yields when treated and managed according to accepted farming methods and technology; (2) Contribute to the State's economic base and produce agricultural commodities for export or local consumption; or (3) Are needed to promote the expansion of agricultural activities and income for the future, even if currently not in production." HRS § 205-42. The IAL designation provides the farmer access to incentives that promote profitable agricultural operations. Incentives include the approval to construct on-site farm dwellings and employee housing, income tax credits for agricultural costs, financing opportunities, loan guarantees, and expedited State-level permitting for agricultural processing facilities. Approximately ~~23,000~~ 22,000 of the 30,000 acres of agricultural fields in Central Maui are designated as IAL (See Figure 5-5 ~~5-4~~).

~~of agricultural activities and opportunities that expand agricultural income and job opportunities and increase agricultural self-sufficiency for current and future generations." IAL designation facilitates the long-term dedication of lands for future agricultural use so long as there is a sufficient supply of water to allow for profitable farming.~~

~~IAL is defined as lands that: "(1) Are capable of producing sustained high agricultural yields when treated and managed according to accepted farming methods and technology; (2) Contribute to the State's economic base and produce agricultural commodities for export or local consumption; or (3) Are needed to promote the expansion of agricultural activities and income for the future, even if currently not in production." The IAL designation provides the farmer access to incentives that promote profitable agricultural operations. Incentives include the approval to construct on-site farm dwellings and employee housing, income tax credits for agricultural costs, financing opportunities, loan guarantees, and expedited State-level permitting for agricultural processing facilities. Approximately 23,000 of the 30,000 acres of agricultural fields in Central Maui are designated as IAL (See Figure 5-4).~~[5]

Table 5-4: Important Agricultural Lands	S	NS	N/A
§205-43 Important Agricultural Lands; Policies - State and county agricultural policies, tax policies, land use plans, ordinances, and rules shall promote the long-term viability of agricultural use of important agricultural lands and shall be consistent with and implement the following policies:			

[5] This was deleted as it was an inadvertent repeat of the preceding paragraphs in Section 5.1.4.

Table 5-4: Important Agricultural Lands	S	NS	N/A
(1) Promote the retention of important agricultural lands in blocks of contiguous, intact, and functional land units large enough to allow flexibility in agricultural production and management;	X		
(2) Discourage the fragmentation of important agricultural lands and the conversion of these lands to nonagricultural uses;	X		
(3) Direct nonagricultural uses and activities from important agricultural lands to other areas and ensure that uses on important lands are actually agricultural uses;	X		
(4) Limit physical improvements on important agricultural lands to maintain affordability of these lands for agricultural purposes	X		
(5) Provide a basic level of infrastructure and services on important agricultural lands limited to the minimum necessary to support agricultural uses and activities;	X		
(6) Facilitate the long-term dedication of important agricultural lands for future agricultural use through the use of incentives;	X		
(7) Facilitate the access of farmers to important agricultural lands for long-term viable agricultural use; and	X		
(8) Promote the maintenance of essential agricultural infrastructure systems, including irrigation systems	X		

Discussion: The Proposed Action will ensure the long-term availability and use of the agricultural fields in Central Maui of which approximately ~~23,000~~ 22,000 of the 30,000 acres of agricultural lands in Central Maui are designated as IAL.

The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion of the Central Maui agricultural fields ~~currently fallow lands~~ to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. Re-establishing these 30,000 acres of the land in farming would provide employment opportunities and significantly expand the agriculture sector of Maui's economy, as well as for the State of Hawai'i. ~~Currently the agricultural land is mostly fallow with initial start-up diversified agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities and planned cultivation of the entire Central Valley may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive and viable diversified agricultural operation.

Additionally, Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services.

Moreover, the agricultural fields in Central Maui are supplied surface water through the EMI Aqueduct System. The Proposed Action will ensure the continued use and maintenance of this system.

5.1.5 Hawai'i Forest Reserves

Much of the License Area is within the Ko'olau Forest Reserve. Hawai'i's Forest Reserve system was established in 1903. Act 44 was "an Act to provide for the encouragement and protection of agriculture, horticulture and forestry." The Forest Reserve Act authorized the governor to place vast amounts of public land, plus private lands temporarily surrendered by their owners, into forest reserves for the primary purpose of protecting water supplies and preventing erosion.

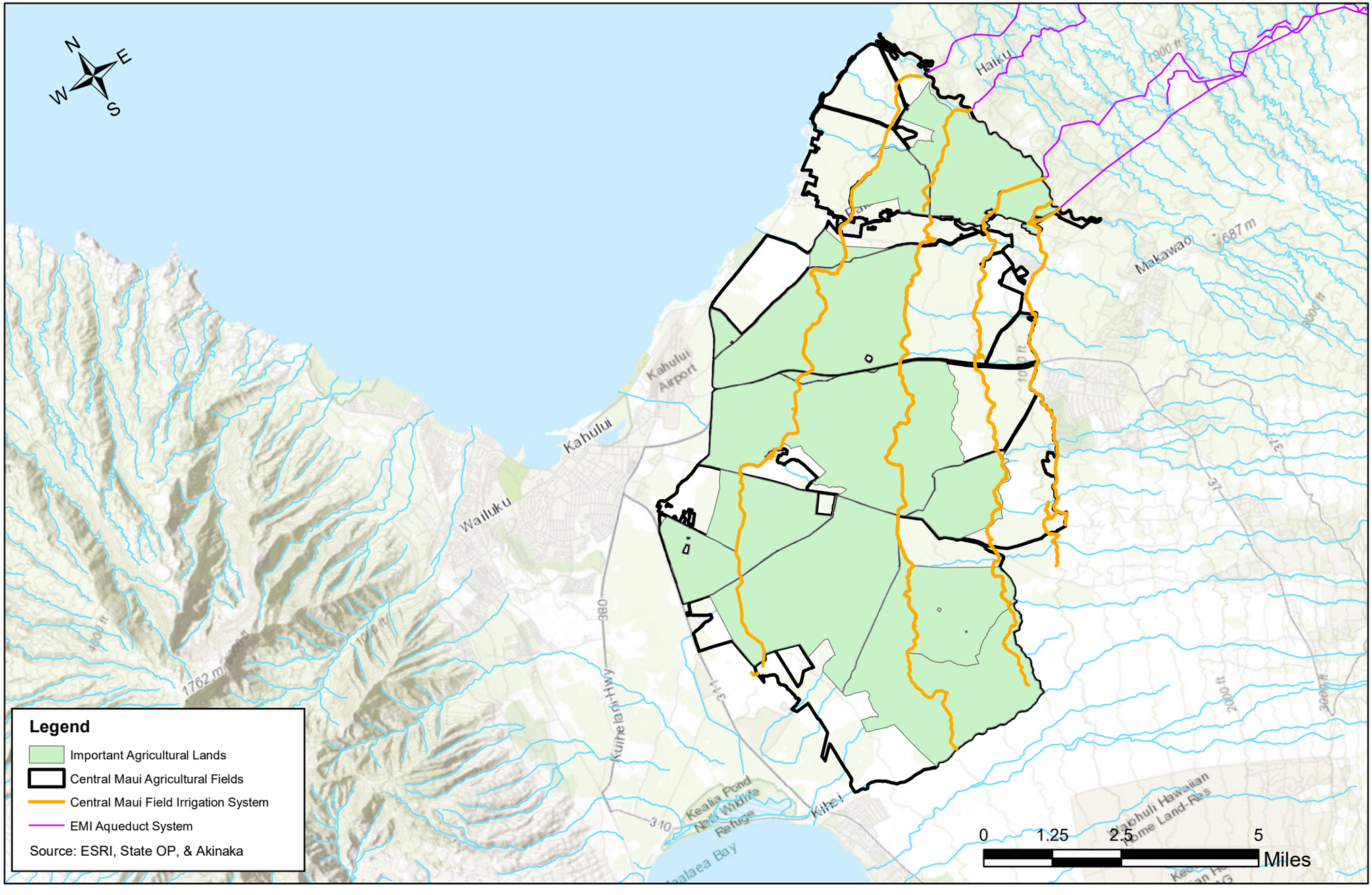

FIGURE 5-5 ~~FIGURE 5-4~~

Important Agricultural Lands Map

Ralph Sheldon Hosmer was appointed to administer the program in 1904. By 1914 he had succeeded in putting 798,214 acres (68% of which belonged to the Territory) into 37 forest reserves. He believed that forest reserves were useful for two primary purposes: water production for the Territory's agricultural industries, and timber production to meet the growing demand for wood products. The forest reserve system, he said, should not lead to "the locking up from economic use of a certain forest area." Even in critical watersheds the harvesting of old trees "is a positive advantage, in that it gives the young trees a chance to grow, while at the same time producing a profit from the forests (Frame and Horwitz, 1965). In its current form, HRS § 183-11 provides:

> The governor may, with the approval of the department of land and natural resources, after a hearing or hearings as hereinafter provided, from time to time set apart any government land or lands, whether under lease or not, as forest reserves. On lands under lease the reserve shall not take effect until the expiration of the existing lease, or in any way affect the rights acquired under the lease. Any land or lands while so set apart shall not be leased or sold by the government or used in any way for any purposes inconsistent with this chapter.
>
> The governor may from time to time, with the approval of the department, after a hearing or hearings as hereinafter provided, revoke, modify, or suspend any and all [of] the orders and proclamations or any part thereof, which set apart the lands.

The ~~Hawai'i Administrative Rules~~ HAR governing Hawai'i Forest Reserves are found in Title 13, ~~chapter~~ Chapter 104. HAR Title 13 ~~chapter~~ Chapter 104 (Rules Regulating Activities Within Forest Reserves) provides regulations for the administration of forest reserves in general. It contains various restrictions on activities within a forest reserve. Building fires on the ground or in any structure is prohibited, as is the use of fireworks. Hunting, fishing, trapping or disturbing any fish, animal, or bird is prohibited, except as allowed by DLNR's hunting or fishing rules. Swimming, driving, and cats, dogs, and other animals are allowed but subject to limitations. No person can remain in the same forest reserve for more than 7 continuous days. Particular rules regarding prohibitions and access permits are discussed below.

Table 5-5: Hawai'i Forest Reserves	S	NS	N/A
HAR §13-104-4. The following activities are prohibited within a forest reserve:			
(1) To remove, injure, or kill any form of plant or animal life, either in whole or in part, except as authorized by the board ~~Board~~ or authorized representative or as provided by rules of the board ~~Board~~;	X		
(2) To remove, damage, or disturb any natural feature or resource (e.g. natural stream beds) except as authorized by the board or its authorized representative;	X		
(3) To remove, damage, or disturb any historic or prehistoric remains;	X		
(4) To remove, damage, or disturb any notice, marker, or structure;	X		
(5) To enter, occupy, or use any building, structure, facility, motorized vehicle, machine, equipment, or tool within or on forest reserve except as authorized by the board or its representative;	X		
(6) To engage in any construction or improvement except as authorized by the board.	X		

Table 5-5: Hawai'i Forest Reserves	S	NS	N/A
(7) To sell, peddle, solicit, or offer for sale any merchandise or service except with written authorization from the board.			X
(8) To distribute or post handbills, circulars, or other notices.			X
(9) To introduce any plant or animal except as approved by the board ~~Board~~.			X
(10) To enter or remain within forest reserves when under the influence of alcohol, narcotics, or drugs, to a degree that may endanger oneself or endanger or cause annoyance to other persons or property. The use or possession of narcotics, drugs or alcohol within forest reserves is prohibited.			X
Discussion: The Proposed Action is consistent with the limitations under HAR § 13-104-4. The Water Lease proposes a continuation of water collection and distribution that started in the 1870s. However, the Proposed Action involves a significant reduction in the amount of water that can be diverted from the License Area due to the IIFS requirements set forth under the CWRM D&O. Any modifications to the EMI Aqueduct System required under the CWRM D&O will be done in compliance with applicable rules of the BLNR. The issuance of the Water Lease itself does not propose any additional changes to the EMI Aqueduct System or the use of the License Area.			
HAR § 13-104-5. The following activities are prohibited within a forest reserve:			
(1) To drain, dump, or leave any litter, animal waste or remains, or any other material which pollutes or is likely to cause pollution in the forest reserve including streams and other water sources;	X		
(2) To deposit any body waste in areas without comfort stations without digging a hole and covering all signs of the waste;	X		
(3) To deposit any body waste within 150 feet of a spring, stream, lake, or reservoir;	X		
(4) To leave or abandon a vehicle or any other large refuse such as refrigerators or stoves, household garbage or trash or other forms of waste or debris.			X
Discussion: The Proposed Action is supportive of the regulations governing the use of forest reserves. No new actions that would generate litter or human waste are proposed in connection with the Water Lease. Maintaining the streams and water sources within the License Area is vital to the objectives of the Proposed Action, such as the ability to continue to deliver water to domestic and agricultural users in Upcountry Maui, ~~Nahiku,~~ and Central Maui. As noted in Section 2.1.2, EMI continually maintains the EMI Aqueduct System as well as its associated access roads and trails. It evaluates areas of the EMI Aqueduct System regularly to identify where maintenance / repair activities are necessary and adds them to a list of maintenance projects. Moreover, in response to comments received on the DEIS, EMI staff have been conducting sweeps to locate / remove debris from the License Area.			
HAR Title 13 Chapter 104 also provides a permitting scheme for access to forest reserves. Access permits shall be obtained from the district offices of the Division of Forestry and Wildlife during regular working hours. By signing the permit and entering into the forest reserve, all persons included on the permit agree to comply with all the terms and conditions of the permit, as well as applicable laws and regulations; and consent to present the permit to a duly authorized representative of the department upon request. Persons applying for a permit shall provide, if requested, identification for all persons included on a permit, satisfactory to the board or its authorized representative. The board or its authorized representative may require the names, addresses, and telephone numbers of all persons included on a permit. HAR § 13-104-18. ~~Persons applying for an access permit must provide their names and addresses and produce satisfactory identification.~~ [6]	X		
Discussion: To hunt within the Hunting Units of the Ko'olau Forest Reserve hunters must obtain a license from the DLNR and an EMI Permit/Waiver. Hunting grounds are limited to one hunting party per hunting area, as regulated by the DLNR. Hunters enter the hunting unit every Saturday and Sunday, as well as holidays observed			

[6] Updated as of January 2021

Table 5-5: Hawai'i Forest Reserves	S	NS	N/A
by EMI. Prior to entering, hunting parties must sign in with the license number obtained from the DLNR, and upon exiting must log in any game that are taken. Access to the hunting grounds is managed by EMI through eight existing EMI access roads. Hunting is permitted year round. Hunting parties may enter the License Area by vehicular access, however, must traverse by foot in most areas.			
HAR § 13-104-23: Permits for access to or entry into forest reserves may be required by the board or its authorized representative for the following purpose:			
(1) To comply with the requirements of private landowners or lessees who permit access to forest reserves through their land;	X		
(2) To control the number of people using a forest reserve or an area within a forest reserve in order to minimize the impact upon environmentally sensitive areas;	X		
(3) To control the types of uses of a forest reserve or an area within a forest reserve in order to minimize the dangers of incompatible uses in the same area (e.g. horseback riding and motorcycle riding);	X		
(4) To control periods of use of a forest reserve, or any portion thereof, which may be under closure or otherwise restricted; and ~~especially during periods when fire danger levels are high~~.	X		
(5) For scientific research activities that are otherwise prohibited by this chapter.[7] ~~To collect plants or animals for scientific purposes.~~			X
Discussion: The Proposed Action is consistent with the regulations governing access to or entry into forest reserves.			

5.1.6 Hawai'i Natural Area Reserves

The Hanawī ~~Natural Area Reserve (~~NAR~~)~~ consists of approximately 7,500 acres. Large portions of the Hanawī NAR are within the Nāhiku portion of the License Area. The revocable permits for the year 2020 and the year 2021 removed the Hanawī NAR from the License Area. Thus, it is anticipated that the BLNR may remove the Hanawī NAR from the License Area should it issue the Water Lease. However, no portion of the EMI Aqueduct System is within the Hanawī NAR. The NAR system is established under HRS Chapter 195. The purpose of the establishment of the NAR system is set forth in HRS § 195-1 as follows:

> The legislature finds and declares that (1) the State of Hawai'i possesses unique natural resources, such as geological and volcanological features and distinctive marine and terrestrial plants and animals, many of which occur nowhere else in the world, that are highly vulnerable to loss by the growth of population and technology; (2) these unique natural assets should be protected and preserved, both for the enjoyment of future generations, and to provide base lines against which changes which are being made in the environments of Hawai'i can be measured; (3) in order to accomplish these purposes the present system of preserves, sanctuaries and refuges must be strengthened, and additional areas of land and shoreline suitable for preservation should be set aside and administered solely and specifically for the aforesaid purposes; and (4) that a statewide natural area reserves system should be established to preserve in perpetuity specific land

[7] Updated as of January 2021

and water areas which support communities, as relatively unmodified as possible, of the natural flora and fauna, as well as geological sites, of Hawai'i.

The ~~Hawai'i Administrative Rules~~ HAR regulating activities within the NAR system are found in Title 13, ~~chapter~~ Chapter 209. Applicable rules regarding prohibited activities within the NAR include the following:

Table 5-6: Hawai'i Natural Area Reserves	S	NS	N/A
HAR § 13-209-4. The following activities are prohibited within a natural area reserve:			
(1) To remove, injure, or kill any form of plant or animal life, except game mammals and birds hunted according to department rules;			X
(2) To introduce any form of plant or animal life, except dogs when permitted by hunting rules of the department and service animals accompanying their handlers;			X
(3) To remove, damage, or disturb any geological or paleontological features or substances;			X
(4) To remove, damage, or disturb any historic or prehistoric remains:			X
(5) To remove, damage, or disturb any notice, marker, or structure;			X
(6) To engage in any construction or improvement;			X
(7) To engage in any camping activity or to establish a temporary or permanent residence;			X
(8) To start or maintain a fire;			X
(9) To litter, or to deposit refuse or any other substance;			X
(10) To operate any motorized or unmotorized land vehicle or air conveyance of any shape or form in any area, including roads or trails, not designated for its use;			X
(11) To operate any motorized water vehicle of any shape or form in freshwater environments, including bogs, ponds, and streams, or marine waters, except as otherwise provided in the boating rules of the department;			X
(12) To enter into, place any vessel or material in or on, or otherwise disturb a lake or pond;			X
(13) To engage in commercial activities of any kind in a natural area reserve without a written special-use permit from the board or its authorized representative;			X
(14) To have or possess the following tools, equipment, or implements: fishing gear or devices within Ahihi-Kinau natural area reserve, including but not limited to any hook-and-line, rod, reel, spear, trap, net, crowbar, or other device that may be used for the taking, injuring, or killing of marine life; cutting or harvesting tools or gear, including but not limited to chainsaws, axes, loppers, any mechanized or manual sawtooth tool, seed pickers, or machete, that may be used for the taking, injuring, or killing of plant life; and hunting gear or			X

Table 5-6: Hawai'i Natural Area Reserves	S	NS	N/A
tools that may be used for the taking, injuring, or killing of wildlife, except as permitted by the hunting rules of the department;			
(15) To hike, conduct nature study, or conduct any activity with a group larger than ten in size;			X
(16) To be present in an area closed pursuant to section 13-209-4.5 or after visiting hours established pursuant to section 13-209-4.6;			X
(17) To anchor any motorized or nonmotorized water vehicle of any shape or form in the marine waters of Ahihi-Kinau natural area reserve;			X
(18) To enter into any cave, as defined in section 6D-1, Hawaii Revised Statutes, or any portion thereof;			X
(19) To conduct any other activity inconsistent with the purpose and intent of the natural area reserves system;			X
(20) To use or possess narcotics or drugs except as provided by Federal or State laws. No person shall enter or remain within the premises when under the influence of alcohol or illegal narcotics or drugs;			X
(21) To use or possess alcohol, except with the written permission of the board or its authorized representative.			X
Discussion: Although a portion of the water Collection Area and License Area is within the Hanawi NAR, the EMI Aqueduct System is not within the NAR. Maintaining the NAR in a relatively unmodified state is consistent with the area being a source of water distributed for domestic and agricultural purposes through the EMI Aqueduct System. The Proposed Action (issuance of a Water Lease) does not involve any prohibited activities under Title 13, Chapter 200. Moreover, as mentioned above, the revocable permits for the year 2020 and the year 2021 removed the Hanawī NAR from the License Area. Thus, it is anticipated that the BLNR may remove the Hanawī NAR from the License Area should it issue the Water Lease.			

5.1.7 Hawaiʻi Coastal Zone Management Program

The National Coastal Zone Management (CZM) Program was created through passage of the Coastal Zone Management Act of 1972. The U.S. Congress enacted the CZM Act to assist states in better managing coastal and estuarine environments. The Act provides grants to states that develop and implement federally-approved CZM plans. The goal of the CZM Act is to “preserve, protect, develop, and where possible, to restore or enhance the resources of the nation’s coastal zone.” Hawaiʻi’s CZM Act, adopted as Chapter 205A, HRS, provides a basis for protecting, restoring and responsibly developing coastal communities and resources. In Hawaiʻi, the "coastal zone management area" means all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the territorial sea.

The Proposed Action's conformance with the ten objectives and numerous policies of the State of Hawaiʻi CZMP is set forth in Table 5-7 below. The Proposed Action does not include the use of any land that is within the Special Management Area designated by the County of Maui in East Maui (See Figure 5-6 ~~5-5~~). However, small portions of the Central Maui agricultural fields in Pāʻia are situated within the Special Management Area (See Figure 5-7 ~~5-6~~).

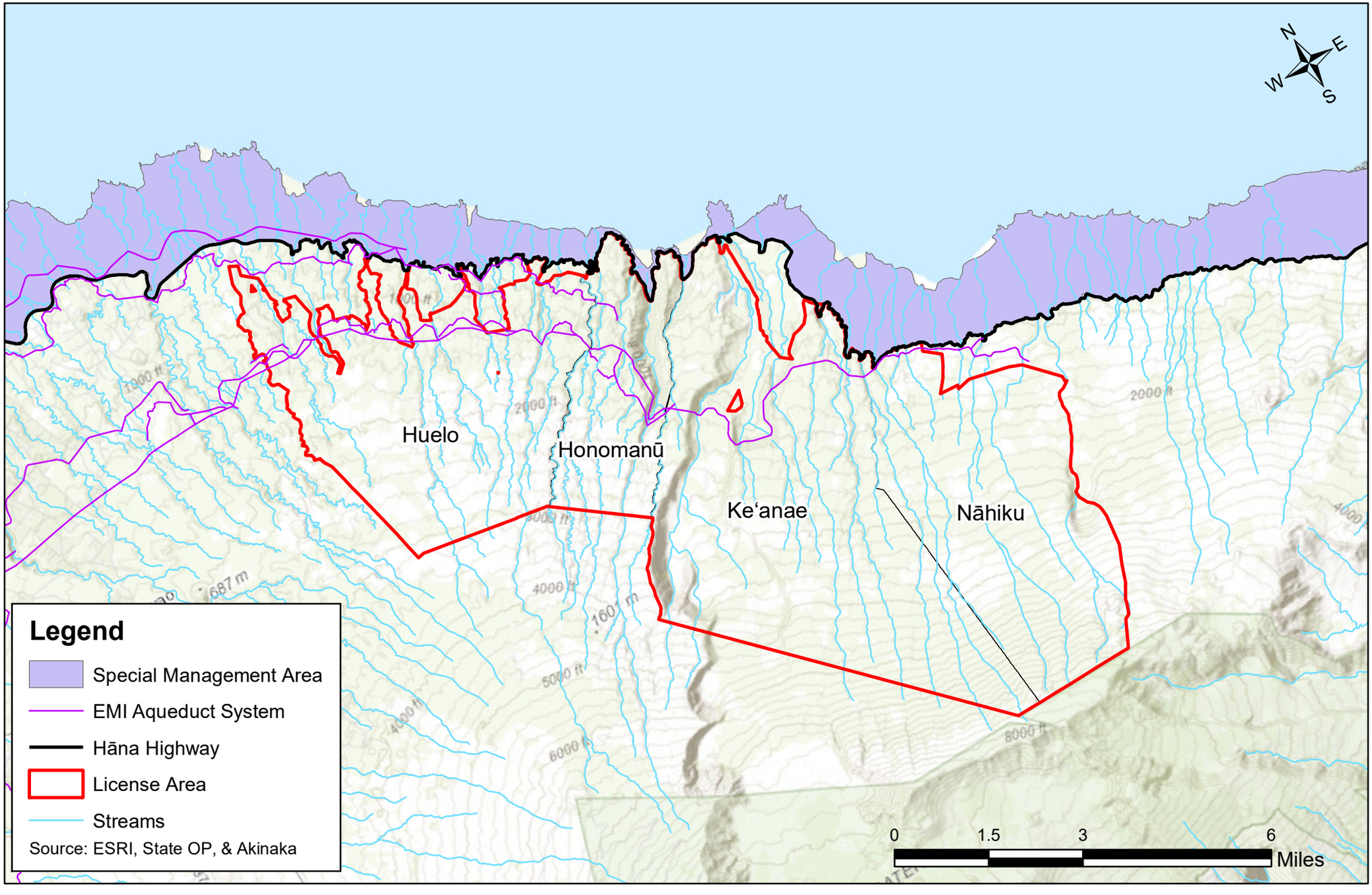

FIGURE 5-6 ~~FIGURE 5-5~~

East Maui Special Management Area Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE‘ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

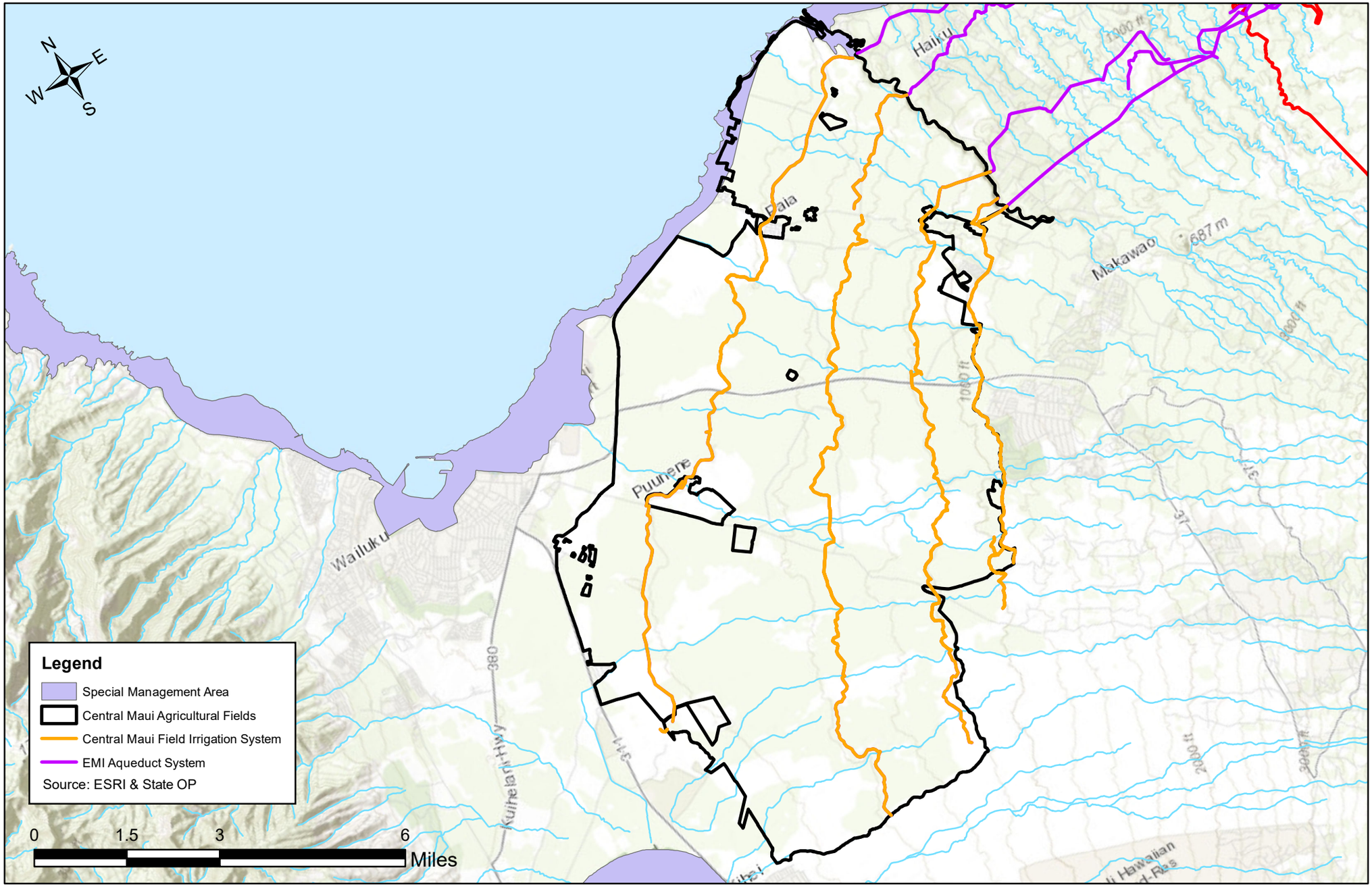

FIGURE 5-7 ~~FIGURE 5-2~~

Central Maui Special Management Area Map

PROPOSED LEASE (WATER LEASE) FOR THE NĀHIKU, KE'ANAE, HONOMANŪ, AND HUELO LICENSE AREAS

WILSON OKAMOTO CORPORATION

Should the Water Lease be issued in accordance with the Proposed Action, surface water will continue to be ~~become~~ available for the various domestic and agricultural uses. This would, in turn, lead to anticipated secondary effects including construction activities such as for building facilities in support of diversified agriculture in Central Maui. Such activities would be subject to various permits and approvals, depending on ~~its~~ location, proposed use and type of construction activity involved, but such permits and approvals are for a secondary activity and not required, or mandated by, for the issuance of the Water Lease. However, it is noted that no development, as that term is defined under HRS § 205A-22, is proposed within the Special Management Area in connection with the Mahi Pono farm plan., ~~including a Special Management Area Permit.~~

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
Recreational Resources			
Objective: Provide coastal recreational opportunities accessible to the public.			
Policies			
(A) Improve coordination and funding of coastal recreational planning and management; and			**X**
(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:			**X**
i. Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;			**X**
ii. Requiring restoration ~~replacement~~ of coastal resources that have ~~having~~ significant recreational and ecosystem value, including, but not limited to, coral reefs, surfing sites, fishponds, ~~and~~ sand beaches, and coastal dunes, when these ~~such~~ resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when restoration ~~replacement~~ is not feasible or desirable;			**X**
iii. Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;			**X**
iv. Providing an adequate supply of shoreline parks and other recreational facilities suitable public recreation;			**X**
v. Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;			**X**
vi. Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;	**X**		
vii. Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and			**X**
viii. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the			**X**

[8] Please note that changes to the objectives and policies are to reflect Act 16 of 2020, which occurred after publication of the DEIS.

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
land use commission, board of land and natural resources, and county authorities; and crediting that ~~such~~ dedication against the requirements of section 46-6.			
Discussion: The Proposed Action ~~does~~ will not adversely impact the shoreline and as such would not affect coastal recreational opportunities accessible to the public. The License Area in East Maui is, at certain locations, as close as 500 feet from the shoreline. However, the Proposed Action does not include any development or construction. Compliance with the ~~The~~ CWRM D&O may require some modifications or potentially complete removal of specific diversions in the EMI Aqueduct System, if needed to achieve compliance, but will not impact coastal recreational opportunities that are accessible to the public as the License Area does not encompass the shoreline. Moreover, coastal resources, such as fishponds and shoreline parks, may be enhanced with the implementation of the IIFS. Some of the agricultural fields in Central Maui are within 300 feet of the shoreline. However, the Proposed Action would allow for the continued conveyance of water from East Maui to the agricultural fields in Central Maui for the continued transition to a diversified agricultural farming model. The various operations that occur within these fields as a result of the Proposed Action will adopt water quality standards and regulate point and nonpoint sources of pollution to protect coastal waters where feasible. The Proposed Action would allow for the continued conveyance of water through the EMI Aqueduct System, which is supplied to the MDWS which is in turn supplied to Upcountry Maui to meet their domestic and agricultural demands. The approximate area of the MDWS Upcountry Maui Water System does include areas of Ha'ikū and Pā'ia. Issuance of the Water Lease would ensure that the MDWS has a reliable source of water to supply the Upcountry Maui Water System with, which may enhance the coastal recreational opportunities by providing for recreational facilities.			
Historic Resources			
Objective: Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.			
Policies:			
(A) Identify and analyze significant archaeological resources;	**X**		
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and			**X**
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.	**X**		
Discussion: The Proposed Action will have no significant impact on historic and cultural resources. For the subject EIS ~~DEIS~~, CSH prepared an Archaeological LRFI report of the License Area to identify and analyze resources. No potential archaeological sites were observed during field inspections and no impact to archaeological historic properties within the License Area are anticipated because the Proposed Action does not include related significant ground disturbance within previously undisturbed areas. Implementation of the CWRM D&O may require modification or complete removal of specific diversions in the EMI Aqueduct System. Mason Architects prepared a Historic Structure Assessment report for the subject Water Lease. It was determined that the EMI Aqueduct System is eligible to be place on the NRHP. Historically significant structures to be modified or removed will be documented photographically and with location sketch plans conforming to the Historic American Engineering Survey (HAER) standards. No development in East Maui is anticipated in connection with the Proposed Action. Should development be proposed in the ~~Any~~ future, as applicable it ~~developments~~ will need to be in conformance with the goals, policies, and objectives of the State of Hawai'i CZMP. In Central Maui, the agricultural fields have been producing sugarcane for over a century up until 2016 ~~2013~~ when A&B ceased its sugarcane ~~sugar cane~~ operations and began to transition towards a diversified agriculture farming model. Should any archeological sites such as walls, platforms, pavements or mounds, or remains such as artifacts,			

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
burials, concentrations of shell or charcoal be encountered during the transition to diversified agriculture, the State Historic Preservation Division will be contacted immediately.			
Scenic and Open Space Resources			
Objective: Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.			
Policies			
(A) Identify valued scenic resources in the coastal zone management area;			X
(B) Ensure that new developments are compatible with their visual environment by designing and locating those ~~such~~ developments to minimize the alteration of natural land forms and existing public views to and along the shoreline;			X
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and	X		
(D) Encourage those developments that are not coastal dependent to locate in inland areas.			X
Discussion: The Proposed Action, with the implementation of the CWRM D&O, will improve the quality of coastal scenic and open space resources. In the License Area, the CWRM D&O requires specific streams to be fully restored with no diversions in the streams, while other streams, designated as "habitat restoration" streams, will be very limited in the amount of water that can be diverted. According to the CWRM D&O, ensuring water connectivity in "fully restored" and "habitat restoration" streams will enhance the scenic value and improve the natural resources of the region. Moreover, Trutta ~~Environmental Solutions, LLC~~ assessed the License Area ~~33~~ streams and the impacts of the Proposed Action. Generally, the assessment found that the Proposed Action, in compliance with the CWRM D&O, increased the overall amount of habitat units regionally when compared to when sugar operations were in full effect from a regional perspective. The issuance of the Water Lease will allow for the continued conveyance of water to supply the agricultural fields in Central Maui. The Water Lease would allow for the continued transition of the agricultural fields to a diversified agriculture farming operation. However, Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential, ~~currently the fields are mostly fallow and not being utilized to their full potential~~. Irrigating the fields will enhance the scenic value of these fields ~~as some are within 300 feet of the coastline~~. The Proposed Action will allow for the continued operation of the EMI Aqueduct System and conveyance of water to the MDWS which is in turn supplied to Upcountry Maui~~, as well as Nāhiku~~. The issuance of the Water Lease would ensure that the MDWS has a reliable source of water to provide these water systems with. Those open space and scenic resources along the coast that depend upon the Upcountry Maui Water System ~~these water systems and require irrigation to be maintained~~ would have a reliable source of water, preserving the scenic value of these resources.			
Coastal Ecosystems			
Objective: Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems.			
Policies			
(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;			X

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
(B) Improve the technical basis for natural resource management;			X
(C) Preserve valuable coastal ecosystems~~, including reefs,~~ of significant biological or economic importance, including reefs, beaches, and dunes;			X
(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and	X		
(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.			X
Discussion: The Proposed Action with the implementation of the IIFS will protect the coastal ecosystems and is not expected to have any adverse effects on coastal ecosystems. In the License Area, the CWRM D&O orders that specific streams be fully restored with no diversions in the streams, while other streams will be very limited to amount of water that can be diverted as specific streams are designated as "habitat restoration" streams. Other streams were ordered to have a wetted pathway maintaining the "mauka to makai" connection. This would allow for the various animal species that have diadromous life cycle to complete their life cycles, benefiting coastal water ecosystems. ~~Sea Engineering, Inc. and Marine Research Consultants, Inc~~. SE and MRC jointly prepared a report assessing the streams and ocean water chemistry to depict the effects of stream discharge of the East Maui streams on the nearshore ocean environment. Results of the investigation indicate that the effects of stream water on marine waters must be considered minor in the nearshore habitats of East Maui. This result is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing condition of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting. Observations of the habitats in these transition zones indicated that they were composed primarily of sand and barren rock. Owing to continual, intense wave energy, these nearshore areas do not constitute important habitats for coral reef communities and associated marine species. Beyond the narrow transition zone, the influence of stream water is minimal owing to rapid and intense mixing. Moreover, additional research by the HSHEP model found that the nearshore environment below the License Area possesses very little estuarine habitats. It was found that five streams have any possibility of an estuarine reach. For these five streams, three streams (Waiohue, Pi'ina'au, and Honomanū) are the most likely to have estuarine reaches and all three of these streams have either full or habitat flow restoration required under the CWRM D&O. Of the two streams that may have a small estuarine reach, Pa'akea will have connectivity flow restoration, while 'O'opuloa will have no flow restoration and will remain as per the 1988 IIFS. Thus overall, the majority of estuarine habitat will be either fully or partially restored under the Proposed Action. The CWRM D&O, however, notes that a total of nine streams (one is considered a tributary to Pi'ina'au Stream) have esturine reaches, four of which were noted by the HSHEP + aerial image review approach as to having estuarine reaches. The streams included in the CWRM D&O are shown in Table 4-8 below along with their overlap with streams determined with the method used by the HSHEP model. According to CWRM, anywhere that the DLNR Division of Aquatic Resources (DLNR-DAR) conducted an estuary survey for the East Maui streams, it was considered an estuary. This includes surveys conducted in bays and/or streams. While the DLNR-DAR's methodology used is for estuary surveys, it does not define the size or extent of an estuary such as the HSHEP model, only that the DLNR-DAR survey was conducted to look for the presence of fish near a stream mouth. Hence, the difference between the two methodologies. This is discussed in more detail in Section 4.2.3 of the FEIS.			
Economic Uses			
Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.			
Policies			
(A) Concentrate coastal dependent development in appropriate areas;			X
(B) Ensure that coastal dependent development ~~such as harbors and ports,~~ and coastal related development ~~such as visitor industry facilities and energy generating facilities,~~ are			X

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area; and			
(C) Direct the location and expansion of coastal development ~~dependent developments~~ to areas ~~presently~~ designated and used for that development ~~such developments~~ and permit reasonable long-term growth at those ~~such~~ areas, and permit coastal ~~dependent~~ development outside of presently designated areas when: i. Use of ~~presently~~ designated locations is not feasible; ii. Adverse environmental effects and risks from coastal hazards are minimized; and iii. The development is important to the State's economy;			X
Discussion: The Proposed Action does not involve the development of, and is not expected to have any adverse effects on, any public or private facilities in coastal areas that are important to the State's economy.			
Coastal Hazards			
Objective: Reduce hazard to life and property from coastal hazards ~~tsunami, storm waves, stream flooding, erosion, subsidence, and pollution~~.			
Policies			
(A) Develop and communicate adequate information about ~~storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution~~ the risks of coastal hazards;			X
(B) Control development, including planning and zoning control, in areas subject to coastal ~~storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution~~ hazards;			X
(C) Ensure that developments comply with requirements of the National ~~Federal~~ Flood Insurance Program; and			X
(D) Prevent coastal flooding from inland projects.			X
Discussion: The Proposed Action is not expected to experience or exacerbate coastal hazards ~~natural levels of flooding or affect flood zone areas~~. The issuance of the Water Lease will allow for the EMI Aqueduct System to continue to divert stream surface water from multiple streams in East Maui after the implementation of the IIFS under the CWRM D&O. Natural flooding events are not expected to increase due to the Water Lease under the Proposed Action. The issuance of the Water Lease will allow for the continued conveyance of water to the agriculture fields in Central Maui for the continued transition to a diversified agriculture farming model. ~~Currently a majority of the fields are in a fallow state~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. If the fields are left in a fallow state for prolonged periods of time, this will increase the amount of windblown erosion that will occur. Irrigating the fields to a cultivated state will decrease the amount of windblown erosion that would occur in contrast. The Central Maui agricultural fields are designed and operated to efficiently utilize irrigation water from the EMI Aqueduct System so there is no surface runoff. Drainage facilities along improved roadways capture rainfall runoff. Anticipated drainage patterns associated with the Proposed Action are forecasted to match existing drainage conditions. The Proposed Action will allow for the continued operation of the EMI Aqueduct System and conveyance of water to the MDWS which is in turn supplied to Upcountry Maui~~, as well as Nāhiku~~ to meet their domestic and agricultural water demands. Issuance of the Water Lease would not increase hazards to life and property from coastal hazards ~~tsunami, storm waves, stream flooding, erosion, subsidence, and pollution~~.			

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
The Proposed Action will also ensure the continued delivery of water for the Nāhiku community, which, through the MDWS, draws water from EMI's land through EMI's West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch.			
Managing Development			
Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.			
Policies			
(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;			X
(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and			X
(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.	X		
Discussion: The Proposed Action does not include development within the coastal zone and will not increase coastal hazards. Although the Proposed Action does not entail coastal development, it has a significant public participation component. This EIS has been prepared under the procedural provisions of HRS, Chapter 343, and HAR, Title 11, Chapter 200, which allows for public review and participation. Accordingly, the preparation of this EIS, and disclosure of anticipated effects of the Proposed Action, is consistent with this policy ~~will comply with the policy on managing development~~. Prior to the publication of the EISPN for the Proposed Action, several outreach meetings were held to notify and initiate consultation with the community for the preparation of a Chapter 343, HRS, EIS (see Sections 9.1 and 9.2). The purpose of this outreach process was to inform and obtain input from the community on relevant issues or concerns that should be considered in the preparation of the EIS documentation for the Proposed Action. The State Office of Environmental Quality Control (OEQC) published the EISPN on February 8, 2017. A 30-day public comment period ensued and ~~this~~ the DEIS responded ~~responds~~ to and ~~documents~~ documents all relevant public comments received. ~~This~~ The DEIS ~~will~~ informed ~~inform~~ interested parties of the Proposed Action and sought ~~seek~~ relevant public comment on subjects of concern for EIS documentation. The filing and publication of the ~~this~~ DEIS with the OEQC ~~will be~~ was followed by a 45-day public comment period. All relevant public comments received during the 45-day public comment period have received ~~will receive~~ a written response for inclusion and use in the preparation in this ~~the forthcoming~~ FEIS.			
Public Participation			
Objective: Stimulate public awareness, education, and participation in coastal management.			
Policies:			
(A) Promote public involvement in coastal zone management processes;	X		
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and	X		
(C) Organize workshops, policy dialogues, and site-specific mitigation to respond to coastal issues and conflicts.			X
Discussion: The Proposed Action does not entail actions that implicate coastal management. Nevertheless, the Proposed Action has a significant public awareness component. Public involvement will consist of public notice of			

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
the Proposed Action during the State EIS process through public scoping, publication in the State OEQC Bulletin, and coordination with agencies, organizations, and individuals. See Chapter 9 ~~Section 11.0~~ for a list of the agencies, organizations and individuals that have been ~~or will be~~ consulted for the Proposed Action. Two EIS public scoping meetings were held to notify and initiate consultation with the community for the preparation of a Chapter 343, HRS. In addition, following the publication of the EISPN through the State OEQC Bulletin on February 8, 2017, a 30-day public comment period followed. The publication of ~~this~~ the DEIS was ~~will be~~ followed by a 45-day public comment period and those comments and responses thereto ~~will be~~ are included in ~~the~~ this FEIS to be presented to BLNR for review and acceptance.			
Beach and Coastal Dune Protection			
Objective: (A) Protect beaches and coastal dunes for: ~~public use and recreation~~. (i) Public use and recreation; (ii) The benefit of coastal ecosystems; and (iii) Use as natural buffers against coastal hazards; and (B) Coordinate and fund beach management and protection.			
Policies:			
(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;			X
(B) Prohibit construction of private shoreline hardening ~~erosion protection~~ structures ~~seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not~~ including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities; and			X
(C) Minimize the construction of public shoreline hardening ~~erosion protection~~ structures including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities; ~~seaward of the shoreline.~~			X
(D) Minimize grading of and damage to coastal dunes;			X
(E) Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and			X
(F) Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.			X
Discussion: The Proposed Action is not anticipated to have a significant impact on beach and coastal dunes ~~shoreline processes~~.			
Marine and Coastal Resources			
Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.			
Policies			
(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;			X

Table 5-7: Hawai'i Coastal Zone Management Act[8]	S	NS	N/A
(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;			X
(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;			X
(D) Promote research, study, and understanding of ocean and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how coastal ~~ocean~~ development activities relate to and impact ~~upon~~ ocean and coastal resources; and			X
(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.			X
Discussion: The Proposed Action is not anticipated to adversely affect marine or coastal ~~aquatic~~ resources. ~~Sea Engineering, Inc. and Marine Research Consultants, Inc~~. SE and MRC jointly prepared a report assessing the streams and ocean water chemistry to depict the effects of stream discharge of the East Maui streams on the nearshore ocean environment. Results of the investigation indicate that the effects of stream water on marine waters must be considered minor in the nearshore habitats of East Maui. This result is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing condition of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting. Observations of the habitats in these transition zones indicated that they were composed primarily of sand and barren rock. Owing to continual, intense wave energy, these nearshore areas do not constitute important habitats for coral reef communities and associated marine species. Beyond the narrow transition zone, the influence of stream water is minimal owing to rapid and intense mixing. Moreover, additional research by the HSHEP model found that the nearshore environment below the License Area possesses very little estuarine habitats. It was found that five streams have any possibility of an estuarine reach. For these five streams, three streams (Waiohue, Pi'ina'au, and Honomanū) are the most likely to have estuarine reaches and all three of these streams have either full or habitat flow restoration required under the CWRM D&O. Of the two streams that may have a small estuarine reach, Pa'akea will have connectivity flow restoration, while 'O'opuloa will have no flow restoration and will remain as per the 1988 IIFS. Thus overall, the majority of estuarine habitat will be either fully or partially restored under the Proposed Action. The CWRM D&O, however, notes that a total of nine streams (one is considered a tributary to Pi'ina'au Stream) have esturine reaches, four of which were noted by the HSHEP + aerial image review approach as to having estuarine reaches. The streams included in the CWRM D&O are shown in Table 4-8 below along with their overlap with streams determined with the method used by the HSHEP model. According to CWRM, anywhere that the DLNR Division of Aquatic Resources (DLNR-DAR) conducted an estuary survey for the East Maui streams, it was considered an estuary. This includes surveys conducted in bays and/or streams. While the DLNR-DAR's methodology used is for estuary surveys, it does not define the size or extent of an estuary such as the HSHEP model, only that the DLNR-DAR survey was conducted to look for the presence of fish near a stream mouth. Hence, the difference between the two methodologies. This is discussed in more detail in Section 4.2.3 of the FEIS.			

5.2 Governor Ige's Sustainability Initiative

As part of the effort to protect and preserve Hawai'i's natural resources, Governor Ige has introduced the Sustainable Hawai'i Initiative. This initiative aims to double local food production by 2020, implement an interagency biosecurity plan by 2027, protect 30% of priority watershed by 2030, effectively manage 30% of nearshore ocean waters by 2030, and achieve 100% renewable electricity by 2045.

The Proposed Action will support Governor Ige's Sustainability Initiative by increasing local food production through diversified agriculture. Full development of the Mahi Pono farm plan ~~Farm Plan~~ is expected to result in a substantial amount of crop production in Central Maui, and the IIFS under the CWRM D&O will enable an ~~as well as~~ increase in kalo production in East Maui. The Proposed Action would produce about 8 million pounds per year from the community farms

~~Community Farms~~, 321 million pounds per year from orchards and 9 million pounds per year of tropical fruits, in addition to production from row crops, annual crops, and energy crops, ~~and kalo in East Maui~~ over the course of the 30-year Water Lease. The proposed solar farm(s) in Central Maui would also support the Governor's plan to achieve 100% renewable electricity by generating potentially 37.5 ~~82,100~~ MW ~~mW~~ of electricity per year.

According to the Draft Maui Island Water Use and Development Plan drafted in March 2019, and updated July 2020 East Maui has a watershed protection priority of I, meaning it has "Potentially High Recharge" and "Potentially High Production/High Chloride." The EMWP consists of approximately 120,000 acres and provides the largest harvested source of surface water in the state. The Proposed Action supports the protection of East Maui's priority watershed by supporting stream restoration and increased use of kalo lands.

5.3 Hawai'i Environmental Policy Act

The Hawai'i Environmental Policy Act, codified as Chapter 344, HRS, was enacted to establish a policy to encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i.

Table 5-8: Hawai'i Environmental Policy Act	S	NS	N/A
§344-4 Guidelines. In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:			
(1) Population			
(A) Recognize population impact as a major factor in environmental degradation and adopt guidelines to alleviate this impact and minimize future degradation.			X
(B) Recognize optimum population levels for counties and districts within the State, keeping in mind that these will change with technology and circumstance, and adopt guidelines to limit population to the levels determined.			X
Discussion: The guidelines related to population are inapplicable to the Proposed Action.			
(2) Land, water, mineral, visual, air, and other natural resources			
(A) Encourage management practices which conserve and fully utilize all natural resources.	X		
(B) Promote irrigation and waste water management practices which conserve and fully utilize vital water resources.	X		
(C) Promote the recycling of waste water.			X
(D) Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas.	X		
(E) Establish and maintain natural area preserves, wildlife preserves, forest reserves, marine preserves, and unique ecological preserves.	X		
(F) Maintain an integrated system of state land use planning which coordinates the state and county general plans.			X
(G) Promote the optimal use of solid wastes through programs of waste prevention, energy resource recovery, and recycling so that all our wastes become utilized.			X

Table 5-8: Hawai'i Environmental Policy Act	S	NS	N/A
Discussion: The Proposed Action supports the guidelines related to land, water, mineral, visual, air, and other natural resources. The Proposed Action and the issuance of a Water Lease will include a requirement that a watershed management plan ~~Watershed Management Plan~~ be developed and implemented for East Maui as discussed in Section 2.1. In addition, EMI was a founding member of the EMWP and continues to be an active member. The Koʻolau Forest Reserve Hunting Unit encompasses portions of the License Area. Limited hunting and hiking within the License Area is permitted, and access for these recreational activities is controlled by EMI. Issuance of the Water Lease under the Proposed Action would allow EMI staff to continue to manage appropriate access into the License Area so that the public may continue to use and enjoy the License Area's recreational and natural resources. Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing ~~designing~~ ~~a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			
(3) Flora and fauna			
(A) Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard.			X
(B) Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.		X	
Discussion: The Proposed Action supports the guidelines related to flora and fauna. The Proposed Action does not require vegetation removal except for routine maintenance purposes in the License Area. Therefore, the amount of each vegetation cover type currently present would remain substantially the same. The Proposed Action anticipates a greater introduction of diversified agricultural crops and activities in Central Maui. Such changes may have an effect on the existing non-native grasses and vegetation, but replacing existing vegetation with diversified agriculture is not expected to have any significant adverse effect.			
(4) Parks, recreation, and open space			
(A) Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses.	X		
(B) Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities.			X
(C) Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people.	X		
Discussion: The Proposed Action does not involve parks or recreation facilities. However, as discussed, the License Area is used for appropriate recreational activities, including hiking and hunting. EMI manages access to the hunting grounds and the Proposed Action would allow EMI staff to continue to manage that access so that the public may continue to use and enjoy the License Area's recreational and natural resources. The Proposed Action also will not affect uses at the shoreline because the License Area and the agricultural fields in Central Maui are not shoreline properties.			

Table 5-8: Hawai'i Environmental Policy Act	S	NS	N/A
Regarding open space, the Proposed Action would allow for the continued conveyance of water to the agricultural fields in Central Maui. Irrigating the fields in Central Maui, a region with very little natural rainfall, would promote the scenic beauty of the region and preserve existing vistas, as the land will be in cultivated green space rather than remaining fallow or being developed.			
(5) Economic development			
(A) Encourage industries in Hawai'i which would be in harmony with our environment.	X		
(B) Promote and foster the agricultural industry of the State; and preserve and conserve productive agricultural lands.	X		
(C) Encourage federal activities in Hawai'i to protect the environment.			
(D) Encourage all industries including the fishing, aquaculture, oceanography, recreation, and forest products industries to protect the environment.			X
(E) Establish visitor destination areas with planning controls which shall include but not be limited to the number of rooms.			X
(F) Promote and foster the aquaculture industry of the State; and preserve and conserve productive aquacultural lands.			X
Discussion: The Proposed Action will support the guidelines related to economic development. The Proposed Action will enable the continued conveyance of water to support conversion to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. The continued reopening ~~Reopening~~ the land for farming would provide employment opportunities and expand the agriculture sector of Maui's economy, as well as for the State of Hawai'i. ~~Currently the agricultural land is mostly fallow, with minimal agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities may not be feasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation.			
(6) Transportation			
(A) Encourage transportation systems in harmony with the lifestyle of the people and environment of the State.			X
(B) Adopt guidelines to alleviate environmental degradation caused by motor vehicles.			X
(C) Encourage public and private vehicles and transportation systems to conserve energy, reduce pollution emission, including noise, and provide safe and convenient accommodations for their users.			X
Discussion: The Proposed Action will not cause environmental degradation related to transportation.			
(7) Energy			
(A) Encourage the efficient use of energy resources.	X		
Discussion: The Proposed Action incorporates and encourages the efficient use of energy resources. Mahi Pono plans to convert 500 acres of the agricultural lands in Central Maui to energy crops. The company also anticipates the installation of one or more solar farms on ~~a~~ 250 acres ~~solar farm~~ with a combined ~~that is~~ projected ~~to create~~ capacity of 37.5 ~~82,125~~ MW ~~mWh~~/year. Transitioning portions of the land to encourage renewable energy			

Table 5-8: Hawai'i Environmental Policy Act	S	NS	N/A
resources would promote the use of green energy on Maui, as well as for the State of Hawai'i. The proposed Water Lease will also encourage the efficient use of energy resources by allowing the continued use of two hydroelectric facilities that utilize water derived from the EMI Aqueduct System. Generating hydroelectric power is a non-consumptive use of water and the water can subsequently be used for agricultural purposes after flowing through the hydroelectric facilities. The hydroelectric plants generate power to supply the many drip irrigation systems, groundwater well pumps, and facility/tenant buildings through a private 62-mile transmission grid throughout the Central Maui agricultural fields.			
(8) Community life and housing			
(A) Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods which reflect the culture and mores of the community.			X
(B) Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation.			X
(C) Encourage the reduction of environmental pollution which may degrade a community.			X
(D) Foster safe, sanitary, and decent homes.			X
(E) Recognize community appearances as major economic and aesthetic assets of the counties and the State; encourage green belts, plantings, and landscape plans and designs in urban areas; and preserve and promote mountain-to-ocean vistas.			X
Discussion: The guidelines related to community life and housing are not applicable to the Proposed Action.			
(9) Education and culture			
(A) Foster culture and the arts and promote their linkage to the enhancement of the environment.	X		
(B) Encourage both formal and informal environmental education to all age groups.	X		
Discussion: The guidelines related to education and culture are not significant to the Proposed Action. In addition to providing land, water, equipment, management, budgeting and marketing services to local farmers, the Mahi Pono farm plan includes acreage for community farms ~~plan under the Proposed Action.~~ and will also provide plots for research and offer an internship program for local high school and college students.			
(10) Citizen participation			
(A) Encourage all individuals in the State to adopt a moral ethic to respect the natural environment; to reduce waste and excessive consumption; and to fulfill the responsibility as trustees of the environment for the present and succeeding generations.			X
(B) Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.	X		
Discussion: Public involvement related to the Proposed Action includes public notice of the Proposed Action during the State EIS process through public scoping, publication in the State OEQC Bulletin, and coordination with agencies, organizations, and individuals. See Chapter 9 ~~Section 11.0~~ for a list of the agencies, organizations and individuals that have been or will be consulted as part of the EIS process.			

Table 5-8: Hawai'i Environmental Policy Act	S	NS	N/A
Two EIS community-scoping meetings were held to notify and initiate consultation with the community for the preparation of a Chapter 343, HRS. In addition, following the publication of the EISPN through the State OEQC Bulletin on February 8, 2017, a 30-day public comment period followed. The publication of ~~this~~ the DEIS was ~~will be~~ followed by a 45-day public comment period and those comments and responses thereto ~~will be~~ are included in ~~the~~ this FEIS to be presented to BLNR for review and acceptance.			

5.4 Maui County Land Use Plans and Policies

5.4.2 Countywide Policy Plan

The Countywide Policy Plan is the first component of the decennial General Plan update. The current plan, approved on March 24, 2010, is an over-arching statement that provides a policy framework for the Maui Island Plan (MIP) (discussed in Section 5.4.3 ~~5.4.2~~) and community plans. The Countywide Policy Plan provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future.

The sections of the approved Countywide Policy Plan directly applicable to the Proposed Action are discussed further below in Table 5-9:

Table 5-9: Countywide Policy Plan	S	NS	N/A
A. Protect The Natural Environment			
Goal: Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.			
Objective: 1. Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.			
Policies			
a. Perpetuate native Hawaiian biodiversity by preventing the introduction of invasive species, containing or eliminating existing noxious pests, and protecting critical habitat areas.	X		
b. Preserve and reestablish indigenous and endemic species' habitats and their connectivity.	X		
c. Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion.	X		
d. Protect baseline stream flows for perennial streams, and support policies that ensure adequate stream flow to support Native Hawaiian aquatic species, traditional kalo cultivation, and self-sustaining ahupua'a.	X		
e. Protect undeveloped beaches, dunes, and coastal ecosystems, and restore natural shoreline processes.			X
f. Protect the natural state and integrity of unique terrain, valued natural environments, and geological features.			X
g. Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources.	X		
h. Expand coordination with the State and nonprofit agencies and their volunteers to reduce invasive species, replant indigenous species, and identify critical habitat.			X
Implementing Actions: Develop island-wide networks of greenways, watercourses, and habitat corridors.	X		
Discussion: The Proposed Action will support the policies of Objective 1 to protect the natural environment. The Proposed Action will be compliant with, and not contrary to, the recent action taken by the CWRM under the CWRM D&O. The CWRM ordered that certain streams, designated as "kalo and community streams", will be fully restored, protecting those special areas that depend upon these streams. These streams support communities that depend upon			

Table 5-9: Countywide Policy Plan	S	NS	N/A
kalo cultivation, an element of Hawai'i's cultural heritage. Other streams are designated as "habitat restoration" streams, which will be limited in the amount of stream surface water that can be diverted as these streams primary function is to support native habitat restoration. Other streams were ordered to have a wetted pathway maintaining the "mauka to makai" connection. This would allow for the various animal species that have diadromous life cycle to complete their life cycles, benefiting coastal water ecosystems. Moreover, an objective of the Proposed Action is to maintain and continue the operation of the EMI Aqueduct System, which has been in place in its current configuration for over 100 years. The EMI staff will be trained by qualified individuals on appropriate conduct and measures to take within the License Area during future maintenance work. This will encourage the protection of the rare and endangered plant and animal species and habitats native to Hawai'i that have been identified in the region. The EMI Aqueduct System will be maintained in a way that is compatible with the existing environment and natural resources in the region. Irrigating the fields in Central Maui, a region with very little natural rainfall, would also maintain existing open space and preserve existing vistas, as the land will be in cultivated green space rather than remaining fallow or being developed. Overall, having the Central Maui lands remain in agriculture will help maintain the rural socio-economic lifestyle on Maui, enjoyed by so many.			
Objective: 2. Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.			
Policies			
a. Protect and restore nearshore reef environments and water quality.			X
b. Protect marine resources and valued wildlife.			X
c. Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.	X		
d. Utilize land-conservation tools to ensure the permanence of valued open spaces.			X
e. Mitigate the negative effects of upland uses on coastal wetlands, marine life, and coral reefs.			X
f. Strengthen coastal-zone management, re-naturalization of shorelines, where possible, and filtration or treatment of urban and agricultural runoff.			X
g. Regulate the use and maintenance of stormwater-treatment systems that incorporate the use of native vegetation and mimic natural systems.			X
h. Advocate for stronger regulation of fishing, boating, cruise ship, and ecotourism activities.			X
i. Restore watersheds and aquifer-recharge areas to healthy and productive status, and increase public knowledge about the importance of watershed stewardship, water conservation, and groundwater protection.	X		
Implementing Actions: Develop regulations to minimize runoff of pollutants into nearshore waters and reduce nonpoint and point source pollution.			X
Discussion: The Proposed Action will support Objective 2 to protect the natural environment. The Proposed Action will be compliant, and not contrary to the recent action taken by the CWRM. The CWRM D&O ordered that certain streams, designated as "kalo and community streams", will be fully restored, protecting those special areas that depend upon these streams. These streams support communities that depend upon kalo cultivation, an element of Hawai'i's cultural heritage improving the connection between urban environments and the natural landscape. A stream and ocean water chemistry assessment was conducted by SE and MRC in 2018 (Appendix B). In general, no significant impacts on coastal water in the region are anticipated. The study concluded that the effects of stream water on marine waters is minor in these habitats owing to the naturally occurring rapid and intense mixing. Moreover, the Central Maui Field Irrigation System ~~EMI Aqueduct System is attributed to~~ has historically contributed to grounwater recharge through approximately 22.7% of system losses ~~on the Central Maui side of the EMI Aqueduct System~~. This loss provides a significant amount of recharge to the Central Maui aquifers. System losses includes water used in Central Maui for reservoirs, fire protection, dust control, and hydroelectric uses.			

Table 5-9: Countywide Policy Plan	S	NS	N/A
The Proposed Action includes a requirement that the Water Lease address watershed management pursuant to HRS § 171-58(e).			
Objective 3. Improve the stewardship of the natural environment.			
Policies			
a. Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value.	X		
b. Improve communication, coordination, and collaboration among government agencies, nonprofit organizations, communities, individuals, and land owners that work for the protection of the natural environment.			X
c. Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.			X
d. Improve efforts to mitigate and plan for the impact of natural disasters, human influenced emergencies, and global warming.			X
e. Regulate access to sensitive ecological sites and landscapes.	X		
f. Reduce air, noise, light, land, and water pollution, and reduce Maui County's contribution to global climate change.			X
g. Plan and prepare for and educate visitors and residents about the possible effects of global warming.			X
h. Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.			X
i. Educate the construction and landscape industries and property owners about the use of best management practices to prevent erosion and nonpoint source pollution.			X
j. Support the acquisition of resources with scenic, environmental, and recreational value, and encumber their use.			X
k. Improve enforcement activities relating to the natural environment.			X
l. For each shoreline community, identify and prioritize beach-conservation objectives, and develop action plans for their implementation.			X
Implementing Actions: a. Document, record, and monitor existing conditions, populations, and locations of flora and fauna communities. b. Implement Federal and State policies that require a reduction of greenhouse-gas emissions. c. Establish a baseline inventory of available natural resources and their respective carrying capacities.	X		
Discussion: The Proposed Action will support Objective 3 to protect the natural environment. The ~~Proposed Action and the~~ issuance of a Water Lease will include a requirement that a watershed management plan ~~Watershed Management Plan~~ be developed and implemented for East Maui as discussed in Section 2.1. In addition, EMI was a founding member of the EMWP and continues to be an active member. The Ko'olau Forest Reserve Hunting Unit encompasses portions of the License Area. The Hunting Unit is administered the DLNR, Division of Forestry and Wildlife. To hunt within the License Area, hunters must obtain a license from the DLNR and an EMI Permit/Waiver. Hunting grounds are limited to one hunting party per hunting area, as regulated by the DLNR. Access to the hunting grounds is managed by EMI through eight existing EMI access roads. Other recreational uses are not permitted on the License Area lands for safety reasons. Hiking is also a permitted recreational use within the License Area, and is limited to hiking clubs and individuals. Access to the License Area lands for hiking is acquired through a Hiking Waiver from EMI. Generally, only two hiking clubs currently enter the License Area lands approximately four to six times a year; the Sierra Club Maui Group and Mauna Ala Hiking Club. They enter on foot, and are guided by a club hiking expert with a manageable number of people. The Proposed Action would allow EMI staff to continue to manage appropriate access into the License Area so that the public may continue to use and enjoy the License Area's recreational, cultural, and natural resources. Moreover, SWCA ~~Environmental Consultants, Inc~~. prepared a terrestrial flora and fauna assessment report assessing the impacts of the Proposed Action. During the field and ground surveys of portions of the License Area and the			

Table 5-9: Countywide Policy Plan	S	NS	N/A
agricultural fields in Central Maui, SWCA documented various species of flora and fauna. The impacts are discussed in Section 4.4 and the report is Appendix C.			
Objective 4. Educate residents and visitors about responsible stewardship practices and the interconnectedness of the natural environment and people.			
Policies			
a. Expand education about native flora, fauna, and ecosystems.			X
b. Align priorities to recognize that the health of the natural environment and the health of people are inextricably linked.			X
c. Promote programs and incentives that decrease greenhouse-gas emissions and improve environmental stewardship.			X
Discussion: The Proposed Action will not affect Objective 4 to protect the natural environment.			
B. Preserve Local Cultures and Traditions			
Goal: Maui County will foster a spirit of pono and protect, perpetuate, and reinvigorate its residents' multi-cultural values and traditions to ensure that current and future generations will enjoy the benefits of their rich island heritage.			
Objective 1. Perpetuate the Hawaiian culture as a vital force in the lives of residents.			
Policies			
a. Protect and preserve access to mountain, ocean, and island resources for traditional Hawaiian cultural practices.			X
b. Prohibit inappropriate development of cultural lands and sites that are important for traditional Hawaiian cultural practices, and establish mandates for the special protection of these lands in perpetuity.			X
c. Promote the use of ahupua'a and moku management practices.			X
d. Encourage the use of traditional Hawaiian architecture and craftsmanship.			X
e. Promote the use of the Hawaiian language.			X
f. Recognize and preserve the unique natural and cultural characteristics of each ahupua'a or district.	X		
g. Encourage schools to promote broader incorporation of Hawaiian and other local cultures' history and values lessons into curriculum.			X
h. Ensure the protection of Native Hawaiian rights.	X		
i. Promote, encourage, and require the correct use of traditional place names, particularly in government documents, signage, and the tourism industry.			X
Implementing Actions: a. Establish alternative land use and overlay zoning designations that recognize and preserve the unique natural and cultural characteristics of each ahupua'a or district. b. Develop requirements for all County applicants to perpetuate and use proper traditional place names in all applications submitted.			X
Discussion: The Proposed Action will support Objective 1 to perpetuate the Hawaiian culture as a vital force in the lives of residents. The Proposed Action will be compliant with, and not contrary to, the recent action taken by the CWRM. Under the CWRM D&O, streams, designated as "kalo and community streams", be fully restored, thereby protecting those special areas that depend upon these streams. These streams support communities that depend upon kalo cultivation, an element of Hawai'i's cultural heritage.			
Objective 2. Emphasize respect for our island lifestyle and our unique local cultures, family, and natural environment.			
Policies			
a. Acknowledge the Hawaiian culture as the host culture, and foster respect and humility among residents and visitors toward the Hawaiian people and their practices.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
b. Perpetuate a respect for diversity, and recognize the historic blending of cultures and ethnicities.			X
c. Encourage the perpetuation of each culture's unique cuisine, attire, dance, music, and folklore, and other unique island traditions and recreational activities.			X
d. Recognize the interconnectedness between the natural environment and the cultural heritage of the islands.	X		
e. Protect and prioritize funding for recreational activities that support local cultural practices, such as surfing, fishing, and outrigger-canoe paddling.			X
Discussion: The Proposed Action will support Objective 2 to preserve local lifestyle, including local cultures, family and natural environment. The Proposed Action will be compliant with, and not contrary to, the recent action taken by the CWRM. The CWRM D&O ordered that certain streams, designated as "kalo and community streams", be fully restored, thereby protecting those special areas that depend upon these streams. These streams support communities that depend upon kalo cultivation, an element of Hawai'i's cultural heritage.			
Objective 3. Preserve for present and future generations the opportunity to know and experience the arts, culture, and history of Maui County.			
Policies			
a. Foster teaching opportunities for cultural practitioners to share their knowledge and skills.			X
b. Support the development of cultural centers.			X
c. Broaden opportunities for public art and the display of local artwork.			X
d. Foster the Aloha Spirit by celebrating the Hawaiian host culture and other Maui County cultures through support of cultural-education programs, festivals, celebrations, and ceremonies.			X
e. Support the perpetuation of Hawaiian arts and culture.			X
f. Support programs and activities that record the oral and pictorial history of residents.			X
g. Support the development of repositories for culture, history, genealogy, oral history, film, and interactive learning.			X
Implementing Actions: a. Establish incentives for the display of public art. b. Establish centers and programs of excellence for the perpetuation of Hawaiian arts and culture.			X
Discussion: The Proposed Action will not affect Objective 3 to preserve the arts, culture, and history of Maui.			
Objective 4. Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.			
Policies			
a. Support the development of island-wide historic, archaeological, and cultural resources inventories.			X
b. Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures to perpetuate a traditional sense of place.	X		
c. Identify a sustainable rate of use and set forth specific policies to protect cultural resources.			X
d. Protect and preserve lands that are culturally or historically significant.			X
e. Support programs that protect, record, restore, maintain, provide education about, and interpret cultural districts, landscapes, sites, and artifacts in both natural and museum settings.			X
f. Perpetuate the authentic character and historic integrity of rural communities and small towns.			X
g. Seek solutions that honor the traditions and practices of the host culture while recognizing the needs of the community.	X		

Table 5-9: Countywide Policy Plan	S	NS	N/A
h. Support the development of an Archaeological District Ordinance.			X
i. Protect summits, slopes, and ridgelines from inappropriate development.			X
j. Support the registering of important historic sites on the State and Federal historic registers.			X
k. Provide opportunities for public involvement with restoration and enhancement of all types of cultural resources.			X
l. Foster partnerships to identify and preserve or revitalize historic and cultural sites.			X
Implementing Actions: a. Identify, develop, map, and maintain an inventory of locally significant natural, cultural, and historical resources for protection. b. Prepare, continually update, and implement a cultural-management plan for cultural sites, districts, and landscapes, where appropriate. c. Enact an Archaeological District Ordinance. d. Nominate important historic sites to the State and Federal historic registers.	X		
Discussion: The Proposed Action will support Objective 4 to preserve significant historic architecture, structure, and cultural sites, districts and landscapes. The Proposed Action will be compliant with, and not contrary to, the recent action taken by the CWRM. The CWRM D&O ordered that certain streams, designated as "kalo and community streams", will be fully restored, thereby protecting those special areas that depend upon these streams. These streams support communities that depend upon kalo cultivation, an element of Hawai'i's cultural heritage. In addition, continued utilization of the EMI Aqueduct System, which has been in place for over one hundred years, to provide water for diversified agriculture in Central Maui will maintain this unique historic resource. The Proposed Action, in itself, does not propose any modifications to the EMI Aqueduct System, and will therefore have negligible impact on historic properties. Mason Architects, Inc. prepared a historic structure assessment report documenting various features and components of the EMI Aqueduct System. The impacts of the Proposed Action to the EMI Aqueduct System is discussed in Section 4.5 and the report can be found in Appendix D.			
C. Improve Education			
Goal: Residents will have access to lifelong formal and informal educational options enabling them to realize their ambitions.			
Objective 1. Encourage the State to attract and retain school administrators and educators of the highest quality.			
Policies			
a. Encourage the State to provide teachers with nationally competitive pay and benefit packages.			X
b. Encourage the State to ensure teachers will have the teaching tools and support staff needed to provide students with an excellent education.			X
c. Explore Maui County district- and school-based decision making in public education.			X
Discussion: The Proposed Action will not affect Objective 1 to improve education. However, it is noted that within Central Maui Mahi Pono intends to provide plots for research and offer an internship program for high school and college students.			
Objective 2. Provide nurturing learning environments that build skills for the 21st century.			
Policies			
a. Expand professional-development opportunities in disciplines that support the economic-development goals of Maui County.			X
b. Plan for demographic, social, and technological changes in a timely manner.			X
c. Encourage collaborative partnerships to improve conditions of learning environments.			X
d. Promote development of neighborhood schools and educational centers.			X
e. Integrate schools, community parks, and playgrounds, and expand each community's use of these facilities.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
f. Support coordination between land use and school-facility planning agencies.			X
g. Encourage the upgrade and ongoing maintenance of public-school facilities.			X
h. Encourage the State Department of Education to seek reliable, innovative, and alternative methods to support a level of per-pupil funding that places Hawai'i among the top tier of states nationally for its financial support of public schools.			X
i. Encourage the State to promote healthier, more productive learning environments, including by providing healthy meals, more physical activity, natural lighting, and passive cooling.			X
j. Encourage the State to support the development of benchmarks to measure the success of Hawai'i's public-education system and clarify lines of accountability.			X
k. Design school and park facilities in proximity to residential areas.			X
l. Support technology- and natural-environment-based learning.			X
m. Encourage the State to support lower student-teacher ratios in public schools.			X
n. Encourage alternative learning and educational opportunities.			X
Implementing Actions: Develop safe walking and bicycling programs for school children.			X
Discussion: The Proposed Action will not affect Objective 2 to improve education and learning environments.			
Objective 3. Provide all residents with educational opportunities that can help them better understand themselves and their surroundings and allow them to realize their ambitions.			
Policies			
a. Encourage the State to improve Maui Community College as a comprehensive community college that will serve each community.			X
b. Broaden the use of technology and telecommunications to improve educational opportunities throughout the County			X
c. Attract graduate-level research programs and institutions.			X
d. Promote the teaching of traditional practices, including aquaculture; subsistence agriculture; Pacific Island, Asian, and other forms of alternative health practices; and indigenous Hawaiian architecture.			X
e. Integrate cultural and environmental values in education, including self-sufficiency and sustainability.			X
f. Foster a partnership and ongoing dialogue between business organizations, formal educational institutions, and vocational training centers to tailor learning and mentoring programs to County needs.			X
g. Ensure teaching of the arts to all ages.			X
h. Expand and develop vocational learning opportunities by establishing trade schools.			X
i. Encourage the State to integrate financial and economic literacy in elementary, secondary, and higher-education levels.			X
Implementing Actions: Encourage the State to establish a four-year university, and support the development of other higher-education institutions to enable residents to obtain bachelor degrees and postgraduate degrees in Maui County.			X
Discussion: The Proposed Action will not affect Objective 3 to improve education. However, it is noted that within Central Maui Mahi Pono intends to provide plots for research and offer an internship program for high school and college students.			
Objective 4. Maximize community-based educational opportunities.			
Policies			
a. Encourage the State and others to expand pre-school, after-school, and homebased (parent-child) learning.			X
b. Support public-private partnerships to develop youth-internship, -apprenticeship, and -mentoring programs.			X
c. Support the development of a wide range of informal educational and cultural programs for all residents.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
d. Improve partnerships that utilize the skills and talents at Hawai'i's colleges and universities to benefit the County.			X
e. Support career-development and job-recruitment programs and centers.			X
f. Attract learning institutions and specialty schools to diversify and enhance educational opportunities.			X
g. Expand education of important life skills for the general public.			X
h. Support community facilities such as museums, libraries, nature centers, and open spaces that provide interactive-learning opportunities for all ages.			X
Discussion: The Proposed Action will not affect Objective 4 to improve education. However, it is noted that within Central Maui Mahi Pono intends to provide plots for research and offer an internship program for high school and college students.			
D. Strengthen Social Healthcare Services			
Goal: In cooperation with the Federal and State governments and nonprofit agencies, broaden access to social and healthcare services and expand options to improve the overall wellness of the people of Maui County.			
Objective 1. In cooperation with the Federal and State governments and nonprofit agencies, broaden access to social and healthcare services and expand options to improve the overall wellness of the people of Maui County.			
Policies			
a. Work with other levels of government and the nonprofit sector to expand services to address hunger, homelessness, and poverty.			X
b. Support the improvement of opportunities for disadvantaged youth, encourage the tradition of hanai relatives, and support expanded opportunities for foster care.			X
c. Support expanded long-term-care options, both in institutions and at home, for patients requiring ongoing assistance and medical attention.			X
d. Encourage the expansion and improvement of local hospitals, facilitate the establishment of new healthcare facilities, and facilitate prompt and high quality emergency- and urgent-care services for all.			X
e. Support broadened access to affordable health insurance and health care, and recognize the unique economic challenges posed to families when healthcare services are provided off-island.			X
f. Encourage equal access to social and healthcare services through both technological and traditional means.			X
Discussion: The Proposed Action will not affect Objective 1 to strengthen social healthcare services, but it is noted that the Water Lease will allow for the continued provision of water from EMI to MDWS for the Upcountry Maui Water System, which provides water to the Kula hospital.			
Objective 2. Encourage the Federal and State governments and the private sector to improve the quality and delivery of social and healthcare services.			
Policies			
a. Strengthen partnerships with government, nonprofit, and private organizations to provide funding and to improve counseling and other assistance to address substance abuse, domestic violence, and other pressing social challenges.			X
b. Encourage the State to improve the quality of medical personnel, facilities, services, and equipment.			X
c. Encourage investment to improve the recruitment of medical professionals and the quality of medical facilities and equipment throughout Maui County.			X
d. Promote the development of continuum-of-care facilities that provide assisted living, hospice, home-care, and skilled-nursing options allowing the individual to be cared for in a manner congruent with his or her needs and desires.			X
e. Support improved social, healthcare, and governmental services for special needs populations.			X
f. Plan for the needs of an aging population and the resulting impacts on social services, housing, and healthcare delivery.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
g. Improve coordination among the police, the courts, and the public in the administration of social and healthcare services.			X
h. Support programs that address needs of veterans.			X
i. Support programs that address the needs of immigrants.			X
Implementing Actions: a. Invest in programs designed to improve the general welfare and quality of life of Native Hawaiians. b. Assist and facilitate the State Department of Public Safety and others in efforts to strengthen programs and facilities that will improve the mental and social health of incarcerated people and assist in prison inmates' successful transition back into Maui County communities. c. Develop and maintain a comprehensive index that will measure the health and wellness needs of families. d. Provide heliports countywide for emergency health and safety purposes.			X
Discussion: The Proposed Action will not affect Objective 2 to strengthen social and healthcare services.			
Objective 3. Strengthen public-awareness programs related to healthy lifestyles and social and medical services.			
Policies			
a. Expand public awareness about personal safety and crime prevention.			X
b. Encourage residents to pursue education and training for careers in the healthcare, social services, and community-development fields.			X
c. Expand public awareness and promote programs to achieve healthy eating habits and drug-free lifestyles.			X
Discussion: The Proposed Action will not affect Objective 3 to strengthen social healthcare services.			
E. Expand Housing Opportunities for Residents			
Goal: Quality, island-appropriate housing will be available to all residents			
Objective 1. Reduce the affordable housing deficit for residents.			
Policies			
a. Ensure that an adequate and permanent supply of affordable housing, both new and existing units, is made available for purchase or rental to our resident and/or workforce population, with special emphasis on providing housing for low- to moderate-income families, and ensure that all affordable housing remains affordable in perpetuity.			X
b. Seek innovative ways to lower housing costs without compromising the quality of our island lifestyle.			X
c. Seek innovative methods to secure land for the development of low- and moderate-income housing.			X
d. Provide the homeless population with emergency and transitional shelter and other supportive programs.			X
e. Provide for a range of senior-citizen and special needs housing choices on each island that affordably facilitates a continuum of care and services.			X
f. Support the Department of Hawaiian Home Lands' development of homestead lands.	X		
g. Manage property-tax burdens to protect affordable resident homeownership.			X
h. Explore taxation mechanisms to increase and maintain access to affordable housing.			X
i. Improve awareness regarding available affordable homeowner's insurance.			X
j. Redevelop commercial areas with a mixture of affordable residential and business uses, where appropriate.			X
k. Ensure residents are given priority to obtain affordable housing units developed in their communities, consistent with all applicable regulations.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
l. Establish pricing for affordable housing that is more reflective of Maui County's workforce than the United States Housing and Urban Development's median-income estimates for Maui County.			X
m. Develop neighborhoods with a mixture of accessible and integrated community facilities and services.	X		
n. Provide alternative regulatory frameworks to facilitate the use of Kuleana lands by the descendants of Native Hawaiians who received those lands pursuant to the Kuleana Act of 1850.			X
o. Work with lending institutions to expand housing options and safeguard the financial security of homeowners.			X
p. Promote the use of the community land trust model and other land-lease and land-financing options.			X
q. Support the opportunity to age in place by providing accessible and appropriately designed residential units.			X

Discussion: The Proposed Action will support Objective 1 to expand housing opportunities for residents.

Issuance of the Water Lease would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there is a lack of alternative water sources and infrastructure to meet present and future demands currently. The County anticipates the Upcountry Maui population, which is dependent on the Upcountry Maui Water System, will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. The Water Lease allows for the opportunity for Upcountry Maui, as well as Nāhiku, for growth and development, supporting County objectives.

In addition, the Water Lease will include a reservation of water for the DHHL. Non-potable water needs for the DHHL's lands in Ke~~'~~anae-Wailuānui amount to 6,868,000 gpd. Although the DHHL holds a reservation for 3,000 gpd of potable water for this area for development over the next 20 years, another 7,000 gpd of potable water may be required for longer-term development. Thus, a potential reservation for this area amounts to 6,875,000 gpd. For its agricultural and residential lots in Keokea-Waiohuli, the DHHL has already secured a potable water reservation from the CWRM. Non-potable water demand amounts to 10,428,000 gpd for which a water reservation would have to be secured.

The DHHL's current plans for its Pulehunui lands in Central Maui include agricultural, commercial, industrial and civic uses. A reservation of 1,734,000 gpd of ground water has already been secured from the CWRM. A non-potable water demand of 1,027,510 gpd has been identified, and water delivered through the EMI Aqueduct System has been identified as a potential source of this water.

The DHHL staff has identified 11,455,510 gpd (10,428,000 gpd for Keokea-Waiohuli + 1,027,510 gpd for Pulehunui) of water as their recommendation for a reservation of water rights sufficient to support current and future homestead needs related to this proposed Water Lease.

The DHHL has indicated that reserved water may be available for other purposes until the DHHL has an actual need for the water. In addition, for its Keokea-Waiohuli and Pulehunui lands, the DHHL will be dependent on the EMI Aqueduct System collecting and transporting East Maui stream waters, in order to get waters to these lands. However, the DHHL has cautioned that in light of the fact that no water leases have been issued under HRS § 171-58, and the manner in which reservations are to be actualized has yet to be determined, in addition to any specifications made by the CWRM and BLNR regarding the Water Lease, a separate agreement between the lessor and the DHHL will be necessary to allow any temporary use of water reserved for DHHL.[9]

Objective

2. Increase the mix of housing types in towns and neighborhoods to promote sustainable land use planning, expand consumer choice, and protect the County's rural and small town character.

Policies

[9] It should be noted that at this time a reservation request has not yet been made to the CWRM.

Table 5-9: Countywide Policy Plan	S	NS	N/A
a. Seek innovative ways to develop 'ohana cottages and accessory-dwelling units as affordable housing.			X
b. Design neighborhoods to foster interaction among neighbors.			X
c. Encourage a mix of social, economic, and age groups within neighborhoods.			X
d. Promote infill housing in urban areas at scales that capitalize on existing infrastructure, lower development costs, and are consistent with existing or desired patterns of development.	X		
e. Encourage the building industry to use environmentally sustainable materials, technologies, and site planning.			X
f. Develop workforce housing in proximity to job centers and transit facilities.			X
g. Provide incentives to developers and owners who incorporate green building practices and energy-efficient technologies into their housing developments.			X
Implementing Actions: Revise laws to support neighborhood designs that incorporate a mix of housing types that are appropriate for island living.			X
Discussion: The Proposed Action will support Objective 2 to expand housing opportunities for residents. Issuance of the Water Lease would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently. The County anticipates the Upcountry Maui population, which is dependent on the Upcountry Maui Water System, will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. The Water Lease allows for the opportunity for Upcountry Maui, as well as Nāhiku, for growth and development, supporting County objectives.			
Objective 3. Increase and maintain the affordable housing inventory.			
Policies			
a. Recognize housing as a basic human need, and work to fulfill that need.			X
b. Prioritize available infrastructure capacity for affordable housing.	X		
c. Improve communication, collaboration, and coordination among housing providers and social-service organizations.			X
d. Study future projected housing needs, monitor economic cycles, and prepare for future conditions on each island.			X
e. Develop public-private and nonprofit partnerships that facilitate the construction of quality affordable housing.			X
f. Streamline the review process for high-quality, affordable housing developments that implement the goals, objectives, and policies of the General Plan.			X
g. Minimize the intrusion of housing on prime, productive, and potentially productive agricultural lands and regionally valuable agricultural lands.			X
h. Encourage long-term residential use of existing and future housing to meet residential needs.			X
Implementing Actions: Develop policies to even out the peaks and valleys in Maui County's construction-demand cycles.			X
Discussion: The Proposed Action will support Objective 3 to expand housing opportunities for residents. Issuance of the Water Lease would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui~~, as well as the Nāhiku community~~, to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently. The County anticipates the Upcountry Maui population, which is dependent on the Upcountry Maui Water System, will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. The Water Lease allows for the opportunity for Upcountry Maui, as well as Nāhiku, for growth and development, supporting County objectives.			
Objective			

Table 5-9: Countywide Policy Plan	S	NS	N/A
4. Expand access to education related to housing options, homeownership, financing, and residential construction.			
Policies			
a. Broaden access to information about County, State, and Federal programs that provide financial assistance to renters and home buyers.			X
b. Expand access to information about opportunities for homeownership and self-help housing.			X
c. Educate residents about making housing choices that support their individual needs, the needs of their communities, and the health of the islands' natural systems.			X
d. Improve home buyers' education on all aspects of homeownership.			X
Discussion: The Proposed Action will not affect Objective 4 to expand housing opportunities for residents.			
F. Strengthen the Local Economy			
Goal: Maui County's economy will be diverse, sustainable, and supportive of community values.			
Objective 1. Promote an economic climate that will encourage diversification of the County's economic base and a sustainable rate of economic growth.			
Policies			
a. Support economic decisions that create long-term benefits.	X		
b. Promote lifelong education, career development, and technical training for existing and emerging industries.			X
c. Invest in infrastructure, facilities, and programs that foster economic diversification.	X		
d. Support and promote locally produced products and locally owned operations and businesses that benefit local communities and meet local demand.	X		
e. Support programs that assist industries to retain and attract more local labor and facilitate the creation of jobs that offer a living wage.	X		
f. Encourage work environments that are safe, rewarding, and fulfilling to employees.	X		
g. Support home-based businesses that are appropriate for and in character with the community.			X
h. Encourage businesses that promote the health and well-being of the residents, produce value-added products, and support community values.			X
i. Foster an understanding of the role of all industries in our economy.			X
j. Support efforts to improve conditions that foster economic vitality in our historic small towns.			X
k. Support and encourage traditional host-culture businesses and indigenous agricultural practices.			X
l. Support public and private entities that assist entrepreneurs in establishing locally operated businesses.			X
Implementing Actions: a. Develop regulations and programs that support opportunities for local merchants, farmers, and small businesses to sell their goods and services directly to the public. b. Monitor the carrying capacity of the islands' social, ecological, and infrastructure systems with respect to the economy.			X
Discussion: The Proposed Action will support Objective 1 to strengthen the local economy. Issuance of the Water Lease will allow for the continued transition of the agricultural fields in Central Maui to a diversified agricultural operation. Generally speaking, under the Proposed Action or otherwise, the farms in East Maui that depend on stream water would generate about $1.7 ~~1.4~~ million per year in direct sales, and about $3.6 ~~2.9~~ million per year in direct and indirect sales.~~,~~ ~~the~~ The Upcountry Maui farms that depend on water from the EMI Aqueduct System would generate direct sales of about $15.1 ~~14.1~~ million per year. Direct and indirect sales would total about $31.8 million per year. ~~, and converting~~ Converting Central Maui from growing sugarcane to diversified farm operations would entail an investment of about $214.7 million spread out over 10 years or so. During this period, expenditures and indirect sales would average about $39.9 million per year. At full implementation of the Mahi Pono farm plan, the ~~The~~ direct sales of $160.7 million per year exceeds sales during sugar operations: about $100.7 million per year for Typical Sugar, and about $115.6 million for Recent Sugar. The Proposed Action will also create approximately 1,140 direct and indirect jobs.			

Table 5-9: Countywide Policy Plan	S	NS	N/A
At full operations, under the Proposed Action, Mahi Pono farm sales would total about $160.7 million per year, of which about $104.4 million would be Hawai'i sales and $56.2 million would be export sales. Adding energy sales of about $8.2 million results in total direct sales of about $168.9 million per year. Direct and indirect sales would total about $329.5 million per year. Additionally, Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services. Issuance of the Water Lease under the Proposed Action would also allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently.			
Objective 2. Diversify and expand sustainable forms of agriculture and aquaculture.			
Policies			
a. Support programs that position Maui County's agricultural products as premium export products.	X		
b. Prioritize the use of agricultural land to feed the local population, and promote the use of agricultural lands for sustainable and diversified agricultural activities.	X		
c. Capitalize on Hawai'i's economic opportunities in the ecologically sensitive aquaculture industries.			X
d. Assist farmers to help make Maui County more self-sufficient in food production.	X		
e. Support ordinances, programs, and policies that keep agricultural land and water available and affordable to farmers.	X		
f. Support a tax structure that is conducive to the growth of the agricultural economy.			X
g. Enhance County efforts to monitor and regulate important agricultural issues.			X
h. Support education, research, and facilities that strengthen the agricultural industry.	X		
i. Maintain the genetic integrity of existing food crops.	X		
j. Encourage healthy and organic farm practices that contribute to land health and regeneration.			X
k. Support cooperatives and other types of nontraditional and communal farming efforts.			X
l. Encourage methods of monitoring and controlling genetically modified crops to prevent adverse effects.			X
m. Work with the State to ease the permitting process for the revitalization of traditional fish ponds.			X
Implementing Actions: a. Redirect efforts in the Office of Economic Development to further facilitate the development of the agricultural section and to monitor agricultural legislation and issues. b. Publicly identify, with signage and other means, the field locations of all genetically modified crops. c. Create agricultural parks in areas distant from genetically modified crops.			X
Discussion: The Proposed Action will support Objective 2 to strengthen the local economy. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion of the agricultural fields in Central Maui to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. The continued reopening ~~Reopening~~ the land for farming would provide employment opportunities and expand the agriculture sector of Maui's economy, as well as for the State of Hawai'i. ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~ Mahi Pono has planted crops			

Table 5-9: Countywide Policy Plan	S	NS	N/A
in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation. Moreover, the diversified agriculture operation will aid in achieving the State's goal of doubling local food production. In the event of a major catastrophe, limiting overseas supplies, this diversified agriculture initiative could help supply the State with food. Mahi Pono will not be planting genetically modified crops. Mahi Pono also intends to provide plots for research and offer an internship program for high school and college students. The EMI Aqueduct System also conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP. Presently, the MDWS serves the KAP with non-potable water from diversions of the same streams that serve the Kamole-Weir WTP ~~Water Treatment Plant~~ through the Wailoa Ditch. KAP currently consists of 31 farm lots, ranging in size from ~~7~~ 10 to 30 ~~29~~ acres, for a total of approximately 445 acres, supporting 26 farmers, and is planned to expand by 262 acres. Issuance of the Water Lease under the Proposed Action would ensure that KAP, and the planned expansion, have a reliable source of water to meet its water demands.			
Objective 3. Support a visitor industry that respects the resident culture and the environment.			
Policies			
a. Promote traditional Hawaiian practices in visitor-related facilities and activities.			X
b. Encourage and educate the visitor industry to be sensitive to island lifestyles and cultural values.			X
c. Encourage a spirit of welcome for residents at visitor facilities, such as by offering kama'āina incentives and discount programs.			X
d. Support the renovation and enhancement of existing visitor facilities.			X
e. Support policies, programs, and a tax structure that redirect the benefits of the visitor industry back into the local community.			X
f. Encourage resident ownership of visitor-related businesses and facilities.			X
g. Develop partnerships to provide educational and training facilities to residents employed in the visitor industry.			X
h. Foster an understanding of local cultures, customs, and etiquette, and emphasize the importance of the Aloha Spirit as a common good for all.			X
i. Support the diversification, development, evolution, and integration of the visitor industry in a way that is compatible with the traditional, social, economic, spiritual, and environmental values of island residents.			X
j. Improve collaboration between the visitor industry and the other sectors of Maui County's economy.			X
k. Perpetuate an authentic image of the Hawaiian culture and history and an appropriate recognition of the host culture.			X
l. Support the programs and initiatives outlined in the Maui County Tourism Strategic Plan 2006-2015.			X
m. Promote water conservation, beach conservation, and open-space conservation in areas providing services for visitors.			X
n. Recognize the important contributions that the visitor industry makes to the County's economy, and support a healthy and vibrant visitor industry.			X
Discussion: The Proposed Action will not affect Objective 3 to strengthen the local economy.			
Objective 4. Expand economic sectors that increase living-wage job choices and are compatible with community values.			
Policies			

Table 5-9: Countywide Policy Plan	S	NS	N/A
a. Support emerging industries, including the following: • Health and wellness industry; • Sports and recreation industry; • Film and entertainment industry; • Arts and culture industry; • Renewable-energy industry; • Research and development industry; • High-technology and knowledge-based industries; • Education and training industry; • Ecotourism industry; and • Agritourism industry.	X		
Discussion: The Proposed Action will support Object 4 to strengthen the local economy. Issuance of the Water Lease will allow for the continued transition of the agricultural fields in Central Maui to a diversified agricultural operation. Generally speaking, under the Proposed Action, the farms in East Maui that depend on stream water would generate about $1.7 ~~1.4~~ million per year in direct sales, and about $3.6 ~~2.9~~ million per year in direct and indirect sales., ~~the~~ The farms in Upcountry Maui that depend on water from the EMI Aqueduct System would generate direct sales of about $15.1 ~~14.1~~ million per year. Direct and indirect sales would total about $31.8 million per year, and converting Central Maui from growing sugarcane to diversified farm operations would entail an investment of about $214.7 million spread out over 10 years or so. During this period, expenditures and indirect sales would average about $39.9 million per year. The Mahi Pono farm plan direct sales of $160.7 million per year exceeds sales during sugar operations: about $100.7 million per year for Typical Sugar, and about $115.6 million for Recent Sugar. The Proposed Action will also create approximately 1,140 direct and indirect jobs. Additionally, Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services. Issuance of the Water Lease under the Proposed Action would also allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently.			
G. Improve Parks and Public Facilities			
Goal: A full range of island-appropriate public facilities and recreational opportunities will be provided to improve the quality of life for residents and visitors.			
Objective 1. Expand access to recreational opportunities and community facilities to meet the present and future needs of residents of all ages and physical abilities.			
Policies			
a. Protect, enhance, and expand access to public shoreline and mountain resources.			X
b. Expand and enhance the network of parks, multi-use paths, and bikeways.			X
c. Assist communities in developing recreational facilities that promote physical fitness.			X
d. Expand venue options for recreation and performances that enrich the lifestyles of Maui County's people.			X
e. Expand affordable recreational and after-school programs for youth.			X
f. Encourage and invest in recreational, social, and leisure activities that bring people together and build community pride.			X
g. Promote the development and enhancement of community centers, civic spaces, and gathering places throughout our communities.			X
h. Expand affordable access to recreational opportunities that support the local lifestyle.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
Implementing Actions: Identify and reserve lands for cemeteries, and preserve existing cemeteries on all islands, appropriately accommodating varying cultural and faith-based lifestyle.			X
Discussion: The Proposed Action will not affect Objective 1 to improve parks and public facilities.			
Objective 2. Improve the quality and adequacy of community facilities.			
Policies			
a. Provide an adequate supply of dedicated shelters and facilities for disaster relief.			X
b. Provide and maintain community facilities that are appropriately designed to reflect the traditions and customs of local cultures.			X
c. Ensure that parks and public facilities are safe and adequately equipped for the needs of all ages and physical abilities to the extent reasonable.			X
d. Maintain, enhance, expand, and provide new active and passive recreational facilities in ways that preserve the natural beauty of their locations.			X
e. Redesign or retrofit public facilities to adapt to major shifts in environmental or urban conditions to the extent reasonable.			X
Discussion: The Proposed Action will not affect Objective 2 to improve parks and public facilities. Issuance of the Water Lease under the Proposed Action would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui~~, as well as the Nāhiku community~~. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, which facilitates the County's ability to maintain community facilities.			
Objective 3. Enhance the funding, management, and planning of public facilities and park lands.			
Policies			
a. Identify and encourage the establishment of regulated and environmentally sound campgrounds.			X
b. Manage park use and control access to natural resources in order to rest sensitive places and utilize the resources in a sustainable manner.			X
c. Provide public-recreational facilities that are clean and well-maintained.			X
d. Develop partnerships to ensure proper stewardship of the islands' trails, public lands, and access systems.			X
e. Ensure that there is an adequate supply of public restrooms in convenient locations.			X
Implementing Actions: a. Encourage the State to allow for overnight fishing along the shoreline in accordance with management plans and regulations. b. Develop and regularly update functional plans, including those relating to public facilities, parks, and campgrounds. c. Develop and adopt local level-of-service standards for public facilities and parks. d. Identify, acquire, and develop lands for parks, civic spaces, and public uses.			X
Discussion: The Proposed Action does not affect Objective 3 as to County public facilities.			
H. Diversify Transportation Options			
Goal: Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.			
Objective 1. Provide an effective, affordable, and convenient ground-transportation system that is environmentally sustainable.			
Policies			
a. Execute planning strategies to reduce traffic congestion.			X
b. Plan for the efficient relocation of roadways for the public benefit.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
c. Support the use of alternative roadway designs, such as traffic-calming techniques and modern roundabouts.			X
d. Increase route and mode options in the ground-transportation network.			X
e. Ensure that roadway systems are safe, efficient, and maintained in good condition.			X
f. Preserve roadway corridors that have historic, scenic, or unique physical attributes that enhance the character and scenic resources of communities.			X
g. Design new roads and roadway improvements to retain and enhance the existing character and scenic resources of the communities through which they pass.			X
h. Promote a variety of affordable and convenient transportation services that meet countywide and community needs and expand ridership of transit systems.			X
i. Collaborate with transit agencies, government agencies, employers, and operators to provide planning strategies that reduce peak-hour traffic.			X
j. Develop and expand an attractive, island-appropriate, and efficient public transportation system			X
k. Provide and encourage the development of specialized transportation options for the young, the elderly, and persons with disabilities			X
l. Evaluate all alternatives to preserve quality of life before widening roads.			X
m. Encourage businesses in the promotion of alternative transportation options for resident and visitor use.			X
n. Support the development of carbon-emission standards and an incentive program aimed at achieving County carbon-emission goals.			X
Implementing Actions: a. Create incentives and implement strategies to reduce visitor dependence on rental cars. b. Establish efficient public-transit routes between employment centers and primary workforce residential areas. c. Create attractive, island-appropriate, conveniently located park-and-ride and ride-share facilities.			
Discussion: The Proposed Action will not affect Objective 1 to diversify transportation options.			
Objective 2. Reduce the reliance on the automobile and fossil fuels by encouraging walking, bicycling, and other energy-efficient and safe alternative modes of transportation.			
Policies			
a. Make walking and bicycling transportation safe and easy between and within communities.			X
b. Require development to be designed with the pedestrian in mind.			X
c. Design new and retrofit existing rights-of-way with adequate sidewalks, bicycle lanes, or separated multi-use transit corridors.			X
d. Support the development of a countywide network of bikeways, equestrian trails, and pedestrian paths.			X
e. Support the reestablishment of traditional trails between communities, to the ocean, and through the mountains for public use.			X
f. Encourage educational programs to increase safety for pedestrians and bicyclists.			X
Implementing Actions: a. Design, build, and modify existing bikeways to improve safety and separation from automobiles. b. Increase enforcement to reduce abuse of bicycle and pedestrian lanes by motorized vehicles. c. Identify non-motorized transportation options as a priority for new sources of funding.			X
Discussion: The Proposed Action will not affect Objective 2 to diversify transportation options.			
Objective 3. Improve opportunities for affordable, efficient, safe, and reliable air transportation.			
Policies			

Table 5-9: Countywide Policy Plan	S	NS	N/A
a. Discourage private helicopter and fixed-wing landing sites to mitigate environmental and social impacts.			X
b. Encourage the use of quieter aircraft and noise-abatement procedures for arrivals and departures.			X
c. Encourage the modernization and maintenance of air-transportation facilities for general-aviation activities.			X
d. Encourage a viable and competitive atmosphere for air carriers to expand service and ensure sufficient intra-County flights and affordable fares for consumers.			X
e. Continue to support secondary airports, and encourage the State to provide them with adequate funding.			X
f. During Community Plan updates, explore the use of the smaller airports.			X
g. Encourage the State to provide efficient, adequate, and affordable parking and transit connections within and around airports.			X
Discussion: The Proposed Action will not affect Objective 3 to diversify transportation options.			
Objective 4. Improve opportunities for affordable, efficient, safe, and reliable ocean transportation.			
Policies			
a. Support programs and regulations that reduce the disposal of maritime waste and prevent spills into the ocean.			X
b. Encourage the upgrading of harbors to resist damage from natural hazards and disasters.			X
c. Encourage the State to study the use of existing harbors and set priorities for future use.			X
d. Explore all options to protect the traditional recreational uses of harbors, and mitigate harbor-upgrade impacts to recreational uses where feasible.			X
e. Encourage the upgrading of harbors and the separation of cargo and bulk materials from passenger and recreational uses.			X
f. Encourage the State to provide for improved capacity at shipping, docking, and storage facilities.			X
g. Encourage the State to provide adequate parking facilities and transit connections within and around harbor areas.			X
h. Encourage the redevelopment and revitalization of harbors while preserving historic and cultural assets in harbor districts.			X
i. Encourage the State to provide adequate facilities for small-boat operations, including small-boat launch ramps, according to community needs.			X
j. Support the maintenance and cleanliness of harbor facilities.			X
k. Support the redevelopment of harbors as pedestrian-oriented gathering places.			X
Discussion: The Proposed Action will not affect Objective 4 to diversify transportation options.			
Objective: 5. Improve and expand the planning and management of transportation systems.			
Policies			
a. Encourage progressive community design and development that will reduce transportation trips.			
b. Require new developments to contribute their pro rata share of local and regional infrastructure costs.			
c. Establish appropriate user fees for private enterprises that utilize public transportation facilities for recreational purposes.			
d. Support the revision of roadway-design criteria and standards so that roads are compatible with surrounding neighborhoods and the character of rural areas.			
e. Plan for multi-modal transportation and utility corridors on each island.			
f. Support designing all transportation facilities, including airport, harbor, and mass-transit stations, to reflect Hawaiian architecture.			

Table 5-9: Countywide Policy Plan	S	NS	N/A
g. Utilize transportation-demand management as an integral part of transportation planning.			
h. Accommodate the planting of street trees and other appropriate landscaping in all public rights-of-way.			
Discussion: The Proposed Action will not affect Objective 5 to diversify transportation options.			
I. Improve Physical Infrastructure			
Goal: Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.			
Objective 1. Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water.			
Policies			
a. Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents.	X		
b. Develop and fund improved water-delivery systems.			X
c. Ensure a reliable and affordable supply of water for productive agricultural uses.	X		
d. Promote the reclamation of gray water, and enable the use of reclaimed, gray, and brackish water for activities that do not require potable water.	X		
e. Retain and expand public control and ownership of water resources and delivery systems.			X
f. Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.	X		
g. Explore and promote alternative water-source-development methods.			X
h. Seek reliable long-term sources of water to serve developments that achieve consistency with the appropriate Community Plans.	X		
Implementing Actions: Develop a process to review all applications for desalination.			
Discussion: The Proposed Action will support Objective 1 to improve physical infrastructure. Issuance of the Water Lease under the Proposed Action would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui, including KAP~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently. The Proposed Action will also insure that groundwater in the Central Maui area will be recharged and thus insure that brackish water may be utilized for agricultural production in Central Maui. Moreover, the MDWS serves the KAP with non-potable water from diversions of the same streams that serve the Kamole-Weir WTP ~~Water Treatment Plant~~ through the Hamakua Ditch, an extension of the Wailoa Ditch. KAP currently consists of 31 farm lots, ranging in size from ~~7~~ 10 to 30 ~~29~~ acres, for a total of approximately 445 acres, supporting 26 farmers, and is planned to expand by 262 acres. The Proposed Action would ensure that KAP, and the planned expansion, have a reliable source of water to meet its water demands.			
Objective 2. Improve waste-disposal practices and systems to be efficient, safe, and as environmentally sound as possible.			
Policies			
a. Provide sustainable waste-disposal systems and comprehensive, convenient recycling programs to reduce the flow of waste into landfills.			X
b. Support innovative and alternative practices in recycling solid waste and wastewater and disposing of hazardous waste.			X
c. Encourage vendors and owners of automobile, appliance, and white goods to participate in the safe disposal and recycling of such goods, and ensure greater accountability for large waste producers.			X
d. Develop strategies to promote public awareness to reduce pollution and litter, and encourage residents to reduce, reuse, recycle, and compost waste materials.			X

Table 5-9: Countywide Policy Plan	S	NS	N/A
e. Pursue improvements and upgrades to existing wastewater and solid-waste systems consistent with current and future plans and the County's Capital Improvement Program.			X
Implementing Actions: a. Establish recycling, trash-separation, and materials recovery programs and facilities to reduce the flow of waste into landfills. b. Study the feasibility of developing environmentally safe waste-to-energy facilities. c. Utilize taxes and fees as means to encourage conservation and recycling. d. Implement and regularly update the Integrated Solid Waste Management Plan. e. Phase out the use of injection wells.			X
Discussion: The Proposed Action will not affect Objective 2 to improve physical infrastructure.			
Objective 3. Significantly increase the use of renewable and green technologies to promote energy efficiency and energy self-sufficiency.			
Policies			
a. Promote the use of locally renewable energy sources, and reward energy efficiency.			X
b. Consider tax incentives and credits for the development of sustainable- and renewable-energy sources.			X
c. Expand education about energy conservation and self-sufficiency.			X
d. Encourage small-scale energy generation that utilizes wind, sun, water, biowaste, and other renewable sources of energy.	X		
e. Expand renewable-energy production.	X		
f. Develop public-private partnerships to ensure the use of renewable energy and increase energy efficiency.			X
g. Require the incorporation of locally appropriate energy-saving and green building design concepts in all new developments by providing energy efficient urban design guidelines and amendments to the Building Code.			X
h. Encourage the use of sustainable energy to power vehicles.			X
i. Promote the retrofitting of existing buildings and new development to incorporate energy-saving design concepts and devices.			X
j. Encourage green footprint practices.			X
k. Reduce Maui County's dependence on fossil fuels and energy imports.			X
l. Support green building practices such as the construction of buildings that aim to minimize carbon dioxide production, produce renewable energy, and recycle water.			X
m. Promote and support environmentally friendly practices in all energy sectors.			X
Implementing Actions: a. Adopt an energy-efficiency policy for Maui County government as a model for other jurisdictions. b. Adopt a Green Building Code, and support green building practices.			X
Discussion: The Proposed Action will support Objective 3 to improve physical infrastructure. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Mahi Pono is also committing land to the production of solar energy for its own use and the public utility system.			
Objective 4. Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.			
Policies			
a. Capitalize on existing infrastructure capacity as a priority over infrastructure expansion.	X		
b. Planning for new towns should only be considered if a region's growth is too large to be directed into infill and adjacent growth areas.			X
c. Utilize appropriate infrastructure technologies in the appropriate locations.	X		

Table 5-9: Countywide Policy Plan	S	NS	N/A
d. Promote land use patterns that can be provided with infrastructure and public facilities in a cost-effective manner.	X		
e. Support catchment systems and on-site wastewater treatment in rural areas and aggregated water and wastewater systems in urban areas if they are appropriately located.			X
Implementing Actions: a. Develop a streamlining system for urban infill projects. b. Identify appropriate areas for urban expansion of existing towns where infrastructure and public facilities can be provided in a cost-effective manner.			X
Discussion: The Proposed Action will support Objective 4 to improve physical infrastructure. Issuance of the Water Lease would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently.			
Objective 5. Improve the planning and management of infrastructure systems.			
Policies			
a. Provide a reliable and sufficient level of funding to enhance and maintain infrastructure systems.			X
b. Require new developments to contribute their pro rata share of local and regional infrastructure costs.			X
c. Improve coordination among infrastructure providers and planning agencies to minimize construction impacts.			X
d. Maintain inventories of infrastructure capacity, and project future infrastructure needs.	X		
e. Require social-justice and -equity issues to be considered during the infrastructure-planning process.			X
f. Discourage the development of critical infrastructure systems within hazard zones and the tsunami-inundation zone to the extent practical.			X
g. Ensure that infrastructure is built concurrent with or prior to development.			X
h. Ensure that basic infrastructure needs can be met during a disaster.	X		
i. Locate public facilities and emergency services in appropriate locations that support the health, safety, and welfare of each community and that minimize delivery inefficiencies.			X
j. Promote the undergrounding of utility and other distribution lines for health, safety, and aesthetic reasons.			X
Implementing Actions: a. Develop and regularly update functional plans for infrastructure systems. b. Develop, adopt, and regularly update local or community-sensitive level-of-service standards for infrastructure systems.			X
Discussion: The Proposed Action will support Objective 5 to improve physical infrastructure. Issuance of the Water Lease under the Proposed Action would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently. The Upcountry Maui Water System's reliance on surface water (80-90%) makes the system extremely vulnerable to drought and presents as a challenge for the MDWS. For decades, the Upcountry Maui region has experienced voluntary and mandatory water use restrictions imposed on residential and agricultural users during droughts, primarily during dry season, often negatively impacting the productivity of the farmers. Droughts are a natural			

Table 5-9: Countywide Policy Plan	S	NS	N/A
phenomenon that have been historically experienced throughout the Hawaiian Islands, however, drought events have become more intense over the years, and are expected to intensify in the future. As noted by the MDWS, droughts in Maui are a part of the regular climate cycle, and have been occurring on average every 3 to 4 years. These periods of low rainfall have even affected the normally lush East Maui area. Historical occurrences as noted in the recently updated Hawai'i Drought Plan have occurred many times within the past 70 years. Since 1950, droughts have occurred in the East Maui in 1953, 1962, 1971, 1981, 1984, 1999, 2006, and most recently a long period of 2008 to 2013. During these times, the EMI Aqueduct System has delivered less than 50,000 million gallons (mg) annually. The average of the delivery over the past century has been 61,000 mg per year (Akinaka, 2019). Historically, Kamole-Weir WTP ~~Water Treatment Facility~~ is the primary source of water for all of Upcountry Maui during times of drought. However, the facility lacks raw water storage and is restricted to how much water that the facility can treat or how much water that can be delivered through the Wailoa Ditch of the EMI Aqueduct System. The Proposed Action would ensure that the MDWS would have a reliable source of water to supply Upcountry Maui with during periods of drought.			
J. Promote Sustainable Land Use and Growth Management			
Goal: Community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner.			
Objective 1. Improve land use management and implement a directed-growth strategy.			
Policies			
a. Establish, map, and enforce urban- and rural-growth limits.			X
b. Direct urban and rural growth to designated areas.			X
c. Limit the number of visitor-accommodation units and facilities in Community Plan Areas.			X
d. Maintain a sustainable balance between the resident, part-time resident, and visitor populations.			X
e. Encourage redevelopment and infill in existing communities on lands intended for urban use to protect productive farm land and open-space resources.			X
f. Discourage new entitlements for residential, resort, or commercial development along the shoreline.			X
g. Restrict development in areas that are prone to natural hazards, disasters, or sea-level rise.			X
h. Direct new development in and around communities with existing infrastructure and service capacity, and protect natural, scenic, shoreline, and cultural resources.	X		
i. Establish and maintain permanent open space between communities to protect each community's identity.			X
j. Support the dedication of land for public uses.			X
k. Preserve the public's rights of access to and continuous lateral access along all shorelines.			X
l. Enable existing and future communities to be self-sufficient through sustainable land use planning and management practices.			X
m. Protect summits, slopes, and ridgelines from inappropriate development.			X
Implementing Actions: a. Regularly update urban- and rural-growth boundaries and their maps. b. Establish transfer and purchase of development rights programs. c. Develop and adopt a green infrastructure plan. d. Develop studies to help determine a sustainable social, environmental, and economic carrying capacity for each island. e. Identify and define resort-destination areas.			X
Discussion: The Proposed Action will support Objective 1 to promote sustainable land use and growth management. Issuance of the Water Lease would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as			

Table 5-9: Countywide Policy Plan	S	NS	N/A
well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently. Moreover, the Proposed Action will be in compliance with the CWRM D&O, which was issued to increase the practical knowledge of stream flows and native habitat restoration. The CWRM D&O establishes a quantity of water that must remain in each stream. Each stream a part of the contested case in East Maui was evaluated individually for their potential for usage, habitat restoration, recreational opportunities, and scenic values. The CWRM D&O ensures the prudent use of the surface water resources in the License Area.			
Objective 2. Improve planning for and management of agricultural lands and rural areas.			
Policies			
a. Protect prime, productive, and potentially productive agricultural lands to maintain the islands' agricultural and rural identities and economies.	X		
b. Provide opportunities and incentives for self-sufficient and subsistence homesteads and farms.	X		
c. Discourage developing or subdividing agriculturally designated lands when non-agricultural activities would be primary uses.			X
d. Conduct agricultural-development planning to facilitate robust and sustainable agricultural activities.	X		
Implementing Actions: Inventory and protect prime, productive, and potentially productive agricultural lands from competing non-agricultural land uses.			
Discussion: The Proposed Action will support Objective 2 to promote sustainable land use and growth management. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion of the agricultural fields in Central Maui to diversified agriculture. The Central Maui fields are largely designated IAL and according to the ALISH map, the agricultural fields of Central Maui are predominantly classified Prime Land (See Figure 4-16). Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. The continued reopening ~~Reopening~~ the land for farming would provide employment opportunities and expand the agriculture sector of Maui's economy, as well as for the State of Hawai'i. ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation. Moreover, the diversified agriculture operation will aid in achieving the State's goal of doubling local food production. In the event of a major catastrophe, limiting overseas supplies, this diversified agriculture initiative could help supply the State with food. Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services, thus facilitating robust and sustainable agricultural activities. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP. Presently, the MDWS serves the KAP with non-potable water from diversions of the same streams that serve the Kamole-Weir WTP ~~Water Treatment Plant~~ through the Hamakua Ditch, an extension of the Wailoa Ditch. KAP currently consists of 31 farm lots, ranging in size from ~~7~~ 10 to 30 ~~29~~ acres, for a total of approximately 445 acres, supporting 26 farmers, and is planned to expand by 262 acres. Issuance of the Water Lease would ensure that KAP, and the planned expansion, have a reliable source of water to meet its water demands.			
Objective 3. Design all developments to be in harmony with the environment and to protect each community's sense of place.			

Table 5-9: Countywide Policy Plan	S	NS	N/A
Policies			
a. Support and provide incentives for green building practices.			X
b. Encourage the incorporation of green building practices and technologies into all government facilities to the extent practicable.			X
c. Protect and enhance the unique architectural and landscape characteristics of each Community Plan Area, small town, and neighborhood.			X
d. Ensure that adequate recreational areas, open spaces, and public-gathering places are provided and maintained in all urban centers and neighborhoods			X
e. Ensure business districts are distinctive, attractive, and pedestrian-friendly destinations.			X
f. Use trees and other forms of landscaping along rights-of-way and within parking lots to provide shade, beauty, urban-heat reduction, and separation of pedestrians from automobile traffic in accordance with community desires.			X
g. Where appropriate, integrate public-transit, equestrian, pedestrian, and bicycle facilities, and public rights-of-way as design elements in new and existing communities.			X
h. Ensure better connectivity and linkages between land uses.			X
i. Adequately buffer and mitigate noise and air pollution in mixed-use areas to maintain residential quality of life.			X
j. Protect rural communities and traditional small towns by regulating the footprint, locations, site planning, and design of structures.			X
k. Support small-town revitalization and preservation.			X
l. Facilitate safe pedestrian access, and create linkages between destinations and within parking areas.			X
Implementing Actions: a. Establish design guidelines and standards to enhance urban and rural environments. b. Provide funding for civic-center and civic-space developments. c. Establish and enhance urban forests in neighborhoods and business districts.			X
Discussion: The Proposed Action will not affect Objective 3 to promote sustainable land use and growth management.			
Objective 4. Improve and increase efficiency in land use planning and management.			
Policies			
a. Assess the cumulative impact of developments on natural ecosystems, natural resources, wildlife habitat, and surrounding uses.			X
b. Ensure that new development projects requiring discretionary permits demonstrate a community need, show consistency with the General Plan, and provide an analysis of impacts.			X
c. Encourage public and private partnerships to preserve lands of importance, develop housing, and meet the needs of residents.			X
d. Promote creative subdivision designs that implement best practices in land development, sustainable management of natural and physical resources, increased pedestrian and bicycle functionality and safety, and the principles of livable communities.			X
e. Coordinate with Federal, State, and County officials in order to ensure that land use decisions are consistent with County plans and the vision local populations have for their communities.			X
f. Enable greater public participation in the review of subdivisions.			X
g. Improve land use decision making through the use of land- and geographic information systems.			X
Implementing Actions: Institute a time limit and sunsetting stipulations on development entitlements and their implementation.			X
Discussion: The Proposed Action will not affect Objective 4 to promote sustainable land use and growth management.			

Table 5-9: Countywide Policy Plan	S	NS	N/A
K. Strive for Good Governance			
Goal: Government services will be transparent, effective, efficient, and responsive to the needs of residents.			
Objective 1. Strengthen governmental planning, coordination, consensus building, and decision making.			
Policies			
a. Plan and prepare for the effects of social, demographic, economic, and environmental shifts.			X
b. Plan for and address the possible implications of Hawaiian sovereignty.			X
c. Encourage collaboration among government agencies to reduce duplication of efforts and promote information availability and exchange.			X
d. Expand opportunities for the County to be involved in and affect State and Federal decision making.			X
e. Plan and prepare for large-scale emergencies and contingencies.			X
f. Improve public awareness about preparing for natural hazards, disasters, and evacuation plans.			X
g. Improve coordination among Federal, State, and County agencies.			X
Implementing Actions: a. Develop policies, regulations, and programs to protect and enhance the unique character and needs of the County's various communities. b. Evaluate and, if necessary, recommend modifications to the County Charter that could result in a possible change to the form of governance for Maui County. c. Study and evaluate the feasibility and implications of district voting in Maui County Council elections. d. Study and evaluate the feasibility of authorizing town governments in Maui County.			X
Discussion: The Proposed Action will not affect Objective 1 to strive for good governance.			
Objective 2. Promote civic engagement.			
Policies			
a. Foster consensus building through in-depth, innovative, and accessible public participatory processes.			X
b. Promote and ensure public participation and equal access to government among all citizens.			X
c. Encourage a broad cross-section of residents to volunteer on boards and commissions.			X
d. Encourage the State to improve its community-involvement processes.			X
e. Support community-based decision making.			X
f. Expand advisory functions at the community level.			X
g. Expand opportunities for all members of the public to participate in public meetings and forums.			X
h. Facilitate the community's ability to obtain relevant documentation.			X
i. Increase voter registration and turnout.			X
Implementing Actions: a. Implement two-way communication using audio-visual technology that allows residents to participate in the County's planning processes. b. Ensure and expand the use of online notification of County business and public meetings, and ensure the posting of all County board and commission meeting minutes. c. Explore funding mechanisms to improve participation by volunteers on boards and commissions. d. Develop a project-review process that mandates early and ongoing consultation in and with communities affected by planning and land use activities.			X
Discussion: The Proposed Action will not affect Objective 2 to strive for good governance.			

Table 5-9: Countywide Policy Plan	S	NS	N/A
Objective 3. Improve the efficiency, reliability, and transparency of County government's internal processes and decision making.			
Policies			
a. Use advanced technology to improve efficiency.			X
b. Simplify and clarify the permitting process to provide uniformity, reliability, efficiency, and transparency.			X
c. Improve communication with Lana'i and Moloka'i through the expanded use of information technologies, expanded staffing, and the creation and expansion of government-service centers.			X
d. Ensure that laws, policies, and regulations are internally consistent and effectuate the intent of the General Plan.			X
Implementing Actions: a. Update the County Code to be consistent with the General Plan. b. Identify and update County regulations and procedures to increase the productivity and efficiency of County government. c. Develop local level-of-service standards for infrastructure, public facilities, and services. d. Implement plans through programs, regulations, and capital improvements in a timely manner. e. Expand government online services.			X
Discussion: The Proposed Action will not affect Objective 3 to strive for good governance.			
Objective 4. Adequately fund in order to effectively administer, implement, and enforce the General Plan.			
Policies			
a. Adequately fund, staff, and support the timely update and implementation of planning policy, programs, functional plans, and enforcement activities.			X
b. Ensure that the County's General Plan process provides for efficient planning at the County, island, town, and neighborhood level.			X
c. Encourage ongoing professional development, education, and training of County employees.			X
d. Encourage competitive compensation packages for County employees to attract and retain County personnel.			X
e. Enable the County government to be more responsive in implementing our General Plan and Community Plans.			X
f. Review discretionary permits for compliance with the Countywide Policy Plan.			X
g. Strengthen the enforcement of County, State, and Federal land use laws.			X
Implementing Actions: Establish penalties to ensure compliance with County, State, and Federal land use laws.			X
Discussion: The Proposed Action will not affect Objective 4 to strive for good governance.			
Objective 5. Strive for County government to be a role model for implementing cultural and environmental policies and practices.			
Policies			
a. Educate residents on the benefits of sustainable practices.			X
b. Encourage the retention and hiring of qualified professionals who can improve cultural and environmental practices.			X
c. Incorporate environmentally sound and culturally appropriate practices in government operations and services.			X
d. Encourage all vendors with County contracts to incorporate environmentally sound and culturally appropriate practices.			X
Discussion: The Proposed Action will not affect Objective 5 to strive for good governance.			

5.4.3 Maui Island Plan

The Maui Island Plan (MIP), adopted on December 28, 2012, is the second component of the decennial General Plan update that acts as a blueprint that directs future growth, the economy, and social and environmental decisions for the island of Maui through the year 2030.

The MIP identifies areas appropriate for future urbanization and revitalization. It also identifies and addresses key environmental, housing and economic development issues relevant to Maui's current and future generations. The Countywide Policy Plan is an overarching document that provides direction to the Maui Island Plan, which in turn, provides direction to the various community plans on the island of Maui.

The Maui Island Plan highlights core values and issues relevant to the island of Maui. Table 5-10 below is a discussion of the relevant goals, objectives and policies that relate to the Proposed Action.

Table 5-10: Maui Island Plan		S	NS	N/A
Population				
Goal				
1.1	Maui's people, values, and lifestyles thrive through strong, healthy, and vibrant island communities.			
Objective				
1.1.1	Greater retention and return of island residents by providing viable work, education, and lifestyle options.			
Policies				
1.1.1.a	Expand programs that enable the community to meet the education, employment, housing, and social goals of youth and young adults.	X		
1.1.1.b	Expand housing, transportation, employment, and social opportunities to ensure residents are able to comfortably age within their communities.	X		
1.1.1.c	Measure and track resident satisfaction through surveys and community indicators			X
1.1.1.d	Support funding for transportation, housing, health care, recreation, and social service programs that help those with special needs (including the elderly and disabled).			X
Discussion: The Proposed Action will support Objective 1.1.1 of the Maui Island Plan. The issuance of the Water Lease under the Proposed Action will allow for the conversion of the agricultural fields in Central Maui to a diversified agricultural operation. The continued reopening ~~Reopening~~ up the agricultural fields for cultivation would increase employment directly and indirectly for the island of Maui and the State. It is projected that approximately 1,140 direct and indirect jobs would be created from implementation of the Proposed Action at full operation. Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services thus providing viable work options. Mahi Pono also intends to provide agricultural plots for research and offer an internship program for high school and college students to meet the educational goals of young adults. Moreover, issuance of the Water Lease would allow for the continued conveyance of water through the EMI Aqueduct System to the MDWS, which supplies water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community,~~ to meet their domestic and agricultural water demands. The Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui, as well as Nāhiku, and to adequately plan, as well as make sound investments, for growth as there are a lack of alternative water sources and infrastructure to meet present and future demands currently.				
Heritage Resources				
Goal				
2.1	Our community respects and protects archaeological and cultural resources while perpetuating diverse cultural identities and traditions.			

Table 5-10: Maui Island Plan		S	NS	N/A
Objective				
2.1.1	An island culture and lifestyle that is healthy and vibrant as measured by the ability of residents to live on Maui, access and enjoy the natural environment, and practice Hawaiian customs and traditions in accordance with Article XII, Section 7, Hawai'i State Constitution, and Section 7-1, Hawai'i Revised Statutes (HRS).			
Policies				
2.1.1.a	Perpetuate the spirit of aloha and celebrate the host Hawaiian culture and other ethnic cultures.			X
2.1.1.b	Perpetuate a respect for diversity and recognize the broad blending of cultures and ethnicities as vital to the quality of life on Maui.			X
2.1.1.c	Ensure traditional public access routes, including native Hawaiian trails, are maintained for public use.			X
2.1.1.d	Support the education of visitors and new residents about the customs and etiquette of the Hawaiian culture, as well as other cultures.			X
Discussion: The Proposed Action will not affect Objective 2.1.1 of the Maui Island Plan. EMI has confirmed that no individual that has approached EMI regarding access to the License Area for cultural purposes has ever been denied access.				
Objective				
2.2	A more effective and efficient planning and review process that incorporates the best available cultural resources inventory, protection techniques, and preservation strategies.			
Policies				
2.1.2.a	Ensure that the island has a comprehensive and up-to-date inventory of historic and archaeological resources, and their cultural significance.	X		
2.1.2.b	Require the update of existing planning and regulatory mechanisms to protect the natural, cultural, scenic, and historic resources within designated Heritage Areas.			X
2.1.2.c	Ensure that cultural, historic, and archaeological resources are protected for the benefit of present and future generations.	X		
Discussion: The Proposed Action will support Objective 2.2 of the Maui Island Plan. In connection with this EIS, Mason Architects prepared a Historic Structure Assessment report for the subject Water Lease. The main purpose of this study was to determine the historical significance of the EMI Aqueduct System. The report provides documentation of various components of the historic EMI Aqueduct System. To assess the Proposed Action, CSH was contracted to conduct an Archaeological LRFI for the License Area in East Maui, as well as a CIA, for the express ~~expressed~~ purpose of assessing the potential for impacts to ~~identifying~~ archaeological and cultural resources. An objective of the Proposed Action is to continue to maintain and operate the EMI Aqueduct System. Should the Water Lease not be issued, the EMI Aqueduct System may be abandoned if it is not economically feasible to operate, resulting in the EMI Aqueduct System falling into disrepair, losing its integrity as a historic resource.				
Objective				
2.3	Enhance the island's historic, archaeological, and cultural resources.			
Policies				
2.1.3.a	Identify and pursue a listing of the properties and sites on the State and National Register of Historic Places.			X
2.1.3.b	Support the use of easements, dedications, and other mechanisms to acquire, maintain, and protect lands with cultural, archaeological, and historic significance.			X
2.1.3.c	Support regulations to require developers, when appropriate, to prepare an Archaeological Inventory Survey, Cultural Impact Assessment, and Ethnographic Inventories that are reviewed and commented upon by the Office of Hawaiian Affairs, Native Hawaiian advisory bodies, the State Historic Preservation Division (SHPD), and the Office of Environmental Quality Control, and systematically comply with the steps listed in SHPD's administrative rules, including consultation and monitoring during construction phases of projects.	X		

Table 5-10: Maui Island Plan		S	NS	N/A
2.1.3.d	Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures.			X
2.1.3.e	Encourage property owners to register historic and archaeological sites on the State and National Register.			X
2.1.3.f	Support opportunities for public involvement with the intent to facilitate the protection and restoration of historic and archeological sites, including consultation with stakeholders.			X
2.1.3.g	Encourage the resolution of land title questions relating to Land Commission Awards and Royal patents.			X
2.1.3.h	Ensure compliance with historic preservation laws, and discourage demolition of properties that are determined to be eligible for listing on the National or State Register of Historic Places.	X		
Discussion: The Proposed Action will support Objective 2.3 of the Maui Island Plan. To assess the Proposed Action, CSH was contracted to conduct an Archaeological LRFI for the License Area in East Maui, as well as a CIA, for the express ~~expressed~~ purpose of assessing the potential for impacts to ~~identifying~~ archaeological and cultural resources. Mason Architects prepared a Historic Structure Assessment report documenting the historic EMI Aqueduct System. The Proposed Action continues the long-standing maintenance and use of the EMI Aqueduct System for the subject Water Lease. The main purpose of this study was to determine the historical significance of the EMI Aqueduct System. Moreover, the Proposed Action does not incorporate any construction or development of new infrastructure.				
Shoreline, Reefs, and Nearshore Waters				
Goal				
2.2	An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.			
Objective				
2.2.1	A more comprehensive and community-based Integrated Coastal Zone Management (ICZM) program.			
Policies				
2.2.1.a	Encourage a management system that protects and temporarily rests the reef ecosystems from overuse.			X
2.2.1.b	Support the establishment of additional Marine Managed Areas (MMAs) and reef replenishment areas.			X
2.2.1.c	Work with appropriate agencies and community members to protect any special managed conservation areas from overuse and ensure that surrounding land uses do not contribute to the degradation of the natural resources, such as 'Ahihi-Kina'u Natural Area Reserve, Honolua-Mokulē'ia Bay Marine Life Conservation District, and Mākena State Park.			X
2.2.1.d	Incorporate the following into the MIP, where consistent with the MIP: (1) Beach Management Plan for Maui; (2) Coastal Nonpoint Pollution Control Program Management Plan; (3) Implementation Plan for Polluted Runoff Control; and (4) Ocean Resource Management Plan.			X
2.2.1.e	Support greater coordination among governmental agencies involved with the protection of the island's marine resources.			X
Discussion: The Proposed Action will not affect Objective 2.2.1 of the Maui Island Plan.				
Objective				
2.2.2	Improved reef health, coastal water quality, and marine life			
Policies				
2.2.2.a	Create additional mechanisms where needed to contain and control runoff and pollution			X
2.2.2.b	Allow extraction of high quality, Class A, low silt sands only when they will be used to protect or restore Maui's shorelines and beaches.			X

Table 5-10: Maui Island Plan		S	NS	N/A
2.2.2.c	Carefully manage beach nourishment activities to protect the coastal and marine ecosystem.			X
2.2.2.d	Require, where appropriate, a buffer between landscaped areas and the shoreline, gulches, and streams to reduce the runoff of fertilizers, pesticides, herbicides, and other pollutants into coastal waters.			X
2.2.2.e	Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with an intent to protect the coastal and marine ecosystem.			X
2.2.2.f	Support greater protection of Keālia Pond National Wildlife Refuge through the following: (1) Enhancement of marine ecosystems; (2) Beach and sand dune restoration; and (3) Expansion of habitat for Maui's threatened or endangered sea turtles, birds, and other species.			X
2.2.2.h	Encourage the State to conduct a regular census of fish populations and monitor coral health.			X
2.2.2.i	Encourage the State to significantly increase the number of park rangers, enforcement officers, and marine biologists to protect coastal resources.			X
2.2.2.j	Encourage the State to prohibit the collection and exportation of fish, coral, algae, and other marine species for the ornamental and aquarium trade.			X
Discussion: The Proposed Action will not affect Objective 2.2.2 of the Maui Island Plan.				
Objective				
2.2.3	Water quality that meets or exceeds State Clean Water Act standards			
Policies				
2.2.3.a	Reduce the amount of impervious surface and devise site plan standards that aim to minimize storm runoff and nonpoint source (NPS) pollution.			X
2.2.3.b	Support the revision of existing regulations to require an Erosion and Sedimentation Control Plan (ESCP) for development activities that may pose a threat to water quality			X
2.2.3.c	Require an on-site monitoring program, where applicable, when grading may pose a threat to water quality or when recommended in the ESCP.			X
2.2.3.d	Avoid development actions that impair Maui's reef systems and remove identified stressors.	X		
2.2.3.e	Phase out cesspools and restrict the use of septic systems in ecologically sensitive coastal areas by converting to environmentally-friendly alternative sewage treatment systems, and connecting to central sewerage systems when and where feasible.			X
2.2.3.f	Prohibit the development of new wastewater injection wells, except when unavoidable for public health and safety purposes.			X
2.2.3.g	Ensure that the County upholds its affirmative duty under the Clean Water Act by monitoring and reducing point and NPS pollution to help safeguard coastal waters.			X

Discussion: The Proposed Action will support Objective 2.2.3 of the Maui Island Plan.

SE and MRC jointly prepared a report assessing the streams and ocean water chemistry to depict the effects of stream discharge of the East Maui streams on the nearshore ocean environment. Results of the investigation indicate that the effects of stream water on marine waters must be considered minor in the nearshore habitats of East Maui. This result is supported by the physical processes associated with relatively small input of stream water to the vastly larger ocean environment. The prevailing condition of extreme mixing by physical forces is the most important factor in diminishing the zone of influence of stream water in the marine setting. Observations of the habitats in these transition zones indicated that they were composed primarily of sand and barren rock. Owing to continual, intense wave energy, these nearshore areas do not constitute important habitats for coral reef communities and associated marine species. Beyond the narrow transition zone, the influence of stream water is minimal owing to rapid and intense mixing. Moreover, additional research by the HSHEP model found that the nearshore environment below the License Area possesses very little estuarine habitats. It was found that five streams have any possibility of an estuarine reach. For these five streams, three streams (Waiohue, Pi'ina'au, and Honomanū) are the most likely to have estuarine reaches and all three of these streams have either full or habitat flow restoration required under the CWRM D&O. Of the two streams that may have a small estuarine reach, Pa'akea

Table 5-10: Maui Island Plan		S	NS	N/A
will have connectivity flow restoration, while 'O'opuloa will have no flow restoration and will remain as per the 1988 IIFS. Thus overall, the majority of estuarine habitat will be either fully or partially restored under the Proposed Action. The CWRM D&O, however, notes that a total of nine streams (one is considered a tributary to Pi'ina'au Stream) have esturine reaches, four of which were noted by the HSHEP + aerial image review approach as to having estuarine reaches. The streams included in the CWRM D&O are shown in Table 4-8 below along with their overlap with streams determined with the method used by the HSHEP model. According to CWRM, anywhere that the DLNR Division of Aquatic Resources (DLNR-DAR) conducted an estuary survey for the East Maui streams, it was considered an estuary. This includes surveys conducted in bays and/or streams. While the DLNR-DAR's methodology used is for estuary surveys, it does not define the size or extent of an estuary such as the HSHEP model, only that the DLNR-DAR survey was conducted to look for the presence of fish near a stream mouth. Hence, the difference between the two methodologies. This is discussed in more detail in Section 4.2.3 of the FEIS.				
Objective				
2.2.4	Acquire additional shoreline lands and shoreline access rights.			
Policies				
2.2.4.a	Promote the use of conservation easements, land trusts, transfer and purchase of development rights, and mitigation banking.			X
2.2.4.b	Require the dedication of public beach and rocky shoreline access ways to and along the shoreline where it serves a practical public interest as a condition of development or subdivision approval; future subdivisions and developments shall be consistent with and effectuate, to the extent practicable, the Shoreline Access Inventory Update - Final Report (March 2005), and its updates.			X
2.2.4.c	Incorporate the Shoreline Access Inventory Update - Final Report (March 2005), and its regular updates, into this plan.			X
2.2.4.d	Identify access points while further acquiring key shoreline parcels and easement rights to enhance and protect beach access and shoreline recreation.			X
Discussion: The Proposed Action will not affect Objective 2.2.4 of the Maui Island Plan.				
Watersheds, Streams, and Wetlands				
Goal				
2.3	Healthy watersheds, streams, and riparian environments.			
Objective				
2.3.1	Greater protection and enhancement of watersheds, streams, and riparian environments.			
Policies				
2.3.1.a	All present and future watershed management plans shall incorporate concepts of ahupua'a management based on the interconnectedness of upland and coastal ecosystems/species.			X
2.3.1.b	Continue to support and be an active member of watershed partnerships.	X		
2.3.1.c	Support the establishment of regional water trusts, composed of public and private members, to manage water resources.			X
2.3.1.d	Support regulations to require developments to utilize ahupua'a management practices.			X
2.3.1.e	Work with private and non-profit entities to educate the public about the connection between upland activities within the watershed and the impacts on nearshore ecosystems and coral reefs.			X
2.3.1.f	Provide adequate funding and staff to develop and implement watershed protection plans and policies, including acquisition and management of watershed resources and land.			X
2.3.1.g	Encourage the State to mandate instream assessment to provide adequate water for native species.	X		
2.3.1.h	Maui will protect all watersheds and streams in a manner that guarantees a healthy, sustainable riparian environment.	X		
Discussion: The Proposed Action will support Objective 2.3.1 of the Maui Island Plan. The Proposed Action and the issuance of a Water Lease will include a requirement that a watershed management plan ~~Watershed Management Plan~~ be developed and implemented for East Maui as discussed in Section 2.1. In addition, EMI was a founding member of the EMWP and continues to be an active member.				

Table 5-10: Maui Island Plan		S	NS	N/A
The CWRM D&O was purposefully designed to increase the practical knowledge of stream flows and native habitat restoration. The CWRM D&O establishes a quantity of water that must remain in each stream subject to that D&O. Each stream was evaluated individually for its potential for usage, habitat restoration, recreational opportunities, and scenic values, among other things. The CWRM D&O ensures that should the Water Lease be issued, there will be a prudent use of the surface water resources in the License Area. The Proposed Action is not contrary to the CWRM D&O, and will exercise a conservation ethic in use of the State's natural resources, and ensure compatibility between land-based activities and natural resources and ecological systems. The amount of water awarded by the Water Lease is subject to all applicable requirements under HRS § 171-58. HRS § 171-58(c), (d), and (e) articulate terms for the disposition of the Water Lease. HRS § 171-58(e) requires that any new lease of water rights "shall contain a covenant that requires the lessee and the department of land and natural resources to jointly develop and implement a watershed management plan. The board shall not approve any new lease of water rights without the foregoing covenant or a watershed management plan." At the March 22, 2019 meeting of the BLNR, the DLNR staff proposed a watershed management cost share formula and contribution for leases of water rights pursuant to HRS § 171-58(e). Although the BLNR deferred decision-making on the staff's proposal, the consensus was that compliance with the watershed management provision of HRS § 171-58(e) should be determined on a case-by-case basis for each individual water lease. On October 11, 2019, the BLNR approved the minimum content requirements for a watershed management plan. A copy of the BLNR-approved DLNR report is enclosed as Appendix O-1. The components of an acceptable watershed management plan are discussed in more detail in Section 2.1 of the FEIS. A&B was a founding member of the EMWP, which was the first watershed partnership in the State of Hawai'i and which served as a model for other watershed partnerships throughout the State. Since the founding of the EMWP in 1991, A&B, on its own and through EMI, has actively participated in watershed partnership activities through monetary contributions and in-kind services. Under the Proposed Action, it is anticipated that EMI and/or Mahi Pono will continue to pursue watershed management activities.				
Objective				
2.3.2	Decreased NPS and point source pollution.			
Policies				
2.3.2.a	Enforce water pollution related standards and codes.			X
2.3.2.b	Support the use of low impact development (LID) Techniques such as those described in the State of Hawai'i LID Practitioner's Guide (June 2006), as amended.			X
2.3.2.c	Encourage farmers and ranchers to use agricultural best management practices (BMPs) to address NPS pollution.	X		
Discussion: The Proposed Action will support Objective 2.3.2 of the Maui Island Plan. The Proposed Action would allow for the continued conveyance of water from East Maui to the agricultural fields in Central Maui for the continued transition to a diversified agricultural farming model. In undertaking the ~~The~~ various operations that occur within these fields as a result of the Proposed Action Mahi Pono will apply BMPs to manage runoff from the agricultural fields that are near coastal waters. The Mahi Pono farm team, as well as its lessees, follow BMPs approved by the DOH, NRCS, the EPA, and other governmental agencies in the use of chemicals, and controlling dust and erosion and runoff associated with its farming activities. Any discharges related to the operation activities within the Central Maui agricultural fields will comply with applicable State Water Quality Standards as specified in HAR, Chapter 11-54 and 11-55 Water Pollution Control, DOH. ~~will adopt water quality standards and best management practices, and regulate point and nonpoint sources of pollution to protect coastal waters where feasible.~~				
Objective				
2.3.3	Preserve existing wetlands and improve and restore degraded wetlands.			
Policies				
2.3.3.a	Prohibit the destruction and degradation of existing upland, mid-elevation, and coastal wetlands.			X
2.3.3.b	Support and fund wetland protection and improvement, and restoration of degraded wetlands.			X

Table 5-10: Maui Island Plan		S	NS	N/A
2.3.3.c	Where applicable, require developers to provide a wetland protection buffer and/or other protective measures around and between development and wetland resources.			X
Discussion: The Proposed Action will not affect Objective 2.3.3 of the Maui Island Plan.				
Objective				
2.3.4	Greater preservation of native flora and fauna biodiversity to protect native species			
Policies				
2.3.4.a	Work with appropriate agencies to eliminate feral ungulate populations and invasive species.			X
2.3.4.b	Encourage the State to provide adequate funding to preserve biodiversity, protect native species, and contain or eliminate invasive species.			X
2.3.4.c	Support the work of conservation groups and organizations that protect, reestablish, manage, and nurture sensitive ecological areas and threatened indigenous ecosystems.			X
Discussion: The Proposed Action will not affect Objective 2.3.4 of the Maui Island Plan.				
Objective				
2.3.5	Limited development in critical watershed areas.			
Policies				
2.3.5.a	Discourage development and subdivision of land within critical watersheds and in areas susceptible to high erosion and sediment loss			X
2.3.5.b	Designate critical watershed areas as conservation lands.			X
2.3.5.c	Strongly encourage new subdivisions and developments that are proximate to environmentally sensitive watershed resources to prepare and implement Conservation Subdivision Design plans.			X
Discussion: The Proposed Action will not affect Objective 2.3.5 of the Maui Island Plan. The License Area is within one of the two critical watershed areas identified in the MIP. No development is proposed within this area, all or most of which is in the Conservation District, under the Proposed Action.				
Objective				
2.3.6	Enhance the vitality and functioning of streams, while balancing the multiple needs of the community.			
Policies				
2.3.6.a	Protect and enhance natural streambeds and discourage stream alteration.	X		
2.3.6.b	Work with appropriate agencies to establish minimum stream flow levels and ensure adequate stream flow to sustain riparian ecosystems, traditional kalo cultivation, and self-sustaining ahupua'a.	X		
2.3.6.c	Respect and participate in the resolution of native Hawaiian residual land and water rights issues (kuleana lands, ceded lands, and historic agricultural and gathering rights).	X		
2.3.6.d	Ensure that stream flows implement laws and policies found in the State Constitution and Water Code.	X		
2.3.6.e	Work with appropriate agencies and stakeholders to establish minimum stream flow levels, promote actions to support riparian habitat and the use of available lo'i, and maintain adequate flows for the production of healthy kalo crops.	X		
Discussion: The Proposed Action will support Objective 2.3.6 of the Maui Island plan. The CWRM D&O was purposefully designed to increase the practical knowledge of stream flows and native habitat restoration. The CWRM D&O establishes a quantity of water that must remain in each stream. Each stream a part of the contested case in East Maui was evaluated individually for their potential for usage, habitat restoration, recreational opportunities, and scenic values. The CWRM D&O ensures the prudent use of the surface water resources in the License Area with the issuance of the Water Lease. The CWRM D&O ordered that certain streams, designated as "kalo and community streams", will be fully restored, protecting those special areas that depend upon these streams. These streams support communities that depend upon kalo cultivation, an element of Hawai'i's cultural heritage. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action is not contrary to the CWRM D&O, and will exercise a				

Table 5-10: Maui Island Plan		S	NS	N/A
conservation ethic in use of the State's natural resources, and ensure compatibility between land-based activities and natural resources and ecological systems.				
Wildlife and Natural Areas				
Goal				
2.4	Maui's natural areas and indigenous flora and fauna will be protected.			
Objective				
2.4.1	A comprehensive management strategy that includes further identification, protection, and restoration of indigenous wildlife habitats.			
Policies				
2.4.1.a	Identify and inventory the following: (1) Natural, recreational, and open space resources; (2) Flora and fauna with medium, high, and very high concentrations of threatened or endangered species; and (3) Location and extent of invasive species.	**X**		
2.4.1.b	Require flora and fauna assessment and protection plans for development in areas with concentrations of indigenous flora and fauna; development shall comply with the assessment and protection plan and shall use the avoidance, minimization, and mitigation approach respectively, with an emphasis on avoidance.	**X**		
2.4.1.c	Support the implementation of Hawai'i's Comprehensive Wildlife Conservation Strategy (October 2005).			**X**
Discussion: The Proposed Action will support Objective 2.4.1 of the Maui Island Plan. SWCA ~~Environmental Consultants~~ was contracted to assess the Proposed Action and the potential impacts on the terrestrial flora and fauna resources, including the potential for the presence of state or federally listed threatened, endangered, proposed, or candidate species or rare species. In summary, the impacts would be minimal from what they have been over the past century. The EMI staff will be trained by qualified individuals on appropriate conduct and measures to take within the License Area during future maintenance work. This will encourage the protection of the rare and endangered plant and animal species and habitats native to Hawai'i that have been identified in the region. The EMI Aqueduct System will be maintained in a way that is compatible with the existing environment and natural resources in the region. The Proposed Action and the issuance of a Water Lease will also include a requirement that a watershed management plan ~~Watershed Management Plan~~ be developed and implemented for East Maui as discussed in Section 2.1. In addition, EMI was a founding member of the EMWP and continues to be an active member.				
Objective				
2.4.2	A decrease in invasive species through programs and partnerships that eradicate undesirable species and protect native habitat.			
Policies				
2.4.2.a	Prevent the introduction of invasive species at all of Maui's airports and harbors.			**X**
2.4.2.b	Encourage the State to increase funding in support of invasive species interception, control, and eradication.			**X**
2.4.2.c	Encourage the State to develop programs that allow students to participate in invasive species eradication projects.			**X**
Discussion: The Proposed Action will not affect Objective 2.4.2 of the Maui Island Plan.				
Objective				
2.4.3	Greater protection of sensitive lands, indigenous habitat, and native flora and fauna.			
Policies				
2.4.3.a	Secure an interconnected network of sensitive lands, greenways, watercourses, and habitats.			**X**
2.4.3.b	Protect Maui's sensitive lands.			**X**
2.4.3.c	Promote innovative environmental-planning methods and site-planning standards that preserve and re-establish indigenous flora and fauna habitat, to preserve and restore connected habitat corridors and open space.	**X**		

Table 5-10: Maui Island Plan		S	NS	N/A
2.4.3.d	Utilize protection tools such as conservation easements, land trusts, land banks, Purchase of Developments Rights, Transfer of Development Rights, and other stewardship tools to acquire natural areas.			X
2.4.3.e	Encourage discussions with communities to designate heritage areas that protect recreational and cultural lifestyles and resources.			X
2.4.3.f	Support the expansion of Haleakalā National Park, and the creation of new national parks, where appropriate and supported by local communities.			X
2.4.3.g	Encourage reforestation efforts that increase native species' habitat.	X		
2.4.3.h	Utilize the Natural Area Partnership Program (NAPP) and other programs to protect natural lands.			X
2.4.3.i	Support increased dedicated funding for the acquisition, protection, restoration, or preservation of important natural areas or open space through the following: grants from the Land and Water Conservation Fund; dedicated funding from real property taxes or other appropriate revenues; bond issues; real estate transfer tax; revenues from the Transient Accommodations Tax; development mitigation fees; and other appropriate funding sources.			X
Discussion: The Proposed Action will support Objective 2.4.3 of the Maui Island Plan. The CWRM D&O was purposefully designed to increase the practical knowledge of stream flows and native habitat restoration. The CWRM D&O establishes a quantity of water that must remain in each stream. Each stream a part of the contested case in East Maui was evaluated individually for their potential for usage, habitat restoration, recreational opportunities, and scenic values. The CWRM D&O ensures the prudent use of the surface water resources in the License Area with the issuance of the Water Lease. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action is not contrary to the CWRM D&O, and will exercise a conservation ethic in use of the State's natural resources, and ensure compatibility between land-based activities and natural resources and ecological systems.				
Scenic Resources				
Goal				
2.5	Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents' quality of life, attract visitors, provide a connection to the past, and promote a sense of place.			
Objective				
2.5.1	A greater level of protection for scenic resources.			
Policies				
2.5.1.a	Protect views to include, but not be limited to, Haleakalā, 'Īao Valley, the Mauna Kahalawai (West Maui Mountains), Pu'u Ō'la'i, Kaho'olawe, Molokini, Moloka'i, and Lāna'i, Mauna Kea, Mauna Loa, sea stacks, the Pacific Ocean, and significant water features, ridgelines, and landforms.			X
2.5.1.b	Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.			X
2.5.1.c	Protect "night sky" resources by encouraging the implementation of ambient light ordinances and encouraging conversion of all sources that create excessive light pollution, affecting our ability to view the stars.			X
2.5.1.d	Protect ridgelines from development where practicable to facilitate the protection of public views.			X
2.5.1.e	Protect scenic resources along Maui's scenic roadway corridors.			X
Discussion: The Proposed Action will support Objective 2.5.1 of the Maui Island Plan. Irrigating the fields in Central Maui, a region with very little natural rainfall, would maintain existing open space and preserve existing vistas, as the land will be in cultivated green space rather than remaining fallow or being developed.				
Objective				
2.5.2	Reduce impacts of development projects and public-utility improvements on scenic resources			
Policies				

Table 5-10: Maui Island Plan		S	NS	N/A
2.5.2.a	Enforce the policies and guidelines of the SMA regarding the protection of views.			X
2.5.2.b	Require any new subdivision of land, development, or redevelopment adjacent to a "high" or "exceptional" scenic corridor to submit an impact assessment of the project's scenic impacts; this assessment shall use the avoidance, minimization, and mitigation steps respectively, with an emphasis on avoidance.			X
2.5.2.c	Require appropriate building setbacks and limits on wall heights to protect views along scenic corridors.			X
2.5.2.d	Encourage the State of Hawai'i Board of Land and Natural Resources to deny any development within the State Conservation District that interferes with a scenic landscape or disrupts important open space resources.			X
2.5.2.e	Require Urban Design and Review Board (UDRB) review and approval of utility poles, facilities, and other visible infrastructure improvements along scenic corridors.			X
2.5.2.f	Ensure little or no effect on scenic resources from utility improvements, primarily power poles.			X
2.5.2.g	Protect scenic vistas from intrusion by power poles.			X
Discussion: The Proposed Action will not affect Objective 2.5.2 of the Maui Island Plan.				
Objective				
2.5.3	Greater protection of and access to scenic vistas, access points, and scenic lookout points.			
Policies				
2.5.3.a	Protect, enhance, and acquire access to Maui's scenic vistas and resources.	X		
Discussion: The Proposed Action will support Objective 2.5.3 of the Maui Island Plan. No new development within the SMA or the Conservation District is proposed as part of the Proposed Action. Irrigating the fields in Central Maui, a region with very little natural rainfall, would maintain existing open space and preserve existing vistas, as the land will be in cultivated green space rather than remaining fallow or being developed.				
Natural Hazards				
Goal				
3.1	Maui will be disaster resilient.			
Objective				
3.1.1	Increased inter-agency coordination			
Policies				
3.1.1.a	Reinforce the island's preparedness capacity by: (1) Applying the latest data-gathering techniques/technology; (2) Pursuing funding opportunities; (3) Improving monitoring and advance warning systems; (4) Fostering public awareness; and (5) Working with external agencies to coordinate disaster mitigation and response.			X
Discussion: The Proposed Action will not affect Objective 3.1.1 of the Maui Island Plan.				
Objective				
3.1.2	Greater protection of life and property.			
Policies				
3.1.2.a	Identify critical infrastructure, lifelines, roads, and populations that are vulnerable to coastal hazards, and encourage strategic retreat and relocation to safer areas.			X
3.1.2.b	Consider the location of dams, reservoirs, holding ponds, and other water-containing entities that are upstream of inhabited areas to anticipate, avoid, and mitigate inundation risks, and discourage new development in areas where possible inundation hazards may exist.			X
3.1.2.c	Strengthen current development standards to minimize destruction of land and property.			X
3.1.2.d	Encourage the use of construction techniques that reduce the potential for damage from natural hazards.			X

Table 5-10: Maui Island Plan		S	NS	N/A
3.1.2.e	Increase the County's resilience to drought.	X		
3.1.2.f	Increase food and energy security through local production and storage.	X		
Discussion: The Proposed Action will support Objective 3.1.2 of the Maui Island Plan. The Water Lease will allow for the continued transition of approximately 30,000 acres of former sugarcane ~~sugar cane~~ land in Central Maui to diversified agriculture. The proposed diversified agriculture operation will aid in achieving the State's goal of doubling local food production to reduce dependence on oversea sources. The Upcountry Maui Water System relies on 80-90% of its water from three surface water treatment plants, which makes the system extremely vulnerable to droughts and presents a challenge to the MDWS. For decades, the Upcountry region has experienced voluntary and mandatory water use restrictions imposed on residential and agricultural users during droughts, primarily during dry season, often negatively impacting the productivity of the farmers. One of the three surface water sources is delivered by the EMI Aqueduct System through the Wailoa Ditch, which is treated at the Kamole-Weir WTP ~~Water Treatment Plant~~. The average daily use by the MDWS from the Wailoa Ditch has been 7.1 mgd, which includes water for the Kamole facility, averaging 3.6 mgd and the KAP. This accounts for a major portion of the water supplied to the Upcountry Maui Water System. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community. The Nāhiku community receives water directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System via a development tunnel in the Koolau Ditch~~. ~~The tunnel draws up 20,000 to 45,000 gallons per day, dependent on weather, directly from the EMI Aqueduct System~~. EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). The water serves about 43 water meters located along Nāhiku Road. One meter is classified as an agricultural use while all the others are classified as single-family use. Without the issuance of the Water Lease under the Proposed Action, the EMI Aqueduct System would only be able to divert water derived from privately owned lands (approximately 30% of water in License Area) plus the 4.37 mgd from the privately owned lands between Honopou Stream and Māliko Gulch, resulting in a vast reduction of water available for agricultural uses in Central Maui and thereby ~~may be left in an inoperable state,~~ leaving Upcountry Maui~~, and the Nāhiku community~~ without a reliable source of water.				
Objective				
3.1.3	A more coordinated emergency response system that includes clearly defined and mapped evacuation routes.			
Policies				
3.1.3.a	Identify and expand shelter facilities and evacuation routes away from areas susceptible to natural hazards.			X
Discussion: The Proposed Action will not affect Objective 3.1.3 of the Maui Island Plan.				
Objective				
3.1.4	A more educated and involved public that is aware of and prepared for natural hazards			
Policies				
3.1.4.a	Promote public education and involvement related to natural hazards awareness and preparedness.			X
3.1.4.b	Coordinate a multi-agency effort to establish and promote a comprehensive public education program that will focus on practical approaches to preparedness, damage prevention, and hazard mitigation.			X
Discussion: The Proposed Action will not affect Objective 3.1.4 of the Maui Island Plan.				
Economic Development				
Goal				
4.1	Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.			
Objective				

Table 5-10: Maui Island Plan		S	NS	N/A
4.1.1	A more diversified economy			
Policies				
4.1.1.a	Encourage an economy that is driven by innovation, research and development, and human resource development, including but not limited to, increasing technology- and knowledge-based sectors to be a major component in Maui County's economic base.			X
4.1.1.b	Support the creation of new jobs and industries that provide a living wage.	X		
4.1.1.c	Facilitate and expedite permits and approvals			X
4.1.1.d	Develop linkages and partnerships among international research and development activities and Maui businesses.			X
Discussion: The Proposed Action will support Objective 4.1.1 of the Maui Island Plan. The issuance of the Water Lease will allow for the conversion of the agricultural fields in Central Maui to a diversified agricultural operation. The continued reopening ~~Reopening~~ up the agricultural fields for cultivation would increase employment directly and indirectly for the island of Maui and the State. It is projected that approximately 1,140 jobs would be created from implementation of the Proposed Action at full operation.				
Objective				
4.1.2	Increase activities that support principles of sustainability			
Policies				
4.1.2.a	Support industries that are sustainable, and culturally and environmentally sensitive.	X		
4.1.2.b	Encourage and support local businesses.	X		
4.1.2.c	Substitute imports with locally-produced services and products where practicable.	X		
4.1.2.d	Support the development of economic development clusters in targeted industry sectors.			X
4.1.2.e	Encourage all businesses to save energy, water, and other resources.	X		
Discussion: The Proposed Action will support Objective 4.1.2 of the Maui Island Plan. The Water Lease under the Proposed Action will allow for the continued transition of approximately 30,000 acres of former sugarcane ~~sugar cane~~ land in Central Maui to diversified agriculture. The proposed diversified agriculture operation will aid in achieving the State's goal of doubling local food production to reduce dependence on oversea sources. In the process of doing so, Mahi Pono's operations can offer opportunities for numerous secondary economic benefits—offering entrepreneurship and small-business owners opportunities for value-added agricultural products whether in retail or food establishments, welcoming innovative methods and approaches for the cultivation of agricultural products, expanding markets for Hawai'i-grown products, providing construction activity for needed facilities, setting the foundation for agricultural cooperatives for farmers, providing jobs directly and indirectly for all segments of Hawai'i's population, especially on a neighbor island where employment opportunities can be limited. Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services. Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is implementing ~~designing~~ ~~a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.				

Table 5-10: Maui Island Plan		S	NS	N/A
Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Mahi Pono is also committing land to the production of solar energy for its own use and the public utility system.				
Objective				
4.1.3	Improve the island's business climate.			
Policies				
4.1.3.a	Upgrade, maintain the quality of, and improve access to telecommunications infrastructure.			X
4.1.3.b	Ensure an adequate supply of affordable workforce housing.			X
4.1.3.c	Develop neighborhoods and communities that are attractive to the workforce of a diversified economy.			X
4.1.3.d	Encourage, nurture, and reward entrepreneurship and innovation.			X
4.1.3.e	Encourage employers to establish incentive programs. Support flexibility in workforce policies compatible with business and quality of life goals.			X
4.1.3.f	Assist community development organizations with revitalization and development of neighborhoods and communities that are attractive to the workforce of a diversified economy.	X		
Discussion: The Proposed Action will support Objective 4.1.3 of the Maui Island Plan. Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services.				
Tourism				
Goal				
4.2	A healthy visitor industry that provides economic well-being with stable and diverse employment opportunities.			
Objective				
4.2.1	Increase the economic contribution of the visitor industry to the island's environmental well-being for the island's residents' quality of life.			
Policies				
4.2.1.a	Engage the visitor industry in the growth of emerging sectors where practicable			X
4.2.1.b	Support the implementation of the Maui County Tourism Strategic Plan (TSP), when consistent with the MIP.			X
4.2.1.c	Focus economic growth in the visitor industry through enhanced visitor experiences and an emphasis on attracting higher-spending.			X
4.2.1.d	Provide a rich visitor experience, while protecting the island's natural beauty, culture, lifestyles, and aloha spirit.			X
4.2.1.e	Diversify the tourism industry by supporting appropriate niche activities such as ecotourism, cultural tourism, voluntourism, ag-tourism, health and wellness tourism, educational tourism, medical tourism, and other viable tourism-related businesses in appropriate locations.			X
4.2.1.f	Recognize the important economic contributions that the visitor industry makes and support a healthy and vibrant visitor industry.			X
4.2.1.g	Support the increased availability of kama'āina discount programs			X
Discussion: The Proposed Action will not affect Objective 4.2.1 of the Maui Island Plan.				
Objective				
4.2.2	Comprehensively manage future visitor-unit expansion.			
Policies				
4.2.2.a	Mitigate the impact of tourism on the host culture, natural environment, and resident lifestyles.			X
4.2.2.b	Allow, where permitted by the community plan, the development of business hotels and small, sensitively-designed inns.			X

Table 5-10: Maui Island Plan		S	NS	N/A
4.2.2.c	Manage impacts from transient vacation rentals, hotels, bed and breakfast units, timeshares, and resort condominiums on residential communities, public infrastructure, and community facilities.			X
4.2.2.d	Discourage supplanting of existing island housing to visitor accommodations that may have a negative impact on long-term rental housing, price of housing, and price of land.			X
4.2.2.e	Allow the designation of retreat/mini-conference centers in appropriate locations through the community plan process.			X
4.2.2.f	Community plans should consider establishing standards such as limits on building size, room count, and the number of inns, if any, that will be allowed in small towns.			X
Discussion: The Proposed Action will not affect Objective 4.2.2 of the Maui Island Plan.				
Objective				
4.2.3	Maximize residents' benefits from the visitor industry.			
Policies				
4.2.3.a	Promote a desirable island population by striving to not exceed an island-wide visitor population of roughly 33 percent of the resident population.			X
4.2.3.b	Use the required General Plan Annual Status Report to monitor trends related to residents and visitors.			X
Discussion: The Proposed Action will not affect Objective 4.2.3 of the Maui Island Plan.				
Agriculture				
Goal				
4.3	Maui will have a diversified agricultural industry contributing to greater economic, food, and energy security and prosperity			
Objective				
4.3.1	Strive for at least 85 percent of locally-consumed fruits and vegetables and 30 percent of all other locally-consumed foods to be grown in-State.			
Policies				
4.3.1.a	Strive to substitute food/agricultural product imports with a reliable supply of locally produced food and agricultural products.	X		
4.3.1.b	Facilitate and support the direct marketing/sale of the island's agricultural products to local consumers, through farmers markets and similar venues.			X
4.3.1.c	Encourage growing a diverse variety of crops and livestock to ensure the stewardship of our land while safeguarding consumer safety.	X		
4.3.1.d	Work with the State to regulate and monitor genetically-modified-organism (GMO) crops to ensure the safety of all crops and label all GMO products.			X

Discussion: The Proposed Action will support Objective 4.3.1 of the Maui Island Plan.

"If agriculture on Maui is to be economically viable, the State and County will need to ensure that farmers have access to sufficient supplies of affordable water." "For agriculture to flourish in Central Maui, reliable and affordable supplies of water will need to be made available to the region. Without an adequate supply of affordable water, farmers may be reluctant to invest capital in agricultural production" (MIP. 4-18).

The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~. Ultimately, the terms of the Water Lease will determine whether and the extent to which the water will be affordable to farmers. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation.

Moreover, the diversified agriculture operation will aid in achieving the goal of increasing the percentage of locally-

Table 5-10: Maui Island Plan		S	NS	N/A
consumed fruits, vegetables and other foods being grown in-State. In the event of a major catastrophe, limiting overseas supplies, this diversified agriculture initiative could help supply the State with food, and substitute imports with a reliable supply of locally produced food and agricultural products. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP. Presently, the MDWS serves the KAP with non-potable water from diversions of the same streams that serve the Kamole-Weir WTP ~~Water Treatment Plant~~ through the Hamakua Ditch, an extension of the Wailoa Ditch. KAP currently consists of 31 farm lots, ranging in size from ~~7~~ 10 to 30 ~~29~~ acres, for a total of approximately 445 acres, supporting 26 farmers, and is planned to expand by 262 acres. Issuance of the Water Lease would ensure that KAP, and the planned expansion, have a reliable source of water to meet its water demands.				
Objective				
4.3.2	Maintain or increase agriculture's share of the total island economy.			
Policies				
4.3.2.a	Encourage the export of the island's agricultural products to offshore markets.	X		
4.3.2.b	Support infrastructure investments at harbors, such as ferry service, airports, and other facilities for the rapid and cost-effective export of island-grown products.			X
4.3.2.c	Encourage the continued viability of sugar cane production, or other agricultural crops, in central Maui and all of Maui Island.	X		
4.3.2.d	Work with the State to reduce excise taxes for commercial agricultural products produced within the State.			X
4.3.2.e	Coordinate with appropriate State and Federal Departments and agencies, private shipping companies, and farmers associations to assist in the rapid and cost-effective export of Maui's agricultural products to off-island markets.			X
Discussion: The Proposed Action will support Objective 4.3.2 of the Maui Island Plan. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. Mahi Pono's agricultural products will be sold within the state and exported to other markets elsewhere. ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. At full implementation the Mahi Pono farm plan is projected to generate more than 338 million pounds per year of crops, generating $155.9 million per year in annual food sales and $329.5 million per year in combined direct and indirect sales. Pastures will support some 7,300 cow-and-calf animal units, producing over 4,300 calves per year and together with crop sales will result in total farm sales of about $160.7 million per year. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation.				
Objective				
4.3.3	Expand diversified agriculture production at an average annual rate of 4 percent			
Policies				
4.3.3.a	Promote the development of locally-grown and ecologically-sound biofuels, aquaculture, and forest products.			X
4.3.3.b	Support the development of farming associations/cooperatives.	X		
4.3.3.c	Work with educational institutions and appropriate agencies to provide education and training for farm owners and entrepreneurs.	X		
Discussion: The Proposed Action will support Objective 4.3.3 of the Maui Island Plan. The Mahi Pono farm plan under the Proposed Action would put 30,000 acres in Central Maui into diversified agricultural uses over the course of 10 years. Mahi Pono intends to provide plots for research and offer an				

Table 5-10: Maui Island Plan		S	NS	N/A
internship program for high school and college students. Mahi Pono also intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services, thus supporting entrepreneurship by residents and assisting small scale producers, manufacturers, and distributors. Additionally, Mahi Pono intends to lease some of its property to other agricultural organizations.				
Emerging Sectors				
Goal				
4.4	A diverse array of emerging economic sectors.			
Objective				
4.4.1	Support increased investment and expanded activity in emerging industries.			
Policies				
4.4.1.a	Support the development of and access to state-of-the-art voice, video, and data telecommunications systems and high-speed Internet.			X
4.4.1.b	Attract and assist industries to compete in high technology activities such as those related to renewable energy, green technologies, diversified agriculture, ocean sciences, health sciences, space technologies, and other knowledge-based industries.	X		
4.4.1.c	Support new industries that are environmentally and culturally sensitive such as health and wellness, sports and outdoor activities, cultural activities, the arts, film-making, entertainment, and digital media.			X
4.4.1.d	Support a sustainable, culturally sensitive, astronomy industry.			X
4.4.1.e	Support the continued development of the Maui Research and Technology Park in Kihei, as a center for research and development, education, and diversified economic development, as provided by the Maui County Code.			X
4.4.1.f	Work with appropriate organizations to support the development of high technology clusters around renewable energy, diversified agriculture, ocean sciences, health sciences, and other knowledge-based industries			X
Discussion: The Proposed Action will support Objective 4.4.1 of the Maui Island Plan. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops. ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation. Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing ~~designing a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with adequate water to accommodate present and future needs. Additionally, Mahi Pono is committing land to the production of solar energy for its own use and the public utility system. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure.				
Objective				
4.4.2	Increase the development of renewable energy technologies that are supported by the local community.			

Table 5-10: Maui Island Plan		S	NS	N/A
Policies				
4.4.2.a	Support the expansion of the renewable energy sector and the use of solar, wind, wave, and biofuel technologies.	X		
4.4.2.b	Provide incentives to encourage renewable energy development, the use of green energy technologies, and energy conservation.			X
4.4.2.c	Ensure an adequate supply of land and facilitate permitting to meet the needs for renewable energy technologies such as solar, wind, wave, biofuel, and other technologies, provided that environmental, view plane, and cultural impacts are addressed.			X
4.4.2.d	Support the Maui County Energy Alliance Plan where consistent with the MIP.			X
Discussion: The Proposed Action will support Objective 4.4.2 of the Maui Island Plan. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Mahi Pono is also committing land to the production of solar energy for the public utility system.				
Small Business Development				
Goal				
4.5	Small businesses will play a key role in Maui's economy			
Objective				
4.5.1	Increase the number of and revenue generated by small businesses and decrease the percentage of small business failures.			
Policies				
4.5.1.a	Provide incentives and support for small businesses and entrepreneurs that incorporate sustainable technologies and practices into their operations, utilize local materials, or produce and sell locally-made goods or services.	X		
4.5.1.b	Assist traditional "mom and pop" business establishments.			X
4.5.1.c	Reduce barriers to small business development			X
4.5.1.d	Require, where feasible, the government procurement of goods and services from locally owned, small businesses			X
4.5.1.e	Support community markets and venues that sell locally-made produce, goods, and services.			X
Discussion: Mahi Pono intends to offer approximately 800 acres of various sized community farm blocks in Central Maui to local farmers. Farmers also would have access to Mahi Pono's equipment, management, budgeting and marketing services. Mahi Pono is committing land to the production of solar energy for its own use and the public utility system.				
Health Care Sector				
Goal				
4.6	Maui will have a health care industry and options that broaden career opportunities that are reliable, efficient, and provide social well-being.			
Objective				
4.6.1	Expand the economic benefits of the health care sector.			
Policies				
4.6.1.a	Encourage expanded services at Maui Memorial Medical Center (MMMC) and at other medical facilities.			X
4.6.1.b	Support expansion of federally qualified health centers with the direct involvement of the residents of the communities served.			X
4.6.1.c	Support the use of multimedia as a means to provide healthcare information.			X
4.6.1.d	Encourage digitalization of all diagnostic equipment at all facilities on Maui to enable sharing of data and more efficient use of limited provider workforce, consistent with data protection and patient privacy.			X
4.6.1.e	Support the expansion of telemedicine.			X
4.6.1.f	Encourage expansion and improved access to emergency care in all communities.			X
Discussion: The Proposed Action will not affect Objective 4.6.1 of the Maui Island Plan.				

Table 5-10: Maui Island Plan		S	NS	N/A
Objective				
4.6.2	Be more efficient in the delivery of health care services and in minimizing health care costs.			
Policies				
4.6.2.a	Support expansion of health care providers and facilities to improve access to quality care throughout the island.			X
4.6.2.b	Encourage the expansion of veteran health care services.			X
4.6.2.c	Allow home-based out-patient medical care that does not interfere with surrounding neighborhoods.			X
Discussion: The Proposed Action will not affect Objective 4.6.2 of the Maui Island Plan.				
Objective				
4.6.3	Expand Maui's alternative health care services, including spiritual practices.			
Policies				
4.6.3.a	Support efforts to promote alternative medicine.			X
4.6.3.b	Allow small-scale home-alternative medicine businesses such as massage, chiropractic care, traditional Hawaiian healing, and acupuncture that do not interfere with surrounding neighborhoods.			X
Discussion: The Proposed Action will not affect Objective 4.6.3 of the Maui Island Plan.				
Education and Workforce Development				
Goal				
4.7	Maui will have effective education and workforce development programs and initiatives that are aligned with economic development goals.			
Objective				
4.7.1	Improve preschool and K-12 education to allow our youth to develop the skills needed to successfully navigate the 21st century.			
Policies				
4.7.1.a	Encourage the State to implement programs such as: (1) Universally available preschool for children between the ages of one and five; (2) Mandatory kindergarten; (3) Mandatory K-5th grade classroom size limits of 1 teacher to 20 students; (4) Mandatory nutrition programs; and (5) Mandatory Native Hawaiian programs at all grade levels.			X
4.7.1.b	Encourage the DOE to extend the school day by at least an hour.			X
4.7.1.c	Encourage the State to increase funding for public education so that Hawai'i is among the top 10 states nationally as measured by investment per pupil.			X
4.7.1.d	Encourage the State to ensure teacher certifications relate to effective delivery and improved student performances, and develop an industry experience/equivalency certification to assure our DOE students have access to career technical education and training.			X
4.7.1.e	Encourage the University of Hawai'i Maui College (UHMC) to provide dormitory space for high school students.			X
4.7.1.f	Encourage the development and implementation of curriculum on native Hawaiian history, culture, and practices, in consultation with native Hawaiian groups and associations.			X
Discussion: The Proposed Action will not affect Objective 4.7.1 of the Maui Island Plan.				
Objective				
4.7.2	Encourage an increase in the number of certificate recipients and associate, bachelors, and graduate degrees conferred.			
Policies				
4.7.2.a	Encourage the State to increase the number of articulation agreements between the UHMC and four-year universities, particularly the University of Hawai'i at Mānoa.			X

Table 5-10: Maui Island Plan		S	NS	N/A
4.7.2.b	Encourage the State to expand accredited 2-year, 4-year, and graduate programs through the UHMC.			X
4.7.2.c	Encourage the education and training of our residents to meet the needs of a diversified economy.	X		
4.7.2.d	Support education and training programs such as student internships, vocational training, and career development opportunities to ensure a highly skilled workforce.	X		
4.7.2.e	Work with educational institutions to improve and expand access to education and training through multiple modes, including distance learning.	X		
Discussion: The Proposed Action will support Objective 4.7.2 of the Maui Island Plan. Mahi Pono also intends to provide agricultural plots for research and offer an internship program for high school and college students.				
Objective				
4.7.3	Strive to ensure that more of Maui's jobs are developed in STEM (science, technology, engineering, and mathematics)-related sectors by 2030.			
Policies				
4.7.3.a	Support the development of STEM-related certificates and degrees at the two- and four year levels			X
4.7.3.b	Support the education initiatives of the Maui Agricultural Development Plan.			X
4.7.3.c	Expand and seek funding for internships, mentoring, job shadowing, etc. to foster interest in health and green workforce careers.			X
4.7.3.d	Work with Maui Economic Development Board, Inc., UHMC, and other similar organizations to expand internship/education programs to support STEM careers.			X
4.7.3.e	Continue to partner with the Maui Economic Development Board, Inc. and other similar organizations to recruit, assist, and retain emerging industries, research and development activities, and educational/workforce opportunities.			X
Discussion: The Proposed Action will not affect Objective 4.7.3 of the Maui Island Plan.				
Housing				
Goal				
5.1	Maui will have safe, decent, appropriate, and affordable housing for all residents developed in a way that contributes to strong neighborhoods and a thriving island community.			
Objective				
5.1.1	More livable communities that provide for a mix of housing types, land uses, income levels, and age.			
Policies				
5.1.1.a	Promote livable communities (compact/walkable/bikeable, access to transit) that provide for a mix of housing types and land uses, including parks, open space, and recreational areas.			X
5.1.1.b	Promote planning approaches that provide a mix of multifamily and single-family housing units to expand housing choices.			X
5.1.1.c	Discourage gated communities			X
5.1.1.d	Provide incentives for the rehabilitation or adaptive reuse of historic structures to facilitate more housing choices.			X
5.1.1.e	Use planning and regulatory approaches to provide higher housing densities.			X
Discussion: The Proposed Action will not affect Objective 5.1.1 of the Maui Island Plan.				
Objective				
5.1.2	Better monitoring, evaluation, and refinement of affordable housing policy in conjunction with the economic cycle.			
Policies				
5.1.2.a	Improve data on resident and nonresident housing.			X
5.1.2.b	Utilize the following approaches to promote resident housing and to minimize offshore market impacts:			X

Table 5-10: Maui Island Plan		S	NS	N/A
	(1) Ensure that the future housing stock is composed of a mix of housing types (multifamily, small lots, ohana units, co-housing, cottage houses, etc.); (2) Encourage new housing in proximity to jobs and services, in places that are conducive/affordable to island residents; and (3) Explore taxation alternatives and building fee structures.			
Discussion: The Proposed Action will not affect Objective 5.1.2 of the Maui Island Plan.				
Objective				
5.1.3	Provide affordable housing, rental or in fee, to the broad spectrum of our island community			
Policies				
5.1.3.a	Consider regulations that can help keep affordable housing available at affordable rents.			X
5.1.3.b	Seek to have ownership of affordable for-sale and rental housing vested in a non-profit community land trust, or other qualified housing provider, committed to keeping such housing affordable in perpetuity.			X
5.1.3.c	Facilitate the use of public lands in urban areas that are suitable for affordable housing.			X
5.1.3.d	Develop or support partnerships and initiatives that provide housing-related education/outreach.			X
5.1.3.e	Support the continuing efforts of the County and its community partners to: (1) Disseminate information on different housing/financial assistance programs (loans, grants, etc.) including information on housing rehabilitation/restoration/adaptive reuse; (2) Provide housing-related counseling including budget, credit, and financial planning assistance; and (3) Create and maintain a comprehensive/master list of available affordable housing to help residents secure a unit that satisfies their need.			X
Discussion: The Proposed Action will not affect Objective 5.1.3 of the Maui Island Plan.				
Objective				
5.1.4	Provide infrastructure in a more timely manner to support the development of affordable housing.			
Policies				
5.1.4.a	Prioritize the development of infrastructure that supports the development of affordable housing.			X
5.1.4.b	Utilize appropriate financing approaches and assistance tools to encourage the development of infrastructure and public facilities.			X
5.1.4.c	Tailor infrastructure requirements to correspond with appropriate level-of-service standards to help control housing costs and to maintain safety			X
Discussion: The Proposed Action will not affect Objective 5.1.4 of the Maui Island Plan.				
Objective				
5.1.5	A wider range of affordable housing options and programs for those with special needs.			
Policies				
5.1.5.a	Ensure that residents with special needs have access to appropriate housing.			X
5.1.5.b	Encourage housing to be built or rehabilitated to allow the elderly and those with special needs to live in their homes.			X
5.1.5.c	Ensure and facilitate programs to assist those with special needs from becoming homeless.			X
5.1.5.d	Promote programs that stimulate the production of sustainable homeless shelters and alternative housing technologies.			X
5.1.5.e	Support programs that offer home modification counseling on low-interest retrofit loans and grants to those with special needs.			X
Discussion: The Proposed Action will not affect Objective 5.1.5 of the Maui Island Plan.				
Objective				

Table 5-10: Maui Island Plan		S	NS	N/A
5.1.6	Reduce the cost to developers of providing housing that is affordable to families with household incomes 160 percent and below of annual median income.			
Policies				
5.1.6.a	Support fast-track processing procedures for the following housing-related entitlements: affordable housing projects/units; indigenous Hawaiian housing/units; and special-needs housing units (seniors, disabled, homeless, etc.).			X
5.1.6.b	Require the construction of affordable for-sale and rental housing units as part of the construction of new housing developments.			X
5.1.6.c	Offer extra incentives in boom periods and withdraw incentives during slack periods.			X
Discussion: The Proposed Action will not affect Objective 5.1.6 of the Maui Island Plan.				
Objective				
5.1.7	Increased preservation and promotion of indigenous Hawaiian housing and architecture.			
Policies				
5.1.7.a	Preserve, promote, and give priority to Hawaiian housing/architecture forms to preserve Hawaiian culture.			X
5.1.7.b	Provide for indigenous architecture as an allowable structure for native Hawaiian uses to include hula and lā'au lapa'au.			X
Discussion: The Proposed Action will not affect Objective 5.1.7 of the Maui Island Plan.				
Infrastructure and Public Facilities				
Goal				
6.1	Maui will have implemented the Integrated Solid Waste Management Plan thereby diverting waste from its landfills, extending their capacities.			
Objectives				
6.1.1	Meet our future solid waste needs with a more comprehensive planning and management strategy.			
Policies				
6.1.1.a	Update and publicize the Integrated Solid Waste Management Plan every ten years			X
6.1.1.b	Strengthen inter-agency coordination including Planning and Environmental Management departments.			X
6.1.1.c	Divert waste from the landfills and educate the public about the recommendations of the Integrated Solid Waste Management Plan.			X
6.1.1.d	Minimize future active, unlined landfill cells to the extent feasible.			X
Discussion: The Proposed Action will not affect Objective 6.1.1 of the Maui Island Plan.				
Objective				
6.1.2	Divert at least 60 percent of solid waste from the island's landfills.			
Policies				
6.1.2.a	Require residents and commercial enterprises that generate waste to pay a fair proportion of disposal costs.			X
6.1.2.b	Encourage environmentally safe waste-to-energy solutions.			X
6.1.2.c	Facilitate the reduction of solid waste generated by packaging, food service products, construction waste, etc.			X
6.1.2.d	Educate residents and visitors about the impacts of and methods to reduce, reuse, and recycle.			X
6.1.2.e	Discourage the disposal of landfill leachate by diversion to wastewater treatment plants, where practicable.			X
Discussion: The Proposed Action will not affect Objective 6.1.2 of the Maui Island Plan.				
Wastewater				
Goal				
6.2	Maui will have wastewater systems that comply with or exceed State and Federal regulations; meet levels-of-service needs; provide adequate capacity to accommodate projected demand; ensure			

Table 5-10: Maui Island Plan		S	NS	N/A
	efficient, effective, and environmentally sensitive operation; and maximize wastewater reuse where feasible.			
Objective				
6.2.1	A wastewater planning program capable of efficiently providing timely and adequate capacity to service projected demand where economically feasible and practicable.			
Policies				
6.2.1.a	Encourage the use of renewable energy in support of wastewater treatment facilities.			X
6.2.1.b	Focus the expansion of wastewater systems to accommodate planned growth consistent with the MIP Directed Growth Strategy.			X
6.2.1.c	Establish new wastewater treatment plant(s) outside the tsunami zone			X
Discussion: The Proposed Action will not affect Objective 6.2.1 of the Maui Island Plan. However, it is noted that under the Proposed Action t is anticipated that all proposed water used in the office and processing facilities associated with the Mahi Pono farm plan (except for restrooms) will be recycled and re-used as part of Mahi Pono's Central Maui Field Irrigation System.				
Objective				
6.2.2	Adequate levels of wastewater service with minimal environmental impacts.			
Policies				
6.2.2.a	Meet or exceed all State and Federal standards regulating wastewater disposal or reuse.			X
6.2.2.b	Encourage tertiary treatment for all municipal wastewater that is disposed through deep injection wells. Phase out all municipal and private injection wells in coordination with water reuse programs, where feasible, by 2020.			X
6.2.2.c	Improve and upgrade the County's existing wastewater collection, treatment, and reuse facilities consistent with current and future plans and the County's CIP.			X
6.2.2.d	Maintain an ongoing sewer inspection program for public and private multi-user systems to identify potential problems and forecast each system's residual life.			X
6.2.2.e	Require all new developments to fund system improvements in proportion to the development impact and in accordance with the County's wastewater functional plan.			X
6.2.2.f	Require appropriate funding mechanisms, such as a sinking fund, to adequately maintain or replace aging water-system components.			X
6.2.2.g	Strongly encourage the phase out of cesspools.			X
Discussion: The Proposed Action will not affect Objective 6.2.2 of the Maui Island Plan. However, it is noted that most workers in the Central Maui agricultural fields use porta potties and this is expected to continue through full impmentation of the Mahi Pono farm plan, as the need and number of porta potties is largely dependent on planting / harvesting schedules.				
Objective				
6.2.3	Increase the reuse of wastewater.			
Policies				
6.2.3.a	Strengthen coordination between the MDWS and Maui County Department of Environmental Management, Wastewater Reclamation Division (WWRD) to promote reuse/recycling of wastewater.			X
6.2.3.b	Expand the reuse of wastewater from the Central Maui, Kīhei, Lāhainā, and other wastewater systems.			X
Discussion: The Proposed Action will not affect Objective 6.2.3 of the Maui Island Plan. However, it is noted that under the Proposed Action t is anticipated that all proposed water used in the office and processing facilities associated with the Mahi Pono farm plan (except for restrooms) will be recycled and re-used as part of Mahi Pono's Central Maui Field Irrigation System.				
Water				
Goal				
6.3	Maui will have an environmentally sustainable, reliable, safe, and efficient water system			
Objective				

Table 5-10: Maui Island Plan		S	NS	N/A
6.3.1	More comprehensive approach to water resources planning to effectively protect, recharge, and manage water resources including watersheds, groundwater, streams, and aquifers.			
Policies				
6.3.1.a	Ensure that MDWS actions reflect its public trust responsibilities toward water.			X
6.3.1.b	Ensure the Water Use Development Plan (WUDP) implements the State Water Code and MIP's goals, objectives, and policies.			X
6.3.1.c	Regularly update the WUDP, to maintain compliance with the General Plan			X
6.3.1.d	Ensure that the County's CIP for water-source development is consistent with the WUDP and the MIP.			X
6.3.1.e	Where desirable, retain and expand public ownership and management of watersheds and fresh-water systems.			X
6.3.1.f	Encourage and improve data exchange and coordination among Federal, State, County, and private land use planning and water resource management agencies.			X
Discussion: The Proposed Action will not affect Objective 6.3.1 of the Maui Island Plan. However, as explained in Section 1.5, the BLNR is requiring preparation of this EIS and it is intended that the data and analysis herein will assist the BLNR to fulfill its Public Trust obligations in the future, after acceptance of this FEIS, when it is deliberating on the proposed Water Lease.				
Objective				
6.3.2	Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.			
Policies				
6.3.2.a	Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.	X		
6.3.2.b	Encourage increased education about and use of private catchment systems where practicable for nonpotable uses			X
6.3.2.c	Maximize the efficient use of reclaimed wastewater to serve nonpotable needs.			X
6.3.2.d	Work with appropriate State and County agencies to achieve a balance in resolving the needs of water users in keeping with the water allocation priorities of the MIP.	X		
6.3.2.e	Ensure water conservation through education, incentives, and regulations			X
6.3.2.f	Acquire and develop additional sources of potable water.			X
Discussion: The Proposed Action will support Objective 6.3.2 of the Maui Island Plan. Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing ~~designing a~~ high-efficiency irrigation systems. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation ensures conservation of Hawai'i's natural resources. The issuance of the Water Lease will allow for the continued conveyance of water from the EMI Aqueduct System to the MDWS, which in turn provides water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community~~. The Upcountry Maui Water System relies on 80-90% of its water from three surface water sources. One of the three surface water sources is delivered by the EMI Aqueduct System through the Wailoa Ditch, which is treated at the Kamole-Weir Water Treatment Plant. The average daily use by the MDWS from the EMI Aqueduct System is 7.1 mgd, which accounts for a major portion of the water supplied to the Upcountry Maui Water System. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community. EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required			

Table 5-10: Maui Island Plan		S	NS	N/A
under the agreement (MDWS, 2007 – 2018). Nāhiku draws water ~~up in between 20,000-45,000 gallons of water daily, dependent upon weather,~~ directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System from the Koʻolau Ditch through a development tunnel~~. Without the issuance of the Water Lease, the EMI Aqueduct System would only be able to divert water derived from privately owned lands (approximately 30% of water in License Area) plus the 4.37 mgd from the privately owned lands between Honopou Stream and Māliko Gulch, resulting in a vast reduction of water available for agricultural uses in Central Maui and thereby ~~may be left in an inoperable state,~~ leaving Upcountry Maui ~~and the Nāhiku community~~ without a reliable source of water.				
Objective				
6.3.3	Improve water quality and the monitoring of public and private water systems.			
Policies				
6.3.3.a	Protect and maintain water delivery systems.	**X**		
Discussion: The Proposed Action will support Objective 6.3.3 of the Maui Island Plan. The issuance of the Water Lease will allow for the continued conveyance of water from the EMI Aqueduct System to the MDWS, which in turn provides water to Upcountry Maui, including KAP and the planned 262-acre KAP expansion~~, as well as the Nāhiku community~~. The agreements with the MDWS provide that the delivery of water to the MDWS is contingent upon the Water Lease being issued. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community, which, through the MDWS, draws water from EMI's land through EMI's West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch. Without the issuance of the Water Lease, the EMI Aqueduct System would only be able to divert water derived from privately owned lands (approximately 30% of water in License Area) plus the 4.37 mgd from the privately owned lands between Honopou Stream and Māliko Gulch, resulting in a vast reduction of water available for agricultural uses in Central Maui and thereby ~~may be left in an inoperable state,~~ leaving Upcountry Maui ~~and the Nāhiku community~~ without a reliable source of water.				
Transportation				
Goal				
6.4	An interconnected, efficient, and well-maintained, multimodal transportation system.			
Objective				
6.4.1	Provide for a more integrated island-wide transportation and land use planning program that reduces congestion and promotes more efficient (transit-friendly) land use patterns.			
Policies				
6.4.1.a	Plan for an integrated multi-modal transportation system comprised of public transit, bicycle, pedestrian, automobile, and other transportation modes.			**X**
6.4.1.b	Refocus transportation investment from the construction of additional roadways only for the automobile to the expansion of a multimodal transportation system.			**X**
6.4.1.c	Encourage the use of "complete streets" design methods.			**X**
6.4.1.d	Encourage employers to implement Transportation Demand Management (TDM) strategies.			**X**
Discussion: The Proposed Action will not affect Objective 6.4.1 of the Maui Island Plan.				
Objective				
6.4.2	Safe, interconnected transit, roadway, bicycle, equestrian, and pedestrian network.			
Policies				
6.4.2.a	Ensure transit-, roadway-, and pedestrian-facilities design and level-of-service standards respect the unique character of our communities			**X**
6.4.2.b	Prioritize transportation improvements list to cost-effectively meet existing and future needs consistent with the MIP.			**X**

Table 5-10: Maui Island Plan		S	NS	N/A
6.4.2.c	Require new development, where appropriate, to integrate sidewalks, pathways, bikeways, and transit infrastructure into new commercial and residential projects while enhancing community character.			X
6.4.2.d	Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.			X
6.4.2.e	Consider identification, acquisition where appropriate, and utilization of abandoned right of-ways for bikeways, pedestrian pathways, and open-space networks.			X
6.4.2.f	Support the implementation of the Central Maui Pedestrian & Bicycle Master Plan (March 2012), when consistent with the MIP.			X
Discussion: The Proposed Action will not affect Objective 6.4.2 of the Maui Island Plan.				
Objective				
6.4.3	An island-wide, multimodal transportation system that respects and enhances the natural environment, scenic views, and each community's character.			
Policies				
6.4.3.a	Ensure that the roadway and transit alignments respect the natural environment and scenic views.			X
6.4.3.b	Ensure that roadways and transit systems in rural areas and small towns enhance community character.			X
6.4.3.c	Design all transit systems to respect visual corridors and Maui's character.			X
Discussion: The Proposed Action will not affect Objective 6.4.3 of the Maui Island Plan.				
Transit				
Goal				
6.5	An island-wide transit system that addresses the needs of residents and visitors and contributes to healthy and livable communities.			
Objective				
6.5.1	An integrated transit system that better serves all mobility needs of Maui's residents and visitors.			
Policies				
6.5.1.a	Maximize access to public transit in town centers, commercial districts, and employment centers.			X
6.5.1.b	Expand regional and inter-regional transit services, where appropriate, in heavily traveled corridors and within communities.			X
6.5.1.c	Increase the frequency of current service, add additional bus routes as demand requires, and transition to nonpolluting transit vehicles, as funding permits.			X
6.5.1.d	Provide adequate transit infrastructure (e.g., bus pullouts, waiting benches and shelters, signs) along existing and future transit right-of-ways.			X
6.5.1.e	Require new development where appropriate, to provide right-of-ways (ROWs) to accommodate transit circulation and support facilities.			X
6.5.1.f	Identify, protect, and preserve, or acquire corridors for future inter-community transit use, including but not limited to, rail and also multimodal use corridors.			X
6.5.1.g	Establish transit corridors by planning for and securing right-of-way when appropriate for alternative modes of transportation (such as rail and water ferry service).			X
6.5.1.h	Pursue improvements and upgrades to the existing transit system consistent with updated MDOT planning studies/transit plans (within the framework of comprehensive island- wide multimodal transportation plans).			X
6.5.1.i	Increase inter-agency coordination between the Department of Planning, State Department of Transportation, County Department of Public Works, and other applicable agencies.			X
Discussion: The Proposed Action will not affect Objective 6.5.1 of the Maui Island Plan.				
Objective				
6.5.2	Plan for a more diversified and stable funding base to support transportation goals.			

Table 5-10: Maui Island Plan		S	NS	N/A
Policies				
6.5.2.a	Support alternative methods and sources of funding transportation improvements (including impact fees, higher taxes, fare adjustments, dedicated sources of funding, and assessments).			X
6.5.2.b	Collaborate with public-private entities or nonprofit organizations to reduce public transit operational expenses.			X
6.5.2.c	Coordinate with appropriate Federal, State, and County agencies to fund transportation projects in areas where growth is anticipated.			X
Discussion: The Proposed Action will not affect Objective 6.5.2 of the Maui Island Plan.				
Parks				
Goal				
6.6	Maui will have a diverse range of active and passive recreational parks, wilderness areas, and other natural-resource areas linked, where feasible, by a network of greenways, bikeways, pathways, and roads that are accessible to all.			
Objective				
6.6.1	More effective, long-range planning of parks and recreation programs able to meet community needs.			
Policies				
6.6.1.a	Support, consistent with the MIP, the implementation of open-space and recreational plans, such as the Pali to Puamana Parkway Master Plan and the Upcountry Greenways Master Plan.			X
6.6.1.b	Utilize the ahupua'a approach by integrating mauka-to-makai natural landscapes into an island-wide parks and recreation functional plan.			X
6.6.1.c	Provide a balanced mix of passive and active parks, including neighborhood, community, and regional parks, in each community plan area.			X
6.6.1.d	Support the expansion of Haleakala National Park, where supported by affected communities.			X
6.6.1.e	Support lo'I and dryland taro restoration in County, State, and Federal parks.			X
6.6.1.f	Encourage private landowners to dedicate land to Federal, State, or County governments, or nonprofit land trusts, for parks and open-space protection consistent with the MIP.			X
6.6.1.g	Strengthen inter-agency coordination including State and County departments, such as resolving joint use of facilities and properties.			X
6.6.1.h	Work with the State to prepare and implement a master management plan for ʻĀhihi- Kīnaʻu and La Perouse-Keoneʻōʻio Bay to Kanaloa Point region.			X
Discussion: The Proposed Action will not affect Objective 6.6.1 of the Maui Island Plan.				
Objective				
6.6.2	Achieve parks and recreation opportunities to meet the diverse needs of our community.			
Policies				
6.6.2.a	Establish appropriate level-of-service standards at the neighborhood, community, and regional levels.			X
6.6.2.b	Identify and acquire parks and recreational facilities that address existing park inadequacies and complement and enhance neighborhoods, communities, and natural- land features.			X
6.6.2.c	Design park facilities to preserve and enhance natural site characteristics, maximize views, protect environmental and cultural sites, and minimize water demands.			X
6.6.2.d	Acquire lands along the shoreline, between coastal roadways and the ocean.			X
6.6.2.e	Encourage the development of regional parks, district parks, and greenways in a manner that helps to contain sprawl, provide separation between distinct communities, or offer open space within urban communities.			X
6.6.2.f	Require large master-planned communities that incorporate a mixture of park facilities pursuant to parks standards and functional plans.			X
6.6.2.g	Support appropriate areas for cultural parks (e.g., Kepaniwai) in each community plan area.			X

Table 5-10: Maui Island Plan		S	NS	N/A
6.6.2.h	Incorporate community input to determine the appropriate location, design, and long-term stewardship of parks and recreation facilities.			X
6.6.2.i	Manage commercial activities at public parks to minimize impacts to residents.			X
6.6.2.j	Support public-private partnerships to implement the acquisition and development of parks when consistent with the General Plan.			X
6.6.2.k	Support a coordinated program to improve, operate, and maintain joint-use facilities and grounds.			X
Discussion: The Proposed Action will not affect Objective 6.6.2 of the Maui Island Plan.				
Objective				
6.6.3	An expanded network of greenways, trails, pathways, and bikeways.			
Policies				
6.6.3.a	Link existing and future park sites, natural areas, the shoreline, and residential areas with a network of bikeways, pedestrian paths, trails, and greenways.			X
6.6.3.b	Support the implementation of plans and programs that facilitate pedestrian mobility and access to active and passive recreation areas and sites.			X
6.6.3.c	Collaborate with the State and private land owners to ensure perpetual access and proper stewardship of traditional trails and access systems.			X
6.6.3.d	Facilitate the development of well-managed noncommercial campgrounds throughout the island.			X
6.6.3.e	Consider requiring commercial bike rental businesses to provide funding that supports a mauka-to-makai Haleakalā bikeway improvement program.			X
6.6.3.f	Ensure ADA compliance and seek opportunities to make all parks and recreational facilities accessible to people with disabilities.			X
Discussion: The Proposed Action will not affect Objective 6.6.3 of the Maui Island Plan.				
Public Facilities				
Goal				
6.7	Maui will have adequate public facilities that meet the diverse needs of residents.			
Objective				
6.7.1	More effective planning for public facilities to meet community needs.			
Policies				
6.7.1.a	Ensure the development and update of island-wide public facilities functional plans that incorporate prioritized facilities, programs, and a financial component.			X
6.7.1.b	Establish appropriate level-of-service standards for public facilities provided by the County.			X
6.7.1.c	Pursue improvements and upgrades of County public facilities consistent with the public facilities functional plan.			X
6.7.1.d	Recognize Wailuku Town as Maui's Civic Center and support the revitalization of the Civic Center District by consolidating government office spaces, enhancing landscape beautification, and providing adequate public parking.			X
6.7.1.e	Support, with community input, the relocation of the Maui Community Correctional Center from Wailuku to an appropriate location in Pu'unēnē.			X
6.7.1.f	Adequately plan and fund public safety facilities (fire, police, ambulance, civil defense) to meet community needs.			X
6.7.1.g	Increase joint facilities utilization and program coordination between State and County agencies such as baseyards, communication centers, recreational facilities, etc., where feasible.			X
6.7.1.h	Focus future expenditures for additional government office space, parking, and related facilities in Wailuku's Civic Center District.			X
6.7.1.i	Encourage continuous and safe walkways for children within one mile of each school.			X
6.7.1.j	Encourage public-private partnerships to identify and resolve public facility plan shortcomings when consistent with the General Plan.			X
6.7.1.k	Incorporate community/area residents' input to determine the appropriate location and design of public facilities.			X

Table 5-10: Maui Island Plan		S	NS	N/A
Discussion: The Proposed Action will not affect Objective 6.7.1 of the Maui Island Plan.				
Schools and Libraries				
Goal				
6.8	Maui will have school and library facilities that meet residents' needs and goals.			
Objective				
6.8.1	Assist in providing appropriate school and library facilities in a timely manner and in strategic locations.			
Policies				
6.8.1.a	Work in partnership with all educational institutions to meet current and future needs including appropriate location, timing, and design of future facilities.			X
6.8.1.b	Allow for the expansion and intensification of uses at the UHMC including satellite campuses operating in remote areas.			X
6.8.1.c	Encourage the DOE to build and maintain smaller, community-oriented schools.			X
6.8.1.d	Encourage better cooperation by the State and County for use of State and County facilities.			X
6.8.1.e	Encourage the State to upgrade, modernize, and expand school facilities, including those in remote communities.			X
6.8.1.f	Work with the State to develop a master plan for the expansion of UHMC in accordance with the MIP.			X
6.8.1.g	Support partnerships (public/private/nonprofit) to build and staff new schools and improve existing facilities.			X
6.8.1.h	Work with the Board of Education Hawai'I State Public Library System to provide centralized library services (including telecommunications) to all areas of Maui.			X
6.8.1.i	Work with the State to expedite planning and construction of Kīhei High School, including the integration of the high school with the Maui Research and Technology Park.			X
6.8.1.j	Work with the State to identify intermediate school sites in Central Maui and other areas where needed.			X
Discussion: The Proposed Action will not affect Objective 6.8.1 of the Maui Island Plan.				
Objective				
6.8.2	Provide a more expansive network of safe and convenient pedestrian-friendly streets, trails, pathways, and bikeways between neighborhoods and schools where appropriate.			
Policies				
6.8.2.a	Encourage the State to build new school facilities in appropriate locations that minimize time and distance for students to travel to and from school.			X
6.8.2.b	Encourage the State to implement the Safe Routes to School initiative with funding commitments to help the County plan and fund projects that ensure safe access routes to school.			X
Discussion: The Proposed Action will not affect Objective 6.8.2 of the Maui Island Plan.				
Healthcare				
Goal				
6.9	All of Maui residents will have the best possible health care to include healthy living, disease prevention, as well as acute and long-term care.			
Objective				
6.9.1	Greater autonomy to the Maui region in their efforts to improve medical care on the island.			
Policies				
6.9.1.a	Encourage the State to give greater autonomy to the Maui region in their efforts to improve medical care on the island.			X
6.9.1.b	Support innovative financial solutions, such as capital partnerships, joint ventures, and consolidations for MMMC and other health institutions.			X
6.9.1.c	Support MMMC as a major core medical center that provides a greater range of services.			X

Table 5-10: Maui Island Plan		S	NS	N/A
6.9.1.d	Support the immediate development of a critical access hospital in West Maui.			X
6.9.1.e	Support the expansion of regional critical-access facilities, where allowed by Federal regulations.			X
6.9.1.f	Improve medical service to remote and outlying regions.			X
6.9.1.g	Support transportation services for dialysis patients and community dialysis programs.			X
6.9.1.h	Work with the State to determine the feasibility of appropriate medical facilities in South Maui and Hāna, including the possible reestablishment of a small community hospital in Hāna, the establishment of a hospital in South Maui, and assist the State in securing funding to meet Maui's health care needs.			X
Discussion: The Proposed Action will not affect Objective 6.9.1 of the Maui Island Plan, but it is noted that the Water Lease will allow for the continued provision of water from EMI to MDWS for the Upcountry Maui Water System, which provides water to the Kula hospital.				
Objective				
6.9.2	An expansion of long-term care facilities and long-term care alternatives to meet the needs of our aging population.			
Policies				
6.9.2.a	Support efforts to increase Maui's long-term care bed capacity to cover current and future needs, close to large population centers.			X
6.9.2.b	Recognize that facilities for low-income elders who need long-term care are a needed form of affordable and subsidized housing.			X
6.9.2.c	Evaluate the needs of the long-term disabled and provide planning support for their care, if there is a need for long-term care facilities.			X
6.9.2.d	Consider long-term care facilities as a major potential employment base and encourage the recruitment and training of potential employees.			X
Discussion: The Proposed Action will not affect Objective 6.9.2 of the Maui Island Plan.				
Objective				
6.9.3	More support to home-care and community-based programs so they become alternatives to traditional nursing homes.			
Policies				
6.9.3.a	Support the establishment of a program to assist the elderly and people with disabilities to remain in their homes or in a home-like setting.			X
6.9.3.b	Support the establishment of senior and adult-day-care centers and senior housing.			X
6.9.3.c	Continue to support existing senior centers (e.g. Kaunoa), and establish new senior centers that will provide day-care sites and programs for the disabled and elderly.			X
6.9.3.d	Support funding alternatives for community-based services that assist home-care efforts.			X
6.9.3.e	Encourage the State to adopt the recommendations contained within the Legislative Reference Bureau's report entitled "Gimme a Break: Respite Care Services in Other States," (December 2007) where appropriate, feasible, and consistent with the MIP.			X
Discussion: The Proposed Action will not affect Objective 6.9.3 of the Maui Island Plan.				
Objective				
6.9.4	Improved preventative medicine and primary health care.			
Policies				
6.9.4.a	Develop and utilize health-status benchmarks to measure prevention and primary health care service delivery.			X
6.9.4.b	Support programs that provide family planning assistance.			X
Discussion: The Proposed Action will not affect Objective 6.9.4 of the Maui Island Plan.				
Energy				

Table 5-10: Maui Island Plan		S	NS	N/A
Goal				
6.10	Maui will meet its energy needs through local sources of clean, renewable energy, and through conservation.			
Objective				
6.10.1	Reduce fossil fuel consumption. Using the 2005 electricity consumption as a baseline, reduce by 15 percent in 2015; 20 percent by 2020; and 30 percent by 2030.			
Policies				
6.10.1.a	Support energy efficient systems, processes, and methods in public and private operations, buildings, and facilities.	X		
6.10.1.b	Support the Maui Solar Rooftop initiative.			X
6.10.1.c	Support Hawai'I Energy and other Public Utility Commission (PUC) approved energy efficiency programs.			X
Discussion: The Proposed Action will support Objective 6.10.1 of the Maui Island Plan. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure, and convert 500 acres of the agricultural lands in Central Maui to energy crops. The company also anticipates the installation of one or more solar farms on ~~a~~ 250 acres ~~solar farm~~ with a combined projected capacity of 37.5 MW /year.				
Objective				
6.10.2	Increase the minimum percentage of electricity obtained from clean, renewable energy sources. By 2015, more than 15 percent of Maui's electricity will be produced from locally-produced, clean, renewable energy sources, 25 percent by 2020, and 40 percent by 2030.			
Policies				
6.10.2.a	Evaluate available renewable energy resource sites and applicable technologies.	X		
6.10.2.b	Encourage the installation of renewable energy systems, where appropriate.	X		
6.10.2.c	Support the establishment of new renewable energy facilities at appropriate locations provided that environmental, view plane, and cultural impacts are addressed.	X		
6.10.2.d	Encourage all new County facilities completed after January 1, 2015, to produce at least 15 percent of their projected electricity needs with onsite renewable energy.			X
Discussion: The Proposed Action will support Objective 6.10.2 of the Maui Island Plan. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Mahi Pono is also committing land to the production of solar energy for its own use and the public utility system.				
Objective				
6.10.3	Increased use of clean, renewable energy.			
Policies				
6.10.3.a	Support efforts in the PUC to upgrade Maui's power grid to integrate renewable energy from multiple sources and wheeling of electricity.			X
6.10.3.b	Encourage the PUC to work with the County to implement and expedite community supported renewable energy projects.			X
6.10.3.c	Encourage efforts to produce more renewable energy using distributed generation.	X		
6.10.3.d	Encourage import substitution by MECO and the broader community to become more self-sufficient in energy production.			X
6.10.3.e	Educate the public on the economic and environmental benefits from the increased use of renewable energy.			X
6.10.3.f	Encourage support from the Federal government, State, and the private sector for Maui's renewable energy objectives.			X
6.10.3.g	Encourage incentives to support the development and use of renewable energy.			X
Discussion: The Proposed Action will support Objective 6.10.3 of the Maui Island Plan.				

Table 5-10: Maui Island Plan		S	NS	N/A
Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Mahi Pono is also committing land to the production of solar energy for its own use and the public utility system.				
Harbor and Airports				
Goal				
6.11	Maui will have harbors and airports that will efficiently, dependably, and safely facilitate the movement of passengers and cargo.			
Objective				
6.11.1	Upgraded harbor facilities to handle larger volumes of freight and passengers and additional small boat harbors.			
Policies				
6.11.1.a	Support the expansion and upgrade of Kahului Harbor through the following, provided that any expansion is respectful of cultural practices and existing recreational uses and supports improved water quality: 1. (1) Accommodate increasing volumes of cargo; 2. (2) Provide deeper pier depths and greater fuel-receiving and storing capacities; and 3. (3) Ensure safe and efficient work areas, including separating passenger operations from fuel and cargo operations.			X
6.11.1.b	Work with public and private entities to provide adequate pier slips, utilities, repair facilities, and waste-disposal capabilities.			X
6.11.1.c	Encourage the State to safely separate passenger (cruise and ferry) operations from hazardous bulk fuels and heavy cargo transporting operations, while not decreasing harbor's capacity to safely support various recreational uses.			X
6.11.1.d	Encourage the State to develop cargo inspecting sites and facilities for efficient cargo and container processing and transportation and to prevent alien species entry.			X
6.11.1.e	Support a State and County task force to study the feasibility of a second commercial harbor on Maui.			X
Discussion: The Proposed Action will not affect Objective 6.11.1 of the Maui Island Plan.				
Objective				
6.11.2	Establish more economically thriving and environmentally sensitive small boat harbors accommodating resident and business activity, including fishing, recreation, and tour boats			
Policies				
6.11.2.a	Provide for needed shore-side facilities and capabilities to support small boat harbor users (e.g. repair facilities, parking, cold storage, and mass-transit connections).			X
Discussion: The Proposed Action will not affect Objective 6.11.2 of the Maui Island Plan.				
Objective				
6.11.3	Upgraded airport facilities and navigation aids to serve the needs of passengers, freight movements, and general aviation.			
Policies				
6.11.3.a	Protect the island's airports from encroaching urbanization that may negatively impact the airport operations.			X
6.11.3.b	Support State efforts to improve Kahului Airport operations to better serve passenger and cargo needs.			X
6.11.3.c	Support State efforts to identify sites and plan to relocate and accommodate small and rotary wing aircraft.			X
6.11.3.d	Encourage the State to improve airport safety including lighting, fuel transmission, fuel safety, etc.			X
6.11.3.e	Consider expansion of rental car facilities in West and South Maui.			X
6.11.3.f	Consider expansion of mass transit (bus, fixed-rail, shuttle, and taxis, bicycle, and pedestrian facilities) to and from Kahului Airport and not limited to passenger movements (allowing for luggage and cargo).			X

Table 5-10: Maui Island Plan		S	NS	N/A
6.11.3.g	Encourage the State to maintain airport capacity and to encourage more responsive air services to Hāna and Kapalua.			X
Discussion: The Proposed Action will not affect Objective 6.11.3 of the Maui Island Plan.				
Land Use				
Goal				
7.1	Maui will have a prosperous agricultural industry and will protect agricultural lands.			
Objective				
7.1.1	Significantly reduce the loss of productive agricultural lands.			
Policies				
7.1.1.a	Allow, where appropriate, the clustering of development on agricultural lands when approved as a Conservation Subdivision Design plan or similar approval mechanism.			X
7.1.1.b	Require, where appropriate, the review and approval of Conservation Subdivision Design plans prior to the subdivision of agricultural land.			X
7.1.1.c	Discourage developing or subdividing productive agricultural lands for residential uses in which the residence would be the primary use and any agricultural activities would be secondary uses.	X		
7.1.1.d	Consider requirements for public notification and review of the subdivision of agricultural land into four or more lots.			X
7.1.1.e	Focus urban growth, to the extent practicable, away from productive and important agricultural lands.	X		
7.1.1.f	Strongly discourage the conversion of productive and important agricultural lands (such as sugar, pineapple, and other produce lands) to rural or urban use, unless justified during the General Plan update, or when other overriding factors are present.	X		
7.1.1.g	Further develop the requirements for agricultural assessments found under Section 19.510, Maui County Code (MCC).			X
7.1.1.h	Provide incentives for landowners to preserve and protect agricultural lands from development through the use of Transfer of Development Rights /Purchase of Development Rights, tax credits, easement programs, or similar means.			X
7.1.1.i	Promote the use of U.S.D.A. Farm and Ranch Lands Protection Program grants to fund the acquisition of conservation easements on eligible agricultural lands.			X
7.1.1.j	Require all major developments adjacent to agricultural lands to provide an appropriate and site-specific agricultural protection buffer as part of a required site plan.			X
7.1.1.k	Support and promote the viability of Maui's agricultural businesses through property tax incentives and other programs and subsidies.			X
7.1.1.l	Encourage future community plan efforts to identify lands within the County Agricultural zoning district that are primarily being used for large-lot residential or rural use and consider such lands for reclassification to an appropriate County Rural zone.			X

Discussion: The Proposed Action will support Objective 7.1.1 of the Maui Island Plan.

"Agriculture creates a diversity of jobs, generates tax revenues, and produces a variety of crops for different local and export markets. While agriculture ranks behind tourism and retail business in terms of market value, its contributions to the economy are significant. In 2007, the total value of crop sales in Maui County approached $139 million and the agricultural industry provided 1,700 jobs. Agriculture also benefits Maui's tourism industry by providing green landscapes and enhancing the island's sense of place" (MIP, 7-3).

The Proposed Action will allow for the continued conveyance of water to supply the agricultural fields in Central Maui to support a diversified agriculture farming model. ~~Currently, the fields are mostly fallow and not being utilized to their full potential~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, or be issued with insufficient water, the agricultural fields may need to be left in a fallow state for a prolonged period of time, and agricultural activities may be unfeasible in Central Maui. Mahi Pono, under

Table 5-10: Maui Island Plan		S	NS	N/A
the No Action Alternative, however, plans to farm a portion of the agricultural fields. For more detail please refer to Chapter 3.				
Objective				
7.1.2	Reduction of the island's dependence on off-island agricultural products and expansion of export capacity.			
Policies				
7.1.2.a	Coordinate with the agricultural community, associations/community groups, agricultural landowners, and the State to designate IALs.			X
7.1.2.b	Support an incentive package for productive Agricultural Lands which aims to ensure agricultural viability for small- and commercial-scale agricultural producers.			X
7.1.2.c	Actively look to acquire land and provide infrastructure to expand the agricultural park and establish new agricultural parks.	X		
7.1.2.d	Support the designation of a research and development area within agricultural parks to help farmers stay attuned to new technology and research.			X
7.1.2.e	Support local cooperative extension services to facilitate timely technology transfer opportunities.			X
7.1.2.f	Support plans and programs to develop additional sources of water for irrigation purposes.			X
7.1.2.g	Consider appropriate subdivision requirements (gravel roads, above-ground utilities, etc.) in those subdivisions creating Agricultural Parks where lots are limited to agricultural production with no dwellings.			X
7.1.2.h	Support the recommendations, policies, and actions contained within the Maui Agricultural Development Plan, July 2009, when consistent with the MIP.			X
7.1.2.i	Allow water and tax discounts for legitimate farming operations on rural and agricultural land.			X
7.1.2.j	Give priority in delivery and use of agricultural water and agricultural land within County agricultural parks to cultivation of food crops for local consumption.	X		
7.1.2.k	Support programs that control pests and diseases that affect agriculture.			X
7.1.2.l	Support the development of training and apprenticeship programs to encourage an adequate supply of agricultural workers.	X		

Discussion: The Proposed Action will support Objective 7.1.2 of the Maui Island Plan.

Much of the approximately 30,000 acres of farmlands in Central Maui were designated as IAL by the LUC under a voluntary petition filed by A&B. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion to diversified agriculture on those IAL lands. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and green energy crops.

The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP, and the planned 262-acre KAP expansion. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan, as well as make sound investments, for growth as there are insufficient alternative water sources and infrastructure to meet present and future demands currently.

While not supporting new sources of irrigation water, and notwithstanding the beneficial effects of the system losses on groundwater recharge,Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is implementing ~~designing a~~ high-efficiency irrigation system. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

Table 5-10: Maui Island Plan		S	NS	N/A
Mahi Pono also intends to provide plots for research and offer an internship program for high school and college students, which supports the development and training of agricultural workers.				
Objective				
7.1.3	Support and facilitate connectivity between communities.			
Policies				
7.1.3.a	Evaluate the impact of gated communities on interconnectivity.			X
7.1.3.b	Discourage land use and urban design that impedes interconnectivity between adjacent communities.			X
Discussion: The Proposed Action will not affect Objective 7.1.3 of the Maui Island Plan.				
Rural Areas				
Goal				
7.2	Maui will have a rural landscape and lifestyle where natural systems, cultural resources and farm lands are protected and development enhances and compliments the viability and character of rural communities.			
Objective				
7.2.1	Reduce the proliferation and impact of residential development outside of urban, small town, and rural growth boundaries.			
Policies				
7.2.1.a	Focus development to areas inside urban, small town, and rural growth boundaries to preserve natural, cultural, and agricultural resources.			X
7.2.1.b	Encourage cluster development with a mandatory buffer requirement/clear edge at the interface of country towns, agricultural uses, and surrounding rural landscapes.			X
7.2.1.c	Encourage or require, where appropriate, Conservation Subdivision Designs and the use of green spaces/natural separations to protect the character of rural landscapes.			X
7.2.1.d	Encourage basic goods/services in business country towns.			X
7.2.1.e	Allow for mixed uses, including residential uses, within Business Country Town Districts.			X
7.2.1.f	Encourage the use of alternative stormwater management techniques that minimize land disturbance and preserve natural drainage features.			X
7.2.1.g	Encourage green belts, open space buffers, and riparian zones to minimize conflicts between agriculture and residential uses.			X
7.2.1.h	Evaluate the impact of gated communities on inter-connectivity.			X
Discussion: The Proposed Action will not affect Objective 7.2.1 of the Maui Island Plan.				
Objective				
7.2.2	More appropriate service/infrastructure standards to enhance and protect the island's rural character and natural systems.			
Policies				
7.2.2.a	Minimize impermeable surfaces within rural areas.			X
7.2.2.b	Protect and support the character, economic viability, and historic integrity of Maui's small towns.			X
7.2.2.c	Use infrastructure, public service, and design standards that are appropriate to rural areas.			X
7.2.2.d	Discourage land use and urban design that impede interconnectivity between adjacent communities.			X
Discussion: The Proposed Action will not affect Objective 7.2.2 of the Maui Island Plan.				
Urban Areas				
Goal				
7.3	Maui will have livable human-scale urban communities, an efficient and sustainable land use pattern, and sufficient housing and services for Maui residents.			

Table 5-10: Maui Island Plan		S	NS	N/A
Objective				
7.3.1	Facilitate and support a more compact, efficient, human-scale urban development pattern.			
Policies				
7.3.1.a	Ensure higher-density compact urban communities, infill, and redevelopment of underutilized urban lots within Urban Growth Boundaries.			X
7.3.1.b	Maintain a distinct separation between communities, such as but not limited to, Wailuku and Waikapū; Wailuku and Waihe'e; Pukalani and Makawao; Pukalani and Kula; Makawao and Hāli'imaile; Lahaina and Kā'anapali; Kīhei and Mā'alaea; and Mā'alaea and Waikapū, to protect the character and identity of Maui's communities.			X
7.3.1.c	Strengthen evaluation requirements for new urban expansion, new towns, and major urban infill projects within urban growth areas. Tailor submittal requirements to reflect the impact or scale of different projects.			X
7.3.1.d	Ensure future amendments to urban growth boundaries achieve the following: (1) provide a beneficial extension of the existing community; (2) are in areas where it is cost- effective to provide and operate infrastructure/public service facilities; and (3) do not promote automobile-oriented land use patterns.			X
7.3.1.e	Evaluate the impact of gated communities on inter-connectivity.			X
7.3.1.f	Encourage the development and implementation of neighborhood design standards that are environmentally friendly, such as Leadership in Energy and Environmental Design for Neighborhood Development standards.			X
7.3.1.g	Discourage future pyramid zoning within the industrial zoning districts, while allowing accessory commercial uses and grandfathering existing uses.			X
7.3.1.h	Promote agriculture by encouraging community gardening, community-supported agricultural programs, and farmers markets within and adjacent to urban areas.			X
7.3.1.i	Discourage land use and urban design that impedes inter-connectivity between adjacent communities.			X
Discussion: The Proposed Action will not affect Objective 7.3.1 of the Maui Island Plan.				
Objective				
7.3.2	**Facilitate more self-sufficient and sustainable communities.**			
Policies				
7.3.2.a	When developing new communities, provide sufficient lands for commercial, appropriate industrial, educational, spiritual, and non-profit uses to serve the daily needs of community residents.			X
7.3.2.b	Site community facilities such as schools, parks, libraries, and community centers within walking and biking distance of residences.			X
7.3.2.c	Facilitate self-sufficient communities and shorten commutes by: 1. Directing residential development to job-rich areas; 2. Allowing for appropriate commercial development and community services to shorten commutes; and 3. Allowing home occupations or home-based businesses that are compatible with surrounding neighborhoods and lifestyles.			X
7.3.2.d	Ensure, where appropriate, that affordable employee housing and multi-modal transportation opportunities are located near major employment centers.			X
7.3.2.e	Discourage the establishment of bedroom communities where long commutes are required to employment centers.			X
7.3.2.f	Facilitate the development of housing by focusing projects in locations where land and infrastructure costs facilitate the development of affordably-priced housing.			X
7.3.2.g	Provide incentives to facilitate the development of multifamily housing.			X
7.3.2.h	Encourage the placement of rental housing projects in the same areas as for-sale housing to facilitate mixed-income communities.			X
7.3.2.i	Develop communities that provide sufficient parks, schools, libraries, and other essential public facilities and services to serve resident needs.			X

Table 5-10: Maui Island Plan		S	NS	N/A
7.3.2.j	Promote agriculture by encouraging community gardening, edible landscaping, community-supported agricultural programs, and farmers markets within and adjacent to urban areas.			X
Discussion: The Proposed Action will not affect Objective 7.3.2 of the Maui Island Plan.				
Objective				
7.3.3	**Strengthen the island's sense of place.**			
Policies				
7.3.3.a	Protect and enhance the unique architectural and landscape characteristics of each community.			X
7.3.3.b	Encourage Hawaiian architecture and tropical building designs.			X
7.3.3.c	Support the continued revitalization of historic country towns, Wailuku Town, and Kahului's commercial core and harbor-front without displacing traditional, cultural, recreational and customary uses.			X
7.3.3.d	Strongly encourage the preservation of buildings, structures, and sites of historic significance.	X		
7.3.3.e	Require community input through Design Workshops for major new urban expansion, new towns, and major urban infill projects.			X
7.3.3.f	Require design enhancement, landscaping, and integration of park and rides, bicycle parking areas, and mass-transit infrastructure to mitigate the effect of parking lots and structured parking on the urban landscape.			X
7.3.3.g	Ensure that safe and attractive public spaces (e.g., plazas, parks, town/village squares) are provided throughout the island's urban areas.			X
Discussion: The Proposed Action will support Objective 7.3.3 of the Maui Island Plan. Implementation of the CWRM D&O may require modification or complete removal of specific diversion in the EMI Aqueduct System. Mason Architects prepared a Historic Structure Assessment report for the subject Water Lease. The main purpose of this study was to determine the historical significance of the EMI Aqueduct System. It was determined that the system is eligible to be place on the NRHP under National Register Criterion A, for its role in supporting the development of the sugar industry on Maui, and Criterion C, as an extensive engineering design that exemplifies the characteristics, technology, and pattern of features common to irrigation ditch systems in Hawai'i. The removal of the sluice gates create an "effect, with agreed upon mitigation commitments" determination. The effect is minimal, as they do not drastically alter the overall physical appearance of the historic EMI Aqueduct System. The proposed mitigation is to document the sluice gates with photos and location sketch plans conforming to the HAER standards where sluice gates are to be removed or altered. Many of the sluice gates are unique to a particular stream, and documentation will ensure that nothing is lost over time. One of the objectives of the Proposed Action is to continue the operation and maintain the EMI Aqueduct System. Issuance of the Water Lease will ensure that the EMI Aqueduct System continues to operate. Should the Water Lease not be issued, the EMI Aqueduct System may be abandoned if it is deemed unfeasible to operate, at which point the EMI Aqueduct System may fall into disrepair.				
Objective				
7.3.4	Strengthen planning and management for the visitor industry to protect resident quality of life and enhance the visitor experience.			
Policies				
7.3.4.a	Discourage the conversion of hotel units to timeshares and fractional ownership.			X
7.3.4.b	Monitor and manage the amount of, and impacts from, timeshares and fractional ownership.			X
7.3.4.c	Manage short-term rentals and bed-and-breakfast homes through a permitting and regulatory process in accordance with adopted ordinances and community plan policies.			X
7.3.4.d	Limit large-scale resort development to the four existing resort destination areas of Wailea, Mākena, Kapalua and Kā'anapali. "Large Scale Resort" is defined as complexes that include multiple accommodation facilities, activity businesses, retail complexes, and other amenities.			X

Table 5-10: Maui Island Plan		S	NS	N/A
Discussion: The Proposed Action will not affect Objective 7.3.4 of the Maui Island Plan.				
Objective				
7.3.5	Ensure that Maui's planning and development review process becomes more transparent, efficient, and innovative.			
Policies				
7.3.5.a	Encourage greater community involvement in land use planning and decision making.			X
7.3.5.b	Establish a predictable and timely development review process that facilitates the approval of projects that meet planning and regulatory requirements.			X
7.3.5.c	Increase inter-agency coordination between the Department of Planning and all State and County agencies responsible for infrastructure and public facilities provision, particularly as it relates to the mitigation of long-term cumulative impacts resulting from development projects.			X
7.3.5.d	Provide greater certainty and transparency in the development review process.			X
7.3.5.e	Expand and maintain land use and geographic information system databases for improved decisions, and make data and products available to the public.			X
Discussion: The Proposed Action will not affect Objective 7.3.5 of the Maui Island Plan.				
Directed Growth				
Goal				
8.1	Maui will have well-serviced, complete, and vibrant urban communities and traditional small towns through sound planning and clearly defined development expectations.			
Policies				
8.1.a	The County, with public input, will be responsible for designating new growth areas where infrastructure and public facilities will be provided, consistent with the policies of the MIP and in accordance with State and County infrastructure plans.			X
8.1.b	Amendments to a Urban Growth Boundary (UGB) or Small Town Boundary (STB) shall be reviewed as a MIP amendment. A UGB or STB shall only be expanded if the island-wide inventory (maintained by the Department of Planning) of existing land uses (residential, commercial, industrial) indicates that additional urban density land is necessary to provide for the needs of the projected population growth within ten years of that inventory; or, during the decennial update of the MIP.			X
8.1.c	Community plans shall provide for urban density land use designations only within UGBs and Small Towns. The County may only support and approve State Urban Land Use Designations for areas within UGBs, STBs, and Rural Villages.			X
8.1.d	The unique character and function of existing small towns shall be protected to retain and preserve their sense of place.			X
8.1.e	New development shall be consistent with the UGBs, STBs, and all other applicable policies of the MIP. New urban-density development shall not be allowed outside of a UGB or STB.			X
8.1.f	The County, as a condition of development approval, shall require developers of privately owned infrastructure systems to provide financial insurance (bonding, etc.) for the operation and maintenance of these systems.			X
8.1.g	The County shall implement a zoning program to comprehensively redistrict and rezone lands within UGBs according to updated community plan policies and map designations.			X
8.1.h	The County will seek to focus capital improvements (schools, libraries, roads, and other infrastructure and public facilities) within the UGBs and STBs in accordance with the MIP.			X
8.1.i	The County will promote (through incentives, financial participation, expedited project review, infrastructure/public facilities support, etc.) appropriate urban infill, redevelopment and the efficient use of buildable land within UGBs to avoid the need to expand the UGBs.			X

Table 5-10: Maui Island Plan		S	NS	N/A
8.1.j	The MIP's UGBs and STBs shall not be construed or implemented to prohibit the construction of a single-family dwelling on any existing parcel where otherwise permitted by law.			X
Discussion: The Proposed Action will not affect Goal 8.1 of the Maui Island Plan.				
Goal				
8.2	Maui will maintain opportunities for agriculture and rural communities through sound planning and clearly defined development expectations.			
Policies				
8.2.a	Amendments to a RGB shall be reviewed as an MIP amendment. A RGB shall only be expanded if an island-wide inventory of existing land uses (residential, commercial, industrial) indicates that additional lands are necessary to provide for the needs of the projected population growth within ten years of that inventory; or, during the decennial update of the MIP.			X
8.2.b	New development shall be consistent with RGB and all other applicable policies and requirements of the MIP. Public, quasi-public, civic, and limited commercial or industrial uses may be allowed in the RGB when the proposed uses demonstrate a public need and are consistent with the Community Plan and zoning.			X
8.2.c	Environmental protection and compatibility will be a top priority in rural growth areas.			X
8.2.d	All development within rural growth areas should avoid encroachment upon prime agricultural land.			X
8.2.e	Rural growth areas include Rural Residential Areas and Rural Villages. Rural residential areas may be designated when they are located in association with or on the border of urban growth areas or Small Towns; and/or when they provide for complete, self- sufficient rural communities with a range of uses to be developed at densities that do not require urban infrastructure.			X
8.2.f	Community plans shall provide for rural density land use designations only within RGBs; provided that limited community plan urban designations may be allowed within Rural Villages. New rural growth areas shall not be located where urban expansion may ultimately become necessary or desirable. New rural-density development shall not be allowed outside of a RGB.			X
8.2.g	New rural growth areas intended to be complete, self-sufficient rural communities must be located a significant distance from existing urban areas, distinctly separated by agricultural or open lands.			X
8.2.h	Urban-scale infrastructure and public facilities shall not be provided in rural areas except as described in the defined Level-of-Service (LOS) standards. There should be no expectations of urban services in rural areas.			X
8.2.i	Urban development standards shall not be required within RGBs except in fulfillment of Federal law.			X
8.2.j	The unique character and function of existing small towns and rural communities shall be protected to retain and preserve their sense of place.			X
8.2.k	Preserve rural landscapes in which natural systems, cultural resources, and agricultural lands are protected and development compliments rural character and contributes to the viability of communities and small towns.			X
8.2.l	The MIP's RGBs shall not be construed or implemented to prohibit the construction of a single family dwelling on any existing parcel where otherwise permitted by law.			X
8.2.m	The County shall implement a zoning program to comprehensively redistrict and rezone lands within RGBs, and to implement community plan policies and map designations.			X
8.2.n	At the time of zoning from agricultural to rural, Council will consider prohibiting restrictions on agricultural activity.			X
Discussion: The Proposed Action maintains opportunities for agriculture, consistent with Goal 8.2, but otherwise will not affect Goal 8.2 of the Maui Island Plan.				

5.5 State Of ~~Hawai'I~~ Hawai'i Water Plan

The ~~Hawai'I~~ Hawai'i State Water Code, HRS Chapter 174C, sets forth the following declaration of policy, recognizing that water must be used to maximize the public's interests, and that agricultural uses of water are in the public interest.

(a) It is recognized that the waters of the State are held for the benefit of the citizens of the State. It is declared that the people of the State are beneficiaries and have a right to have the waters protected for their use.

(b) There is a need for a program of comprehensive water resources planning to address the problems of supply and conservation of water. The ~~Hawai'I~~ Hawai'i Water Plan ~~water plan~~, with such future amendments, supplements, and additions as may be necessary, is accepted as the guide for developing and implementing this policy.

(c) The state water code shall be liberally interpreted to obtain maximum beneficial use of the waters of the State for purposes such as domestic uses, aquaculture uses, irrigation and other agricultural uses, power development, and commercial and industrial uses. However, adequate provision shall be made for the protection of traditional and customary Hawaiian rights, the protection and procreation of fish and wildlife, the maintenance of proper ecological balance and scenic beauty, and the preservation and enhancement of waters of the State for municipal uses, public recreation, public water supply, agriculture, and navigation. Such objectives are declared to be in the public interest.

(d) The State Water Code ~~state water code~~ shall be liberally interpreted to protect and improve the quality of waters of the State and to provide that no substance be discharged into such waters without first receiving the necessary treatment or other corrective action. The people of Hawai'i have a substantial interest in the prevention, abatement, and control of both new and existing water pollution and in the maintenance of high standards of water quality.

(e) The State Water Code ~~state water code~~ shall be liberally interpreted and applied in a manner which conforms with intentions and plans of the counties in terms of land use planning.

As noted in section (b), the Water Code requires the preparation of the Hawai'i Water Plan, which consists of five components: (i) water resources protection plan, which is prepared by the CWRM; (ii) water quality plan, which is prepared by the DOH ~~Department of Health~~, (iii) State water projects plan, which is prepared by the DLNR Engineering Division; (iv) agricultural water use and development plan, which is prepared by the DOA ~~Department of Agriculture~~; and (v) the County water use and development plans, prepared by each of the four Counties.

5.5.1 Agricultural Water Use and Development Plan

The State Agricultural Water Use and Development Plan must include a master irrigation inventory plan that: (i) inventories public and private irrigation water systems; (ii) identifies the extent of rehabilitation needed for each system; (iii) identifies sources of water used by agricultural operations and particularly those on lands identified and designated as IAL under part III of ~~chapter~~ Chapter 205, HRS; (iv) identifies current and future water needs for agricultural operations

and particularly those on lands identified and designated as IAL; (v) subsidizes the cost of repair and maintenance of the systems; (vi) establishes criteria to prioritize the rehabilitation of the systems; (vii) develops a five-year program to repair the systems; and (viii) sets up a long-range plan to manage the systems.

The current Agricultural Water Use and Development Plan was prepared by the Department of Agriculture in December 2003 and revised in December 2004. The plan was conceived to ensure that the plantation irrigation systems affected by plantation closures would be rehabilitated and maintained for agricultural use. The plan evaluates the irrigations systems deemed to be important and viable to Hawai'i's growing diversified agricultural industry and existing monocrop industry. The plan provides an assessment for the EMI Aqueduct System, which states, "For this report, no assessment of the needs and concerns were conducted due to time constraints and limited funds. No proposed improvements are included for the same reason. Future studies will be directed toward a detailed evaluation of this system."

5.4.4 Draft Maui Island Water Use & Development Plan (March 2019, Updated July 2020)

Under HRS ~~§~~ §174C-31, island-level water use and development plans must be consistent with the respective County ~~county~~ land use plans and policies including general plan and zoning as determined by each respective County ~~county~~, as well as with the State Land Use classification and policies. Each County ~~county~~ water use and development plan shall include but not be limited to: (i) status of water and related land development, including an inventory of existing water uses for domestic, municipal, and industrial users, agriculture, particularly agriculture on lands designated as IAL, aquaculture, hydropower development, drainage, reuse, reclamation, recharge, and resulting problems and constraints; (ii) future land uses and related water needs; and (iii) regional plans for water developments, including recommended and alternative plans, costs, adequacy of plans, and relationship to the water resource protection and water quality plans. Currently the Maui Island Water Use and Development Plan is in draft form. The update was approved by the Board of Water Supply in January 2019 and submitted to the Maui County Council in March 2019 for adoption by ordinance. The Draft Maui Island Water Use and Development Plan was then updated in July 2020.

The Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020) provides a 20-year blueprint for all uses of water in the county. The Draft Maui Island Water Use and Development Plan is limited to the island of Maui and does not encompass Lāna'i or Moloka'i. The primary objective of the Draft Maui Island Water Use and Development Plan is to provide guidelines for the management and use of the island's water resources. This will help ensure the future water needs of all water users are met while preserving the integrity of the County's water resources. The Draft Maui Island Water Use and Development Plan coordinates water use with land use policies set by the Maui Island Plan and the State of Hawai'i. The Draft Maui Island Water Use and Development Plan is a resource-focused plan, rather than an infrastructure plan. The Draft Maui Island Water Use and Development Plan inventories existing water resources, sources and uses; discusses existing and future land uses and related water needs over a 20-year timeframe, discusses resource impacts of adopted plans, existing and future land uses, and related water needs; considers multiple forecasts and scenarios; and sets forth a program with the objective to meet all water needs. It must be drafted with credible public involvement.

The Draft Maui Island Water Use and Development Plan includes six regional plans (Wailuku Aquifer Sector Area, Central Aquifer Sector Area, Ko'olau Aquifer Sector Area, Hāna Aquifer

Sector Area, Kahikinui Aquifer Sector Area, Lahaina Aquifer Sector Area) based on Aquifer Sectors as hydrologic units. Area specific issues are addressed in each regional Aquifer Sector. The Proposed Action involves both the Koʻolau and Central Aquifer Sectors. The License Area and Upcountry Maui are located within the Koʻolau Aquifer Sector. The agricultural fields in Central Maui are located within the Central Aquifer Sector. Below is a discussion of the Proposed Action's consistency with the relevant Draft Maui Island Water Use and Development Plan Aquifer Sectors.

Table 5-11: Koʻolau Aquifer Sector Area Strategies		S	NS	N/A
Resource Management				
1	Seek dedicated, long term and broad based core funding for maintaining and expanding watershed protection areas and providing for watershed maintenance in East Maui and Hana watersheds for habitat protection and water security. The annual EMWP budget varies but have been in the range of $800,000-$1,000,000, with funding from Federal, State, County and private sources	X		
Planning Objectives: • Maintain sustainable resources • Protect water resources • Protect and restore streams				
2	Support and promote community grassroots initiatives to collaborate with state and land owner partnerships to increase participation in natural resource management and to ensure adequate access and opportunities for traditional uses of the region's natural resources. Use established moku process to consult on resource management.	X		
Planning Objectives: • Maintain sustainable resources • Protect water resources • Protect and restore streams				
3	Support collaborative hydrogeological studies to inform impact from climate change and future well development on groundwater health for Haʻikū and Honopou aquifers.			X
Planning Objectives: • Maintain sustainable resources • Protect water resources • Protect and restore streams				
4	Convene sector-based drought workshops to assist stakeholders in developing or improving their individual drought/water conservation plans. Focus in the Koʻolau sector should be on catchment systems and contingency supply to supplement or substitute catchment when necessary.			X
Planning Objectives: • Provide adequate volume of water supply • Maximize reliability of water service				
Discussion: The Proposed Action will support the Koʻolau Aquifer Sector Area Strategies related to resource management. The Proposed Action will include a requirement that that the lessee participate in watershed management for East Maui as discussed in Section 2.1. The Water Lease under the Proposed Action will be in compliance with the CWRM D&O, which ordered stream restoration to protect and restore stream resources.				

Table 5-12: Central Aquifer Sector Area Strategies		S	NS	N/A
Resource Management				
1	Explore funding and conduct a cost benefit analysis of improvements to the EMI non-potable conveyance system to mitigate losses and preserve existing reservoirs at risk of decommissioning. Priority components and associated costs TBD.	X		

Planning Objectives: • Maintain sustainable resources • Protect water resources • Protect and restore streams • Maximize efficiency of water use				
Discussion: The Proposed Action will support the resource management strategies and planning objectives identified in the Central Aquifer Sector Area under the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020). Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing ~~designing a~~ high-efficiency irrigation system. ~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with adequate water to accommodate present and future needs. Moreover, it should be noted that, although the Central Maui Field Irrigation System ~~EMI Aqueduct System~~ has historically contributed to groundwater recharge through ~~attributed to~~ approximately 22.7% of system losses ~~on the Central Maui side of the EMI Aqueduct System~~, this loss provides a significant amount of recharge to the Central Maui aquifers. System losses includes water used in Central Maui for reservoirs, fire protection, dust control and hydroelectric uses.				
Conventional Water Source Strategies				
2	Assess alternative options to restructure and process the existing Upcountry Meter Priority List to improve processing rate and adequate source development.			**X**
Planning Objectives: • Provide adequate volume of water supply • Maximize reliability of water service				
3	Explore new basal well development in the Makawao aquifer to accommodate growth Upcountry and add reliable new source. Potential yield is up to 3 mgd.			**X**
Planning Objectives: • Provide adequate volume of water supply • Maximize reliability of water service • Minimize adverse environmental impacts				
4	Explore East Maui well development in combination with Makawao aquifer basal groundwater to meet projected demand on the MDWS Upcountry System. Initiate a hydrologic study to determine any negative impact on existing ground and surface water sources, stream flow and influences from dikes. Potential yield is > 6 mgd.			**X**
Planning Objectives: • Provide adequate volume of water supply • Maximize reliability of water service • Minimize adverse environmental impacts				
5	Explore Pā'ia aquifer for non-potable demand, and potable use with additional treatment as necessary to serve projects included in the Maui Island Plan that cannot feasibly be serviced by MDWS source and infrastructure. Estimated demand for the Maui High School Campus is about 0.75 mgd.			**X**
Planning Objectives: • Provide adequate volume of water supply • Maximize reliability of water service				
6	Execute a long term source agreement for use and maintenance of the Wailoa Ditch that ensures adequate non-potable supply for the Kula Agricultural Park expansion and potable supply for projected MDWS Upcountry System needs over the planning period.	**X**		
Planning Objectives:				

• Provide adequate volume of water supply • Maximize reliability of water service				
7	Pursue hydrologic studies needed to explore the Haʻikū aquifer and an updated ditch flow analysis to optimize raw water storage and treatment plant capacity at Kamole Weir in order to expedite the most feasible new source. Surface water strategies are contingent on a long term agreement with A&B Properties allocating adequate surface water for the MDWS Upcountry System.			**X**
Planning Objectives: • Minimize cost of water supply • Provide adequate volume of water supply • Maximize reliability of water service • Maintain consistency with General and Community Plans				
Discussion: The Proposed Action will support the conventional water source strategies and planning objectives identified in the Central Aquifer Sector Area under the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020). The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan, as well as make sound investments, for growth as there are insufficient alternative water sources and infrastructure to meet present and future demands currently.				
Alternative Water Source Strategies				
8	Consider alternative sources of irrigation water including wastewater reuse, recycled stormwater runoff, and brackish well water in land use permitting to mitigate low flow stream conditions. Require alternative sources for irrigation when reasonably available in county discretionary land use permitting.	**X**		
Planning Objectives: • Maintain sustainable resources • Protect and restore streams • Minimize adverse environmental impacts • Maximize efficiency of water use • Maintain consistency with General and Community Plans				
9	Expand distribution from the Kahului WWTF and the application for planned energy crops. Potential available recycled water is 4.2 mgd.			**X**
Planning Objectives: • Maximize efficiency of water use • Maintain consistency with General and Community Plans				
10	MDWS and MDEM collaborate to identify private-public partnerships, state and federal funding sources to maximize utilization of recycled water produced at the Kihei WWTF and supplemental non-potable sources for seasonal use of R-1 water.			**X**
Planning Objectives: • Maximize efficiency of water use • Maintain consistency with General and Community Plans				
Discussion: The Proposed Action will support the alternative water source strategies and planning objectives identified in the Central Aquifer Sector Area under the Draft Maui Island Water Use and Development Plan (March 2019, Updated July 2020). Notwithstanding the beneficial effects of the system losses on groundwater recharge, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is implementing ~~designing a~~ high-efficiency irrigation systems.				

~~The~~ These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation assures the availability of agriculturally suitable lands with adequate water to accommodate present and future needs. An analysis of the use of recycled water from Kahului WWRF for the purposes of supplementing or replacing the water to be obtained from the Water Lease was undertaken and is described in Section 3.1.1.2 (Reclaimed Water). As it relates to the Proposed Action, the use of recycled waters from the Kahului WWRF continues to be dismissed from consideration as a reasonable alternative to the Proposed Action.

5.6 Maui County Zoning

The Maui County Zoning Administration and Enforcement Division administers the enforcement of State and County land use laws, codes, regulations and the general and community plans. The Zoning Administration and Enforcement serves as primary departmental advisory and information branch regarding the interpretation and application of codes, ordinances, decision and orders, and other matters of enforcement.

East Maui

The entire License Area is situated in the Maui County's "Interim" zoning designation. Areas below the License Area, such as the Nāhiku community, are situated within the AG-Agriculture zoning designation. The Proposed Action is consistent with the County zoning regulations.

Upcountry Maui

Majority of Upcountry Maui is situated in the County's AG-Agriculture zoning designation. Other zoning designations within Upcountry Maui are residential, business, rural, urban reserve, project district, park, public, and interim zones. The Proposed Action is consistent with the County zoning ~~Zoning~~ regulations.

Central Maui

The majority of the approximate 30,000-acre Central Maui agricultural fields are situated in Maui County's AG-Agriculture zoning designation. The transition of the agricultural fields to a diversified agricultural operation is consistent with the county zoning regulations.

5.7 Maui Island Community Plans

5.7.1 Hāna Community Plan (1994)

The Hāna Community Plan is one of nine (9) community plans for the County of Maui. The plan reflects current and anticipated conditions in the Hāna ~~Hana~~ region, and advances the community's planning goals, objectives, policies, and implementation to guide the future of the region. The Hāna ~~Hana~~ region encompasses approximately 145,000 acres in the eastern portion of the island of Maui. The boundary of the region, from its northern shoreline at Makaiwa Bay, runs mauka along 'O'opuola and Waikamoi Streams, then along the boundaries of Haleakala National Park and the Kahiknui Forest Reserve and finally makai along the boundary between Auahi and Kanaio to Kanaloa Point on the southern shoreline of the region. This region encompasses portions of the License Area, as well as the communities of Nāhiku and Ke'anae. Table 5-13 below, is a discussion of the relevant objectives and policies of the Hāna Community Plan that relate to the Proposed Action.

Table 5-13: Hāna Community Plan	S	NS	N/A
Land Use			
Goal An efficient distribution of urban, rural, and agricultural land uses in order to provide for the social and economic well-being of residents in the Hāna Community Plan region. Preservation and enhancement of the current land use patterns which establish and enrich the Hāna Community Plan region's unique and diverse qualities			
Objectives and Policies			
1. Preserve existing mauka open space vistas throughout the State Agricultural and Conservation Districts and existing coastal open space vistas by discouraging linear development along the highways traversing the Hāna District.			X
2. Encourage single-family and multi-family land use designations which provide affordable housing opportunities for the region's residents in areas compatible with surrounding uses and in proximity to urban infrastructure and services.			X
3. Explore alternative land use and overlay zoning designations that recognize and preserve the unique natural and cultural characteristics of each community within the Hāna region.			X
4. Consider alternative regulatory frameworks to facilitate family residential use of Hawaiian hui and kuleana lands.			X
5. Encourage the availability of agriculturally suitable lands to provide opportunities for small diversified agricultural activities with residential tenancy for farmers.			X
6. Prohibit uses and discourage activities which adversely affect active diversified agricultural endeavors within designated agricultural use areas.			X
7. Discourage developing or subdividing land under agricultural use or agriculturally designated lands for passive agricultural, estate residential uses.			X
8. Discourage urban land uses and Special Use Permits outside of the Hāna Town area except to allow those activities which are essential to the region's economic well-being, which provide essential services for the residents of the Hāna District, or which provide for the essential 14 domestic needs of remote communities such as Ke'anae, Kipahulu and Kaupo. Such activities shall not adversely affect surrounding neighborhoods and shall be supportive of the agricultural activities of the area.			X
9. Discourage transient rental accommodation uses outside of the Hāna urban area.			X
10. Discourage "heavy industrial" uses within the Hāna Community Plan region, except those temporary or on-site activities which are essential for the construction of facilities and infrastructure within the Hāna District.			X
11. Encourage the development of a light industrial area to serve the region's needs.			X
12. Should further land other than that depicted on the Land Use Map be required to accommodate urban growth, limit State Urban District boundary expansion to the State Agricultural and Rural District areas between the current Hāna School and the Hasegawa General Store site in Hāna Town.			X
13. Encourage community-based dialogue regarding proposed land use changes in order to avoid unwarranted conflict.			X
Implementing Actions: 1. Identify and inventory exceptional open space resources and viewsheds. Explore protective management measures such as covenants, easements, and other planning tools 2. Establish zoning standards with varying minimum lot sizes to prevent improper use and reflect different kinds of agricultural activities within the agricultural district. 3. Implement new procedures to provide increased opportunity for community and agency review of agricultural subdivisions. 4. Adopt land use standards and overlay zoning designations that recognize and preserve the unique natural, cultural and land use characteristics of each community within the Hāna region. 5. Conduct an inventory and study of existing non-conforming uses, including vacation rentals, to determine (1) their numbers, (2) geographic distribution, and (3) effects upon the local housing and real estate markets and the local economy, and identity recommendations for resolving non-conforming use issues.			X

Table 5-13: Hāna Community Plan	S	NS	N/A
Discussion: The Proposed Action will not affect the Land Use objectives and policies of the Hāna Community Plan.			
Environment			
Goal Protection and management of Hāna's land, water and ocean resources to ensure that future generations can enjoy the region's exceptional environmental qualities.			
Objectives and Policies			
1. Protect, preserve and increase the Hāna region's natural marine, coastal and inland resources, encouraging comprehensive resource management programs.			X
2. Recognize residents' traditional uses of the region's natural resources which balance environmental protection and self-sufficiency.	X		
3. Manage, protect, and where appropriate, restore areas which have significant indigenous flora and fauna habitat resource value.	X		
4. Discourage water or land development and activities which threaten the biological diversity of the Hāna region and degrade the existing quality of the region's (1) air and noise character, (2) marine, surface and ground water and (3) scenic resources and vistas.	X		
5. Encourage organic farming practices and environmental protective practices in the selection and application of chemical pesticides, herbicides, and fertilizers.			X
6. Encourage resource management programs that maintain and re-establish indigenous and endemic flora and fauna in the Hāna region.	X		
7. Protect, restore and preserve native aquatic habitats and resources within and along all streams within the Hāna District by (1) protecting existing instream flows, and (2) regulating diversions of stream waters	X		
8. Ensure that groundwater and surface water resources are preserved and maintained at capacities and levels to meet the current and future domestic, agricultural, commercial, ecological and traditional cultural demands of each area in the Hāna District.	X		
9. Avoid development of flood prone areas, stream channels and gulches.			X
10. Discourage development of geothermal sources or energy transmission line corridors within environmentally sensitive and archaeologically significant areas in the Hāna Community Plan region.			X
Implementing Actions: 1. In coordination with Native Hawaiian residents and community representatives, prepare watershed management plans and a groundwater and surface water resources monitoring program to protect the district's surface and ground waters, and monitor water levels to meet current and future demands. 2. Establish and maintain an aquatic resources management and monitoring program to ensure the sustainability of the region's ocean resources and protect the ecological integrity of the district's coastal waters and streams. 3. Establish and maintain feral animal control programs, and programs which control invasive alien plant species. 4. Conduct a regional land resources assessment to identify areas suitable for (1) revegetation and reforestation with native plant species, and (2) the re-establishment of indigenous fauna. 5. Establish pro-active conservation programs to ensure the sustainability of the region's indigenous flora and fauna. 6. Establish a program to (1) monitor the selection and application of chemical pesticides, herbicides, and fertilizers, and (2) develop incentives to reduce the dependency on such chemicals. 7. Explore methods to diminish out-of-district diversions of the district's groundwater and/or surface water resources in order to meet current and future domestic, agricultural, commercial, ecological, and traditional cultural needs within the district.	X		

Table 5-13: Hāna Community Plan	S	NS	N/A
8. Initiate re-classification of lands and streams into the State Conservation District where warranted by biological values that do not unduly burden native Hawaiian rights to cultivate or reside on kuleana or hui lands.			
Discussion: The Proposed Action will support the Environment objectives and policies of the Hāna Community Plan. The water source for the EMI Aqueduct System comes from East Maui streams. 24 of the streams that are diverted by the EMI Aqueduct System in the License Area were subject to the CWRM D&O. The CWRM D&O established the IIFS in attempt to properly manage the surface water for habitat restoration, instream uses, offstream uses, scenic value, and recreational opportunities. Certain streams were designated as "kalo and community" streams. These streams support communities that depend upon kalo cultivation, an element of Hawaiʻi's cultural heritage. Other streams are designated as "habitat restoration" streams, which will be limited in the amount of stream surface water that can be diverted as these streams primary function is to support native habitat restoration. Other streams were ordered to have a wetted pathway maintaining the "mauka to makai" connection. This would allow for the various animal species that have diadromous life cycle to complete their life cycles, benefiting coastal water ecosystems. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action will not be contrary to the CWRM D&O. The Proposed Action and the issuance of a Water Lease will include a requirement that a watershed management plan ~~Watershed Management Plan~~ be developed and implemented for East Maui as discussed in Section 2.1. In addition, EMI was a founding member of the EMWP and continues to be an active member.			
Cultural Resources			
Goal Identification, preservation, protection, and where appropriate, restoration of significant cultural resources and practices, that provide a sense of history and identity for the Hāna region.			
Objectives and Policies			
1. Identify, preserve and protect historically, archaeologically and culturally significant areas, sites, and features within the Hāna District.	X		
2. Acknowledge and respect family ancestral ties to cultural resources.	X		
3. Encourage community stewardship of historic sites and provide for the curation of artifacts in the Hāna region.			X
4. Promote the cultural resources of the Hāna region as an identifying characteristic of the people and the place.	X		
5. Encourage the restoration and use of loʻi kalo (taro terraces) found in the Hāna region.	X		
6. Encourage and protect traditional mauka and makai accesses for traditional cultural uses and practices.	X		
7. Promote development of educational and cultural programs which emphasize the perpetuation of Hawaiian and other ethnic arts, crafts and practices.			X
Implementing Actions: 1. Encourage community participation by creating a Hāna Cultural Resources and Historic Site Preservation Committee to serve as an advisory agency to the Maui Cultural Resources Commission to identify significant cultural resources and provide recommendations specific to the Hāna region. 2. Require development projects to identify all cultural resources within or adjacent to the project area as part of the County development review process. Further require that all proposed development include appropriate mitigation measures including site avoidance, adequate buffer areas and interpretation. 3. General site types and areas that should be flagged for preservation during development review include the following: Piʻilani Trail/Old government roads Hāna/Piʻilani Highways and historic bridges Fishponds Landings Nearshore marine cultural resources	X		

Table 5-13: Hāna Community Plan	S	NS	N/A
Habitation complexes (shoreline and interior) Loʻi terraces and ʻauwai Native vegetation zones Plantation ditch systems Religious structures (shrines, churches and heiau) Plantation era structures and homes Petroglyphs Burials 4. Develop regulations and implement programs to protect *loʻi kalo* (taro terraces), and encourage their productive use. 5. Conduct and maintain a native language oral history program to record the knowledge and expertise of the *kupuna*, particularly as it relates to agricultural practices, fishing practices, and cultural practices and values. 6. Establish and maintain programs to rejuvenate and exhibit the various cultural practices, skills and traditions of the Hāna region, and to reorient youth and adults with their cultural heritage and Hawaiian language. 7. Establish a Hawaiian language immersion program in Hāna.			
Discussion: The Proposed Action will support the Cultural Resources objectives and policies of the Hāna Community Plan. The water source for the EMI Aqueduct System comes from East Maui streams. 24 of the streams that are diverted by the EMI Aqueduct System in the License Area were subject to the CWRM D&O. The CWRM D&O established the IIFS in attempt to properly manage the surface water for habitat restoration, instream uses, offstream uses, scenic value, and recreational opportunities. Certain streams were designated as "kalo and community" streams. These streams support communities within the Hāna Community Plan boundaries that depend upon kalo cultivation, an element of Hawaiʻi's cultural heritage. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O and will not be contrary to the CWRM D&O. Additionally, the CIA includes recommended mitigation measures, as discussed in Section 4.6, see also Table 5-1, under objective and policies for socio-cultural advancement--culture.			
Economic Activity			
Goal A balanced local economy which provides long-term viability and sustainability while meeting residents' needs and respecting the cultural and natural resources of Hāna.			
Objectives and Policies			
1. Encourage a local economy which provides employment choices for the region's residents and which provides future employment opportunities for the region's youth.			X
2. Utilize existing components of the local economy to establish a framework for balanced regional economic development.			X
3. Encourage economic activities which are: of substantive economic benefit to the residents of the area; environmentally benign; and compatible with the cultural sensitivities of the residents of the Hāna region.			X
4. Protect traditional mauka and makai access for subsistence activities that supplement family food sources.			X
5. Promote and maintain agriculture as a major economic activity with emphasis on a regional diversified agricultural industry.			X
6. Maintain taro farming, ranching and floriculture as major economic activities and promote their economic viability and sustainability. Promote aquaculture and horticulture as economic activities.	X		
7. Maintain the visitor industry as a major economic activity, encouraging commercial activities which focus on the "day" visitor market and/or complement the "overnight" visitor market.			X
8. Support the continued operation of the Hotel Hāna-Maui as a significant economic unit in order to provide stable employment for local residents at a size and scale that is in balance with the character of the Hāna Town community.			X

Table 5-13: Hāna Community Plan	S	NS	N/A
9. Support community-based economic development activities and regional cooperative marketing.			X
10. Promote self-sufficiency by using local resource materials, products, and natural energy sources. Encourage and promote programs which allow use of certain abundant native plant species, such as hala and kukui, for commercial endeavors by residents of the Hāna District.			X
11. Assist the region's local fishing industry and promote its economic viability and sustainability.			X
12. Encourage contractors to employ qualified Hāna District residents when constructing facilities or other structures within the Hāna District			X
Implementing Actions: 1. Update the County's socio-economic forecast model at least once a year to provide an on-going basis for evaluating socio-economic issues and conditions in the Hāna Community Plan region. 2. Seek government funds to promote economic diversification, community-based economic development, and economic self-sufficiency of the Hāna District. 3. Seek government funds and technical assistance to establish a community-based Hāna Economic Development Task Force to implement the policies of this plan.			X
Discussion: The Proposed Action will support the Economic Activity objectives and policies of the Hāna Community Plan. The water source for the EMI Aqueduct System comes from East Maui streams. 24 of the streams that are diverted by the EMI Aqueduct System in the License Area were subject to the CWRM D&O. The CWRM D&O established the IIFS in attempt to properly manage the surface water for habitat restoration, instream uses, offstream uses, scenic value, and recreational opportunities. Certain streams were designated as "kalo and community" streams. These streams support communities within the Hāna Community Plan boundaries that depend upon kalo cultivation. ~~Under the Proposed Action~~, As described in this EIS, the farms in East Maui that depend on stream water would provide about ~~14~~ 18 jobs with a payroll of about $600,000 ~~500,000~~ per year, and generate about ~~21~~ 26 direct and indirect jobs having a payroll of $1.0 million ~~800,000~~. ~~the~~ The farms in East Maui that depend on stream water would generate about $1.7 ~~1.4~~ million per year in direct sales, and about $3.6 ~~2.9~~ million per year in direct and indirect sales. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O, and therefore supportive of the Economic Activity objectives and policies.			
Housing			
Goal The provision of housing opportunities to the residents of Hāna, for all income and age groups, which are affordable, safe, and environmentally and culturally compatible.			
Objectives and Policies			
1. Encourage a comprehensive housing strategy which encompasses private sector initiatives, government programs, public-private joint efforts, and other assistance programs to reduce costs and increase housing availability for all income and age groups.			X
2. Provide sufficient land area for urban residential development only in appropriate areas near urban facilities.			X
3. Encourage modification of regulatory codes which may not be appropriate to the Hāna region and which increase the time and cost of providing housing opportunities for the region's residents.			X
Implementing Actions: 1. Develop government-sponsored housing units to be used by State and County personnel who reside in the Hāna region only for the purpose of fulfilling their professional responsibilities. 2. Review and modify the existing Maui County building code and subdivision code to reduce home construction costs in rural and remote areas. Implement alternative rural standards for items such as road widths, street lighting, etc. 3. Seek government funds to assist community-based housing groups, such as the Hāna Affordable Housing and Community Development Corporation,			X

Table 5-13: Hāna Community Plan	S	NS	N/A
in developing housing projects and housing rehabilitation programs, consistent with the Hāna Community Plan, to meet the needs of Hāna District residents. 4. Establish a housing rehabilitation program, including loans, grants, and/or technical assistance and community outreach. 5. Provide programs including, but not limited to, home ownership counseling and self-help housing to enhance home ownership opportunities for the residents of the Hāna District.			
Discussion: The Proposed Action will not affect the Housing objectives and policies of the Hāna Community Plan.			
Urban Design			
Goal Harmony between the natural and man-made environments through building, infrastructure and landscaping design which ensures that the natural beauty and character of the Hāna region is preserved.			
Objectives and Policies			
1. Support design controls for Hāna Town and the Hāna region based on maintaining the existing low rise character and rural scale of the area.			X
2. Encourage roadway, drainage, landscaping and other public improvement standards which are in harmony with an informal rural or natural environment.			X
3. Maintain the informal rural streetscape which provides character identification for Hāna Town.			X
4. Preserve significant view corridors			X
Implementing Actions: 1. Prepare "country town" design guidelines for Hāna Town which enhance the natural beauty and Hawaiian character of the region, through appropriate building, infrastructure and landscape design. 2. Develop and implement appropriate "rural standards" for public facilities and privately sponsored building improvements, roadways and subdivisions. 3. Limit building height to two stories or thirty-five (35) feet above grade throughout the region. 4. Limit the height of man-made walls to avoid visual obstruction of coastal and scenic mauka areas. 5. Identify significant view corridors and seek their protection through covenants, easements, and other planning tools.			X
Discussion: The Proposed Action will not affect the Urban Design objectives and policies of the Hāna Community Plan.			
Physical Infrastructure			
Goal Timely and environmentally sensitive development and maintenance of infrastructure systems which protect and preserve the safety and health of the Hāna region's residents and visitors, including the provision of domestic water, utility and waste disposal services, and effective transportation systems which meet the needs of residents and visitors while protecting the region's rural character.			
Objectives and Policies			
All Areas			
1. Ensure community participation, including resident Hawaiian, in all long-term infrastructure planning.			X
Transportation			
2. Improve road conditions through more frequent resurfacing and repair.			X
3. Encourage a program of roadway safety improvements, including shoulder widening, pull-over spots and installation of new signage and guardrails that do not detract from the region's scenic and rural character.			X
4. Balance traffic flow and safety requirements with the preservation of the Hāna region's historic bridges.			X

Table 5-13: Hāna Community Plan	S	NS	N/A
5. Encourage the development of a quasi-public shuttle service to meet the intraregional and/or interregional transportation needs of the residents of the Hāna Community Plan region.			X
6. Ensure that any master plan for the Hāna Airport is consistent with the objectives and policies set forth in the Hāna Community Plan.			X
Water			
7. Improve water source and delivery facilities to ensure that water supplied to the region's residents and visitors is of the highest quality.	X		
8. Identify water service area expansion needs in the Hāna region.			X
9. Encourage water conservation measures by residents and businesses.			X
Liquid and Solid Waste			
10. Develop and implement a comprehensive waste management plan which includes reduction, recycling and reuse of solid waste and wastewater as major plan components.			X
11. Incorporate household re-use of gray water in the County's wastewater management strategy.			X
Energy and Public Utilities			
12. Promote energy efficiency as the energy resource of first choice, and encourage energy conservation practices by residents and businesses.			X
13. Improve energy and communication systems to ensure reliable service to the residents and businesses of the Hāna region.			X
14. Identify service area expansion needs for energy services in the Hāna region.			X
15. Promote the environmentally and culturally sensitive use of renewable energy resources, like biomass, solar energy, and wind energy, in all sectors of the community.			X
Implementing Actions: 1. Prepare a Hāna Highway and Pi'ilani Highway roadway management plan which identifies: (1) significant natural and structural features to be preserved; (2) comprehensive road signage requirements; (3) long-term roadway maintenance requirements; and (4) a traffic management system which provides for pull-over spots, and interpretive scenic lookouts. 2. Improve Hāna Highway to allow safe passage of two-way vehicular traffic. 3. Improve Pi'ilani Highway as an alternative route to Hāna while protecting and preserving the integrity of natural landforms and historic structures. 4. Improve walkways and roads within residential areas to ensure safe passage for pedestrians and vehicular traffic. 5. Develop appropriate and achievable rural standards for infrastructural improvements. 6. Provide a back-up electrical generator which will provide power to the Hāna region during periods of electrical power outages. 7. Provide energy services to Kipahulu. 8. Provide municipal water service to Kipahulu and Upper Nāhiku. 9. Prepare a domestic water system master plan and a wastewater system master plan for the Hāna region. 10. Prepare a Hāna Airport master plan.			X
Discussion: The Proposed Action supports the Physical Infrastructure objectives and policies of the Hāna Community Plan. The Proposed Action will also ensure the continued delivery of water for the Nāhiku community. The Nāhiku community receives water directly from the EMI West Makapipi Tunnel 2 (Well No. 4806-07), also known as the Nāhiku Tunnel, a development tunnel located EMI land directly adjacent to the Koolau Ditch ~~Aqueduct System via a development tunnel in the Koolau Ditch. The tunnel draws up 20,000 to 45,000 gallons per day, dependent on weather, directly from the EMI Aqueduct System~~. EMI has accommodated the needs of the Nāhiku community, which have ranged between approximately 8,345 (2018) to 40,925 (2007) gpd on a daily basis, although supply of amounts over 20,000 gpd on any given day is not required under the agreement (MDWS, 2007 – 2018). The water serves about 43 water meters located along Nāhiku Road. One meter is classified as an agricultural use while all the others are classified as single-family use.			

Table 5-13: Hāna Community Plan	S	NS	N/A
Without the issuance of the Water Lease, the EMI Aqueduct would only be able to divert water derived from privately owned lands (approximately 30% of water in License Area) plus the 4.37 mgd from the privately owned lands between Honopou Stream and Māliko Gulch, resulting in a vast reduction of water available for agricultural uses in Central Maui and thereby ~~may be left in an inoperable state,~~ leaving Upcountry Maui~~, and the Nāhiku community~~ without a reliable source of water.			
Social Infrastructure			
Goal An efficient and responsive system of people-oriented public services which enable residents to live a safe, healthy and enjoyable lifestyle, and offer the youth and adults of the region opportunities and choices for self and community improvement.			
Objectives and Policies			
Recreation			
1. Encourage recreational programs for all age groups, and provide opportunities for passive recreation.			X
2. Improve regulation of commercial activities with public recreational areas in collaboration with community-based organizations.			X
3. Recognize and respect the recreational values and pristine character of Hāna's natural land and water resources.	X		
Public Health and Safety			
4. Improve emergency rescue services and medical services for the Hāna region.			X
5. Encourage the provision of public health education programs, including mental health counseling services.			X
6. Improve fire protection, prevention and suppression services in the Hāna region.			X
7. Encourage the recruitment and retention of police department personnel who are thoroughly familiar with the needs of the community.			X
8. Encourage upgrading and expanding the facilities at the Hāna Medical Center.			X
9. Encourage the provision of services and development of facilities to meet the current and future "elderly care" needs of the Hāna District.			X
Education			
10. Maintain and expand educational opportunities for adults.			X
11. Expand vocational programs			X
12. Support a Hawaiian language immersion program in Hāna.			X
13. Enhance educational quality of schools within the Hāna region through collaborative efforts with community-based groups such as the PTSA.			X
Implementing Actions: 1. Prepare a recreation management plan for Hāna Bay to identify compatible and conflicting uses and to establish a regulatory context for uses within the bay in conjunction with the Hāna Harbor Advisory Committee. 2. Establish and maintain an area for canoes and other similar recreational type boats at Hāna Bay. 3. Prohibit dry docking of boats within the Hāna Bay area except during storm and/or high surf conditions. 4. Provide water safety officers for Hāna Bay. 5. Regulate commercial tour operator use of Hāna Bay Pavilion and picnicking area, Wai'anapanapa, Pua'a Ka'a, and Kaumahina State Parks in order to allow residents and other visitors greater use of these facilities. 6. Maintain Hāna Bay Beach Park and Hāna Ball Park as primary recreational areas within Hāna Town. Establish traffic management programs to promote safety during times when events are occurring. 7. Develop a larger multi-purpose facility in order to meet the social activity needs of an expanding residential population. 8. Establish and maintain passive parks and regional recreation parks to meet the residential needs of remote communities throughout the Hāna region.			X

Table 5-13: Hāna Community Plan	S	NS	N/A
9. Improve and maintain Ke'anae Community Park. 10. Establish and maintain an enforcement officer's position dedicated to enforcing rules and regulations within State parks, beach areas, and conservation lands. 11. Establish and maintain a Rescue Squad at the new Hāna Fire Station. 12. Maintain a civil defense coordinator position for Hāna and establish emergency evacuation centers for remote centers of the region. 13. Increase the police force, possibly by deputizing part-time officers in more remote areas. 14. Improve emergency communications equipment. 15. Maintain the Hāna Health Advisory Committee to assist in developing programs to meet future medical service needs. 16. Establish a full-time mental health case management position and a full-time elderly services case management position in the Department of Health to meet the residents' needs. 17. Develop and maintain a "meals-on-wheels" program and a transportation program for senior citizens. 18. Establish and maintain a public cemetery. 19. Provide sufficient counselor positions in the Department of Education to meet the students' needs at the Hāna High and Elementary School. 20. With community participation, identify the causes and develop appropriate incentives to reduce teacher turnover at schools. 21. Seek funding to expand skybridge and other community education and telecommunications programs.			
Discussion: The Proposed Action will support the Social Infrastructure objectives and policies of the Hāna Community Plan. The water source for the EMI Aqueduct System comes from East Maui streams. ~~Twenty four~~ 24 of the streams that are diverted by the EMI Aqueduct System in the License Area were subject to the CWRM D&O. The CWRM D&O established the IIFS in attempt to properly manage the surface water for habitat restoration, instream uses, offstream uses, scenic value, and recreational opportunities. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action will not be contrary to the CWRM D&O.			
Government			
Goal The provision of accessible, cost effective, and responsive government services and programs which meet the unique needs of residents and the cultural, geographic and socio-economic characteristics of the Hāna region.			
Objectives and Policies			
1. Provide better access to County and State officials by establishing outreach services in the Hāna region.			X
2. Encourage improved communication between government agencies and residents in order to improve residents' understanding of the development permit process and compliance with regulatory requirements.			X
3. Promote the development of building and subdivision codes and standards which are appropriate for the Hāna region.			X
4. Utilize the government budgeting process as a means to carry out the policies and priorities of the Hāna Community Plan.			X
5. Ensure the participation of native Hawaiian residents and community representatives in all CIP and program planning that impacts on the Hāna region.			X
6. Maintain a policy within the County Council and the State Land Use Commission to hold hearings in Hāna on land use issues which affect the Hāna District.			X
7. Maintain the Hāna Advisory Committee to the Maui Planning Commission to make recommendations regarding all land use policies, permits, and changes in designation within the Hāna District.			X
Implementing Actions: 1. Develop a satellite government center for the Hāna region with scheduled days for different government agencies.			X

Table 5-13: Hāna Community Plan	S	NS	N/A
2. Pursue creative regulatory solutions to provide better government services. 3. Develop recruitment/incentive programs to attract Hāna region residents into positions within the Fire and Police Departments, Department of Land and Natural Resources, the National Parks Service and other government agencies located in the Hāna region. 4. Compile special plans and studies necessary to implement the recommendations of the Community Plan. These would include market studies and assessments of the diversified agricultural economic sector, the current and projected visitor accommodation market mix, water development, housing, local and regional circulation, drainage, solid waste, and other special studies as required.			
Discussion: The Proposed Action will not affect the Government objectives and policies of the Hāna Community Plan.			

5.7.2 Pā'ia -Ha'ikū Community Plan (1995)

The Pā'ia -Ha'ikū Community Plan is one of nine (9) community plans for the County of Maui. The plan reflects current and anticipated conditions in the Hāna region, and advances the community's planning goals, objectives, policies, and implementation to guide the future of the region. The Pā'ia -Ha'ikū Community Plan region is located along the north shore of Maui between the urban center of Kahului and the rural enclave of Hāna, and encompasses portions of the License Area. The planning region encompasses an area of approximately 17,300 acres that can be characterized by the following sub-regions: Pā'ia and Ha'ikū. Table 5-14 below, is a discussion of the relevant objectives and policies of the Pā'ia -Ha'ikū Community Plan that relate to the Proposed Action.

Table 5-14: Pā'ia -Ha'ikū Community Plan	S	NS	N/A
Land Use			
Goal A well-planned community that preserves the region's small town ambiance and rural character, coastal scenic vistas, and extensive agricultural land use, and accommodates the future needs of residents at a sustainable rate of growth and in harmony with the region's natural environment, marine resources, and traditional uses of the shoreline and mauka lands.			
Objectives and Policies			
1. Protect the marine environment and quality of the offshore waters.			X
2. Preserve important scenic vistas and shoreline resources of the region.			X
3. Prohibit hotel/resort development within the region.			X
4. Ensure that appropriate lands are available to support the region's current and future agricultural industries, including sugar, pineapple, diversified agriculture, and aquaculture.			X
5. Identify prime or productive agricultural lands, and develop appropriate regulations for their protection.			X
6. When appropriate, incorporate low-rise town or village forms of development, such as the neotraditional town, with defined growth limits and a village core of mixed public, residential and commercial uses, organized and designed to enhance pedestrian and bicycle access as an alternative to linear forms of development, which are characteristic of more urban areas.			X
7. Provide for a range of residential lot sizes in appropriate areas.			X
8. Define urban and rural growth limits and densities for the region by determining the needed space to accommodate projected growth, designating the required land using the land use map, and supporting needed development in these areas.			X
9. Maintain and expand areas desirable for public recreational uses.	X		

Table 5-14: Pā'ia -Ha'ikū Community Plan	S	NS	N/A
10. Discourage approvals of Special Permits in State Agricultural and Rural Districts unless: (a) necessary to serve the immediate community in remote areas; (b) supportive of agricultural uses; or (c) needed for the use or distribution of locally produced products and services that otherwise do not adversely affect the environment, surrounding agricultural uses, or public safety.			X
11. For the outlying areas such as Ha'ikū with existing Urban or Rural Land Use classifications, consideration for expansion of the State Land Use District Boundary should be made on a case by case basis for limited residential development in accordance with the following criteria: a. That the proposed change is contiguous with the Urban or Rural District and compatible with the existing character of the surrounding area; b. That adequate public services and facilities are available or can be provided at reasonable cost to the petitioner; and c. That the proposed land use amendment shall have no significant adverse effects upon agricultural, natural, environmental, recreational, scenic, historic, or other resources of the area.			X
12. Designate the following areas for park use: a. Baldwin Park to "Small Park" in Pā'ia; b. Hookipa Park expansion including land around the existing park for immediate development, as well as the realignment of Hāna Highway (Note that mauka lands shall be a park reserve which would allow existing agricultural cultivation to continue until the future park expansion); c. Kaulahao Beach ("Blue Tile Beach"); d. Near Pa'uwela Road and mauka of the Ha'ikū School and existing residential developments; and e. Mauka of 4th Division Marine Park for an active park area and Kauhikoa Hill for a passive recreational/scenic area			X
13. Limit visitor accommodations to owner-occupied "bed and breakfast" establishments that are residential in both scale and character. Any proposed "bed and breakfasts" should not be situated near the shoreline so as to avoid the proliferation of this use and subsequent changes in the character of the region's coast.			X
14. Limit and manage windsurfing meets at Hookipa in order to better accommodate traditional uses, such as fishing and surfing, and maintain other public recreational uses of the area.			X
15. Avoid development of flood prone areas, stream channels and gulches due to safety concerns, open space relief, and visual separation. Drainage channels should be regularly maintained by appropriate agencies.			X
16. Require Special Use Permits for public/quasi-public uses in the State Rural District.			X
17. Upon any closure of the Pā'ia Mill, the Mill's Heavy Industrial land use designation shall be evaluated by the Department of Planning to determine whether it is appropriate for such designation to be retained, and the Department shall transmit a report and recommendation to the Council for action as appropriate.			X
Implementing Actions: 1. Review, amend and adopt, as appropriate, zoning ordinances to carry out the intent of the land use categories identified in the Pā'ia-Ha'ikū Community Plan, including, but not limited to, a Rural Light Industrial zoning classification. 2. Adopt rules requiring Special Use Permits for public and quasi-public uses in the State Rural District. 3. Establish varying minimum lot sizes and subdivision standards to reflect different kinds of proposed uses and activities, thereby, preventing the improper use of agricultural and rural areas. Moreover, ensure that minimum two-acre lot subdivisions intended for "gentleman estates" are limited to areas that (a) have adequate public services and infrastructure, and (b) would not significantly detract from the agricultural, rural, open space, scenic and environmental qualities of the region.			X

Table 5-14: Pā'ia -Ha'ikū Community Plan	S	NS	N/A
4. Establish and enforce regulations for "bed and breakfast" establishments conducted by owner occupants within single-family residential dwellings to ensure that they will be situated in appropriate areas and not adversely affect the surrounding neighborhood. The regulations should include, but not be limited to, criteria related to location, size of operation, off-street parking, and other appropriate mitigate measures. 5. Improve standards and procedures to protect scenic vistas and shoreline resources of the region. 6. Designate areas for agricultural parks suitable for diversified agriculture and aquaculture. 7. Develop and implement a directed and managed growth plan and strategies to guide and coordinate future development consistent with the provision and availability of public infrastructure.			
Discussion: The Proposed Action will support the Land Use objectives and policies of the Pā'ia -Ha'ikū Community Plan. The Ko'olau Forest Reserve Hunting Unit encompasses portions of the License Area. The Hunting Unit is administered the DLNR, Division of Forestry and Wildlife. To hunt within the License Area, hunters must obtain a license from the DLNR and an EMI Permit/Waiver. Hunting grounds are limited to one hunting party per hunting area, as regulated by the DLNR. Hunters enter the hunting unit every Saturday and Sunday, as well as holidays observed by EMI. Prior to entering, hunting parties must sign in their license number they obtained from the DLNR, and log in any game that are taken. Access to the hunting grounds is managed by EMI through eight existing EMI access roads. Hunting is permitted year round. Hunting parties may enter the License Areas by vehicular access, however, must traverse by foot in most areas. Hiking is also a permitted recreational use within the License Area, and is limited to hiking clubs and individuals. Access to the License Area lands for hiking is acquired through a Hiking Waiver from EMI. ~~Only~~ Generally, only two hiking clubs currently enter the License Area lands approximately four to six times a year; the Sierra Club Maui Group and Mauna Ala Hiking Club. They enter on foot, and are guided by a club hiking expert with a manageable number of people Other recreational uses are not permitted on the License Area lands for safety reasons. Issuance of the Water Lease would allow EMI staff to continue to manage appropriate access into the License Area to use and enjoy the License Area's recreational and natural resources.			
Environment			
Goal The preservation and protection of the natural environment, marine resources and scenic vistas to maintain the rural and natural ambiance and character of the region.			
Objectives and Policies			
1. Preserve and protect scenic vistas along Hāna Highway			X
2. Preserve and protect unique natural areas with significant conservation value, including, but not limited to, the native rain forest at Waikamoi.	X		
3. Encourage and support the establishment of native forest and vegetation.	X		
4. Preserve the shoreline sand dune formations throughout the planning region. These topographic features are a significant element of the natural setting and should be protected from any actions which would detract from their scenic, cultural or ecological value.			X
5. Establish a system of temporary shoreline closures to fishing, alternating various segments of the coast, to minimize depletion and allow the resources to regenerate.			X
6. Protect the quality of surface and groundwater resources.	X		
7. Protect all wetland resources. Such resources provide open space and habitat for plant and animal life in the aquatic environment. Ensure that the development of new water sources does not adversely affect in-stream flows.			X

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
8. Protect and maintain the quality of the nearshore and offshore waters and marine environment. Ensure that storm water run-off and siltation from proposed development will not adversely affect the marine environment and nearshore and offshore water quality. Open culverts which empty directly into nearshore waters should be avoided.			X
9. Encourage the construction of natural grass-lined drainage channels, as opposed to concrete channels, and the installation of siltation basins.			X
10. Effectively control agricultural run-off.			X
11. Promote greater awareness and opportunities for recycling and sound conservation practices.			X
Discussion: The Proposed Action will support the Environment objectives and policies of the Pāʻia -Haʻikū Community Plan. The CWRM D&O was purposefully designed to increase the practical knowledge of stream flows and native habitat restoration. The CWRM D&O establishes a quantity of water that must remain in each stream. Each stream a part of the contested case in East Maui was evaluated individually for their potential for usage, habitat restoration, recreational opportunities, and scenic values. The CWRM D&O ensures the prudent use of the surface water resources in the License Area with the issuance of the Water Lease. Should the Water Lease be issued, the Proposed Action will be required to be in compliance with the CWRM D&O. The Proposed Action is not contrary to the CWRM D&O, and will exercise a conservation ethic in use of the natural resources, and ensure compatibility between land-based activities and natural resources and ecological systems. An objective of the Proposed Action is to maintain and continue the operation of the EMI Aqueduct System. The EMI staff will be trained by qualified individuals on appropriate conduct and measures to take within the License Area during future maintenance work. This will encourage the protection of the rare and endangered plant and animal species and habitats native to Hawaiʻi that have been identified in the region. The EMI Aqueduct System will be maintained in a way that is compatible with the existing environment and natural resources in the region.			
Cultural Resources **Goal** Identification, protection, preservation, enhancement and appropriate use of cultural resources, cultural practices and historic sites that provide a sense of history and define a sense of place for the Pāʻia -Haʻikū region.			
Objectives and Policies			
1. Encourage and protect traditional mauka and makai accesses, cultural practices and rural lifestyles. Protect traditional hunting, fishing and gathering.	X		
2. Prevent the desecration of ancient and historic burial sites.			X
3. Identify, protect, preserve, and, where appropriate, restore significant archaeological and cultural sites and resources unique to the State of Hawaiʻi and Island of Maui.	X		
4. Foster an awareness of the diversity and importance of cultural resources and of the history of Pāʻia -Haʻikū. Promote distinct cultural resources as an identifying characteristic of the region.			X
5. Recognize and respect family ancestral ties to certain sites.			X
6. Encourage community stewardship of historic sites.			X
7. Encourage the development of "cultural parks" for visitation and education.			X
8. Encourage cultural and educational programs to perpetuate Hawaiian and other ethnic heritages.			X
9. Encourage the ongoing state and national register nomination process, by government and private property owners, to increase awareness and protection of sites and districts.			X
10. Encourage the restoration and traditional use of taro patches, and the re-establishment of breadfruit groves.	X		
11. Recognize and respect the importance of various ethnic representations in the cultural site identification process.			X
Implementing Actions:			X

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
1. Update the County Cultural Resource Management Plan to further identify specific and significant cultural resources in the region and provide strategies for preservation and enhancement. Include a cross section of residents familiar with the various ethnic histories of the region to advise the Cultural Resources Commission in the designation and management of significant cultural resources. 2. Require development projects to identify all archaeological and cultural sites and resources, including traditional accesses, located within or adjacent to the project area as part of initial project studies. Further require that all proposed activity include appropriate measures such as site avoidance, buffer areas and interpretation, to mitigate potential adverse impacts on cultural resources. Establish standards and procedures to be followed during the subdivision, special management area permit, or change in zoning application stage to ensure adequate review of lands involving archaeologically and culturally sensitive sites. 3. Implement a historic or cultural district overlay ordinance to provide protection for areas of significant archaeological, historical and cultural resources. Areas which should be considered for designation include the following: a. Pāʻia Town b. Hoʻolawa Bay, Huelo c. Kuiaha Bay, Haʻikū d. Halehaku Bay, Pilale e. Honopou Valley, Peahi (coastal valley area) f. Kaupakulua Gulch (coastal valley area) g. Hanawana Landing, Huelo/Kailua 4. Investigate the creation of a "cultural park" at Hoʻolawa Bay and other important sites in the region. 5. Flag for preservation the following general site types and areas: a. Ancient Trails/Old government roads b. Fishponds c. Landings d. Nearshore marine cultural resources e. Stream valley areas (1) habitation complexes (shoreline and interior) (2) loʻi and ʻauwai (3) terraces f. Significant native vegetation zones g. Plantation ditch systems h. Religious structures (shrines, churches and heiau) i. Old bridges j. Plantation camps k. Plantation era structures and homes l. Petroglyphs m. Burials 6. Initiate and adopt, under the auspices of the Department of Planning, a mauka/makai access dedication ordinance pursuant to Chapter 46, H.R.S. and acquire accesses through purchase, dedication, condemnation, or land exchange. 7. Formulate and adopt rural and historic district roadway standards to promote the maintenance of historic landscapes and streetscapes in character with the region. 8. Designate the location of former camps and communities through a historical marker program. 9. Implement a community curatorship program, and site reconstruction and interpretation project at Nakalele Point (west of Hoʻokipa). 10. Require archaeological field checks before issuance of building and grading permits for properties located in gulches or other areas which could hold archaeological resources. 11. Recommend to the Arborist Committee for consideration as "Exceptional Trees," all trees, or groves of trees, that have significant historic or			

Table 5-14: Pā'ia -Ha'ikū Community Plan	S	NS	N/A
cultural value, represent an important community resource, or are exceptional by reason of age, rarity, location, size or aesthetic quality.			
Discussion: The Proposed Action will support Cultural Resources objectives and policies of the Pā'ia -Ha'ikū Community Plan. A recent action taken by the CWRM ordered full restoration for 10 streams. These streams are categorized as "Kalo and Community Streams" and were restored due to the streams historically supporting and currently supporting communities for taro cultivation, an element of Hawai'i's cultural heritage. The Proposed Action will be in compliance with the CWRM D&O. For the subject Water Lease, CSH prepared an Archaeological LRFI report on behalf of A&B which was also updated with subsequent field work and literature review in June 2020 in response to comments on the DEIS. This investigation was designed to determine the likelihood that historic properties (any, building, structure, object, district, area, or site over 50 years old) may be affected by the Proposed Action and, based on findings, consider cultural resource management recommendations. CSH completed an archaeological field inspection between May 15 and 18, 2018 in conjunction with a survey of EMI infrastructure conducted by Mason Architects. While the primary focus of the survey was to visit 21 sluice gates along the EMI Aqueduct System for architectural recordation, CSH used the opportunity to inspect portions of the License Area along access roads, ditch trails, and within upland stream valleys. The field inspection provided an opportunity to inspect some of the upland areas of the License Area within steep-sided valleys that have not been formally surveyed by archaeologists. As expected, ground visibility was poor due to thick vegetation cover throughout the License Area. Additionally, in many cases, the terrain on both the upslope and downslope sides of the access roads and trails consisted of nearly vertical valley walls that were inaccessible. No potential archaeological sites were observed. Additionally, the CIA includes recommended mitigation measures, as discussed in Section 4.6, see also Table 5-1, under objective and policies for socio-cultural advancement--culture.			
Economic Activity			
Goal A stable economy that complements the rural character of the region and provides opportunities for economic diversification and community needs.			
Objectives and Policies			
1. Maintain agriculture as the primary economic activity. Enhance opportunities for the cultivation and processing of local agricultural products and encourage the establishment of agricultural parks and support services (i.e., co-op facilities for distribution, marketing and sales) to enhance diversified agricultural activities.			X
2. Establish opportunities for rural light industrial uses as a secondary economic activity consistent with the rural character of the region. This would include uses which are related to the agricultural base, light industries which are oriented to servicing the surrounding community, and small skilled-craft operations.			X
3. Provide for neighborhood-scale commercial services within or in close proximity to residential areas to accommodate the needs of residents.			X
4. Consider "bed and breakfast" establishments as transient visitor facilities, provided that these are conducted by owner-occupants within a single-family residential dwelling and approved for such use.			X
5. Encourage the establishment of a farmers' market at an appropriate site in the Pā'ia and Ha'ikū areas.			X
Implementing Actions: 1. Encourage the State Department of Agriculture to draft or propose a master plan to promote diversified agriculture by expanding agricultural programs, identifying the specific uses of those agricultural lands, and locating a site(s) for an agricultural park. 2. Update the County's socio-economic database to provide an on-going basis for evaluating socio-economic issues and conditions in the Pā'ia-Ha'ikū Community Plan region.			X
Discussion: The Proposed Action will not affect the Economic Activity objectives and policies of the Pā'ia -Ha'ikū Community Plan.			

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
Housing			
Goal A sufficient supply and choice of attractive housing accommodations with emphasis on affordable housing for a broad cross section of residents.			
Objectives and Policies			
1. Meet the 20-year housing needs of the planning region. Provide sufficient land area for residential development only in appropriate areas near public facilities in order to discourage land speculation, and provide for predictable, efficient land use and development patterns in the region.			X
2. Expand the inventory of affordable housing. Provide a variety of affordable housing opportunities, including improved lots and self-help projects, and provide for special needs, including the elderly, single-parent families and the disabled. Encourage public sector projects, government programs, public/private joint efforts, and other assistance programs to reduce costs and increase the availability of affordable and gap-group housing projects			X
3. Reduce residential home energy and water consumption.			X
4. Secure lands for future low-cost residential development by government or private nonprofit corporations.			X
5. Credit the donation of improved residential land to the State or County government towards affordable housing requirements by private developers.			X
6. Institute measures to prevent speculation in government-assisted or subsidized affordable housing projects			X
7. Plan, design and construct off-site public infrastructure improvements (i.e., water, recreation, roads, sewer, drainage and solid waste) in anticipation of residential developments defined in the Community Plan and consistent with a directed and managed growth plan or strategy			X
8. Require a mix of affordable and market-priced housing in all major residential projects, unless the project is to be developed exclusively as an affordable housing project.			X
9. Ensure that community parks are developed before major new development projects are allowed to occur.			X
10. Support efforts to develop housing for the elderly, the homeless and the working poor.			X
Implementing Actions: 1. Develop a comprehensive plan for housing assistance programs which coordinates all available public and private financial resources and incorporates appropriate regulatory measures. 2. Establish a housing rehabilitation program, including loans, grants and/or technical assistance and community outreach. 3. Adopt standards for housing design and construction to reduce energy and water consumption. 4. Encourage efforts to provide shelter for Maui's homeless, and low-cost rental housing for its working poor. 5. Propose and define growth limits around existing urbanized areas to accommodate residential development while directing growth in an organized manner.			X
Discussion: The Proposed Action will not affect the Housing objectives and policies of the Pāʻia -Haʻikū Community Plan.			
Town Design			
Goal Attractive rural town development in keeping with the existing scale, form and character of settlement areas in the region.			
Objectives and Policies			

Table 5-14: Pā'ia -Ha'ikū Community Plan	S	NS	N/A
1. Incorporate design standards, including, but not limited to, lighting, building and roadway design, appropriate for rural communities. In Agricultural and Rural Districts, excessive roadway standards and street lighting requirements should be discouraged.			X
2. Establish in designated areas a neotraditional village form of development with defined growth limits and a core of low-rise mixed public, residential and commercial uses organized and designed to enhance pedestrian and bicycle access.			X
3. Limit building heights to two (2) stories or thirty (30) feet above grade throughout the region, with any exceptions being subject to design review by the County			X
4. Follow the established design standards for the commercial use areas of Pā'ia Town and Ha'ikū based on the following guidelines: a. Visually maintain and enhance the low-density town character. b. Require that future development be compatible with the desired scale and rural character. c. Maintain the ambiance of Pā'ia and Ha'ikū Towns. Design improvements should be undertaken in a coordinated and ongoing fashion so as to ensure compatibility of future development projects with the desired character. Road improvements for drainage, lighting, and safety should be coordinated with the maintenance of the existing rural, informal streetscape which exemplifies the character of Pā'ia and Ha'ikū Towns. For example, urban roadway standards which require excessive street widths detract from a rural character and should be discouraged.			X
5. Save and incorporate healthy, mature trees in the landscape planting plans of subdivisions, roads or any other construction or development.			X
6. Incorporate the principles of xeriscaping in all future landscape planting.			X
7. Use "native plants" for landscape planting in all public projects to the extent practicable.			X
8. Ensure that all future subdivisions, construction projects, and developments comply with the Maui County Planting Plan.			X
9. Encourage neighborhood communities and citizen groups to upgrade streets and parks in accordance with the Maui County Planting Plan.			X
10. Enhance existing public rights-of-way and parks with appropriate trees, turfgrass and groundcovers.			X
Implementing Actions: 1. Revise subdivision standards, including, but not limited to, roadways and street lighting, for rural areas such as Pā'ia-Ha'ikū to maintain a rural character and appearance. In Agricultural and Rural Districts, excessive roadway standards and street lighting requirements should be discouraged. 2. Encourage landscape buffering along the makai side of the proposed Alternate Road and along the makai and mauka edges of the sugar mill area in a manner that does not detract from scenic vistas.			X
Discussion: The Proposed Action will not affect the Town Design objectives and policies of the Pā'ia -Ha'ikū Community Plan.			
Physical Infrastructure			
Transportation			
Goal Transportation systems that facilitate the safe and efficient movement of people, produce and goods within and outside the region.			
Objectives and Policies			
1. Strongly encourage the coordinated efforts of all appropriate County, State and Federal agencies to plan, fund and construct an alternate route around Pā'ia Town.			X

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
2. Establish a regional network of bikeways and pedestrian paths. This should include providing adequate space to accommodate bicycle traffic throughout the Pāʻia Town area, including along Baldwin Avenue from Pāʻia to Makawao.			X
3. Encourage convenient pedestrian and bicycle access between residences and neighborhood commercial areas, parks and public facilities, in order to minimize use of the automobile within residential communities.			X
4. Require off-street parking as a part of new commercial development in Lower Pāʻia .			X
5. Realign Hāna Highway in the vicinity of Hookipa Park to provide an area for park expansion.			X
6. Discourage heavy truck traffic through Pāʻia Town.			X
Implementing Actions: 1. Plan, fund and construct an alternative roadway mauka of Pāʻia Town. 2. Prepare or update a roadway and drainage master plan for the Pāʻia- Haʻikū area and incorporate appropriate road standards for rural areas. 3. Incorporate a regional pedestrian and bikeway plan as a functional element of the Community Plan. 4. Acquire sites for public parking within Pāʻia Town. 5. Adopt an in-lieu parking ordinance that allows the payment of fees for the development of public parking in other nearby locations, in lieu of the construction of required off-street parking as part of a commercial project proposed on a small lot. 6. Undertake more frequent resurfacing and repair, and widening of road shoulders in dangerous sections, in order to improve road conditions. 7. Provide a stop sign on Haʻiku Road at its intersection with West Kuiaha Road, so that West Kuiaha Road becomes a through street. 8. Construct sidewalks with landscaping in the commercial areas of Pāʻia and Haʻikū, so as to retain their existing characters.			X
Water			
Goal An adequate supply of potable and irrigation water to meet the needs of the region.			
Objectives and Policies			
1. Increase water storage capacity with a reserve for drought periods.			X
2. Ensure that adequate water capacity is available for domestic and agricultural needs of the region.	X		
3. Ensure that the development of new water sources does not adversely affect in-stream flows.			X
4. Continue the conversion to drip irrigation in sugar cane fields, provided that the practice complies with soil conservation standards.			X
5. Improve the existing potable water distribution system and develop new potable water sources prior to further expansion of the State Urban District boundary or major subdivision of land in the State Agricultural or Rural Districts.			X
6. Ensure adequate supply of groundwater to residents of the region before water is transported to other regions of the island.			X
Implementing Actions: 1. Prepare or update a water improvement master plan for the Pāʻia-Haʻikū region to be incorporated as a functional component of the Community Plan. 2. Update the County's Water Use and Development Plan and estimated water use for the Pāʻia-Haʻikū region based on the adopted Community Plan and include a reserve capacity for drought conditions. 3. Develop a comprehensive agricultural water system, including the use of recycled water and a dual water system for domestic and irrigation uses. 4. Provide incentives for water conservation.			X
Liquid and Solid Waste			
Goal			

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
Efficient, safe and environmentally sound systems for the disposal, recycling and reuse of liquid and solid wastes.			
Objectives and Policies			
1. Connect urban residential communities to the County's wastewater treatment system.			X
2. Reduce the disposal of solid wastes in the landfills through expanded source reduction, reuse and recycling programs and the provision of convenient drop-off facilities.			X
Implementing Actions: 1. Develop and implement a comprehensive waste management and recycling program for the region. 2. Extend the service area of the sewer system to include new major urban residential communities delineated in the Community Plan.			X
Drainage			
Goal Improvements to the storm drain system which provide for a high standard in preventing flooding and property damage while not adversely affecting the marine environment and nearshore and offshore water quality**.**			
Objectives and Policies			
1. Ensure that storm water run-off and siltation from proposed development will not adversely affect the marine environment and nearshore and offshore water quality. Open culverts which empty directly into nearshore waters should be avoided.			X
2. Encourage the construction of natural grass-lined drainage channels, as opposed to concrete channels, and installation of siltation basins.			X
3. Encourage the incorporation of drainageways into open space, pedestrian way and bikeway networks.			X
4. Effectively control storm water run-off in new urban, rural or agricultural subdivisions and developments, so as to avoid net increase in storm water run-off where practicable.			X
Implementing Actions: 1. Review County drainage standards as they relate to rural and agricultural areas. 2. Maintain drainageways, swales and spillways.			X
Energy			
Goal Greater self-sufficiency in the need for non-renewable energy and more efficiency in use of energy resources.			
Objectives and Policies			
1. Promote energy efficiency as the energy resource of first choice and increase the energy efficiency in all sectors of the community.			X
2. Promote environmentally and culturally sensitive use of renewable resources such as biomass, solar, wind, and hydroelectric energy in all sectors of the community.			X
3. Support the establishment of an alternate fuels distribution infrastructure.			X
4. Utilize renewable energy for water pumping and other energy services which can take advantage of intermittent energy resources.			X
5. Support the development of communication infrastructure and promote telecommuting to minimize travel.			X
6. Support energy-efficient building design and site development practices.			X
7. Promote energy conservation and awareness programs			X
8. Limit requirements for street lighting in agricultural and rural communities.			X
9. Increase the energy security of community "lifeline" facilities and improve energy emergency response capabilities.			X
Implementing Actions: 1. Develop incentives and requirements for energy-efficient new building design, existing building retrofit, and site development practices through various approaches, including modifications to building, zoning, and subdivision codes.			X

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
2. Develop and adopt an integrated energy functional plan for the County of Maui that includes, but is not limited to, strategies for energy conservation, reuse of treated wastewater, recycling, reduction in the use of fossil fuels, public education and awareness, and other strategies and actions related to transportation and utilities, housing, environment, urban design and economic activity. 3. Develop, compile and disseminate information on new energy technologies, policies, and programs that may prove helpful to the community's economy and environment. 4. Initiate an integrated County energy resource planning program. 5. Use energy efficient street lights and develop appropriate street lighting standards for agricultural and rural areas. 6. Identify energy-saving measures for all community buildings and facilities.			
Discussion: The Proposed Action will support Physical Infrastructure objectives and policies for water in the Pāʻia -Haʻikū Community Plan. The Proposed Action will for the continued conveyance of water to the MDWS to provide Upcountry Maui, which includes the Haʻikū community as it is a part of the Upcountry Maui Water System. The Proposed Action will ensure that the MDWS has a reliable source of water. Should the water lease not be issued, the EMI Aqueduct System may be abandoned, leaving the MDWS without a reliable source of water, and alternative sources would need to be developed.			
Social Infrastructure			
Recreation and Open Space			
Goal Quality recreational facilities to meet the present and future needs of residents of all ages and physical ability with emphasis on securing shorefront lands.			
Objectives and Policies			
1. Develop a system of bicycle and pedestrian accesses along the shoreline, where practicable.			X
2. Secure shorefront lands with scenic and recreational value potential, especially those identified on the Land Use Map.			X
3. Develop adequate park land for active and passive recreational uses.			X
4. Improve maintenance and provide more facilities at existing recreation areas, including the old Maui High School.			X
5. Improve small boat launching facilities at Maliko Bay to accommodate non-commercial boating needs for Central Maui, Upcountry and North Shore residents. "Commercial" in this context refers to charter boat operations or "boats for hire."			X
6. Encourage preservation of rodeo arenas at Maliko and Ulumalu.			X
7. Support the expansion of youth recreation programs, including team sports, archery, and tennis.			X
Implementing Actions: 1. Adopt a mauka/makai access dedication ordinance pursuant to Chapter 46, H.R.S., and acquire accesses through purchase, dedication, condemnation or land exchange. 2. Implement a program to acquire shorefront sites for future parks and lands for new and expanded parks, consistent with the Community Plan Land Use Map. The program should focus on the following areas: a. Develop a regional beach park between Baldwin Park and "Small Park". b. Establish a community park near the Haʻikū School on Paʻuwela Road, as identified on the Land Use Map. c. Expand Hookipa Park and establish parks at Maliko Bay, Kaulahao and Paʻuwela Point. d. Expand camping opportunities in the region in attractive areas such as Hookipa Park. e. Develop a gymnasium for the Haʻikū region.			X

Table 5-14: Pāʻia -Haʻikū Community Plan	S	NS	N/A
f. Develop an active recreational park on lands immediately mauka of the 4th Marine Division Park and preserve Kauhikoa. 3. Provide youth recreation programs, including team sports, archery, and tennis. 4. Revise standards in the Park Dedication Ordinance to increase the quantity and quality of parks generated by new developments. Strategies which should be explored include increasing park assessment provisions, various cash vs. land dedication options, and provision of active vs. passive recreation parks. The analysis should recognize the importance of on-site recreational facilities as well as the need for parks at the neighborhood, community and regional level.			
Education			
Goal Quality education that meets the needs of residents and provides a solid foundation for self-understanding and enrichment, and future educational and employment opportunities.			
Objectives and Policies			
1. Provide permanent school facilities within the region as needed. Avoid the use of portable structures when permanent facilities are warranted.			X
2. Support the construction of covered school walkways and bus shelters.			X
3. Provide a community library in the Pāʻia -Haʻikū region.			X
Health and Public Safety			
Goal A sense of security for all residents and visitors, and aid in the protection of life and property.			
Objectives and Policies			
1. Improve fire protection capabilities in the Haʻikū area and ensure adequate water pressure for fire protection, particularly in urban and rural areas.			X
2. Expand surveillance of beach park areas			X
Implementing Actions: 1. Provide a fire station or sub-station in Haʻikū in the vicinity of Haʻikū Elementary School and near Hāna Highway. 2. Provide more police patrols, especially in beach park areas.			X
Discussion: The Proposed Action will not affect the Social Infrastructure objectives and policies of the Pāʻia - Haʻikū Community Plan.			
Government			
Goal Government that demonstrates the highest standards of fairness and is responsive to the needs of the community, fiscally responsible and prudent, effective in planning and implementing programs to accommodate anticipated growth, fair and equitable in taxation, strict in the implementation of the Community Plan, and managed efficiently to provide coordinated and timely responses and the delivery of necessary services and programs to the public.			
Objectives and Policies			
1. Coordinate, direct and manage future development, and provide for necessary public services and infrastructure in a more effective and timely fashion.			X
2. Establish a real property tax system that is fair and equitable to homeowners and takes into account the ability to pay.			X
3. Inspire and preserve trust and confidence in the integrity of government.			X
4. Continue to investigate and pursue ways to streamline the permit process through means such as consolidated public hearings and concurrent processing of applications.			X
5. Continue to investigate and pursue ways to expedite the review and approval process for projects which will result in public benefit by various methods such as "fast-tracking" and the assignment of permit expediters.			X
6. Utilize the County's budgeting process as a means to carry out the policies and priorities of the Community Plan.			X

Table 5-14: Pā'ia -Ha'ikū Community Plan	S	NS	N/A
7. Utilize the County's real property tax assessment function as both a means to carry out the policies and priorities of the Community Plan and a mechanism for monitoring and updating the Community Plan.			X
8. Support a program of incentives, rebates or credits for voluntary energy conservation and the installation of related improvements, such as solar heating, photovoltaic electrical systems and low flow fixtures.			X
9. Determine whether applications for government action within the region are in conformance with the goals, objectives and policies of the Community Plan, as well as the land use map, prior to decision making.			X
10. Require that actions taken by public officials, boards or commissions of the County of Maui be in compliance with the goals, objectives and policies of the Community Plan.			X
Implementing Actions: 1. Revise building, subdivision and roadway standards appropriate for rural areas to maintain its character, and reduce costs of development. 2. Formulate and implement a directed and managed growth program, consistent with the adopted community plans. 3. Continue to fund and operate mobile/satellite government facilities.			X
Discussion: The Proposed Action will not affect the Government objectives and policies of the Pā'ia -Ha'ikū Community Plan.			

5.7.3 Makawao-Pukalani-Kula Community Plan (1996)

The Makawao-Pukalani-Kula Community Plan is one of nine (9) community plans for the County of Maui. The plan reflects current and anticipated conditions in the Makawao-Pukalani-Kula region, and advances the community's planning goals, objectives, policies, and implementation to guide the future of the region. The Makawao-Pukalani-Kula region is located on the western slopes of Haleakala and includes portions of the Haleakala National Park and encompasses the Upcountry Maui Water Service Area. The following is a discussion of the relevant objectives and policies of the Makawao-Pukalani-Kula Community Plan that relate to the Proposed Action.

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
Economic Activity			
Goal A stable and diverse economic environment which supports a level of community prosperity in order to provide social services and environmental amenities and which respects the region's rural and agricultural lifestyle, open space and natural resources.			
Objectives and Policies			
1. Provide for the preservation and enhancement of agricultural lands and operations, emphasizing the importance of promoting diversified agriculture to the region's economic base and lifestyle.	X		
2. Support programs and plans to develop adequate water systems for agricultural use.			X
3. Protect existing agricultural operations from urban encroachment.			X
4. Support bona fide "family subdivisions" that employ rural planned unit or cluster concepts and thereby encourage existing farms to remain in production.			X
5. Recognize the rural, open space character of the Upcountry region as an economic asset of the island.			X
6. Preserve agriculture by actively promoting locally grown agricultural products.	X		
7. Discourage large scale visitor industry facilities which result in high concentrations of visitors in the Makawao-Pukalani-Kula region (e.g., Maui Tropical Plantation).			X
8. Support existing and new service and retail industry endeavors such as medical, law, accounting and architectural/engineering offices which will diversify the region's economic base without compromising its rural and agricultural integrity, and			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
which will preserve the traditional scale and style of businesses in the Upcountry area.			
9. Encourage the continuation of sugar, pineapple, cattle ranching, and diversified agriculture as major agricultural activities in the region and at the same time encourage the pursuit of alternative agricultural industries.	X		
10. Promote agricultural practices that encourage energy efficient and environmentally sound measures such as catchment systems, and use of grey water, organic pesticides, organic fertilizers and biomass energy.			X
11. Develop a stable and balanced employment base which will provide opportunities for increasing the standard of living for all of the region's residents.			X
12. Support the perpetuation of traditional independent grocery stores to preserve the upcountry character			X
13. Encourage the establishment of an institution of higher learning to enhance economic and cultural diversity.			X
Implementing Action: 1. Analyze the zoning and subdivision ordinances and revise wherever needed to facilitate and support the maintenance and development of diversified agricultural activities. 2. As a condition of subdivision approval for non-agricultural lots, require that lot owners execute agreements which preclude legal action being brought against nearby farmers on issues relating to agricultural operations/nuisances. 3. Request a State Department of Agriculture-prepared master plan to support and expand agricultural activities in the Upcountry region. 4. Support, develop and implement programs to increase demand and reliable supply of locally grown produce to hotels, restaurants, and other visitor industry establishments. 5. Support, develop and implement programs for marketing agricultural products to neighbor island and Pacific Rim basin markets. 6. Seek funding to study the development potential of selected low-intensity service industry activities such as retreats, medical services, camps, cultural centers and education programs	X		
Discussion: The Proposed Action will support the Economic Activity objectives and policies of the Makawao-Pukalani-Kula Community Plan. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Proposed Action will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan, as well as make sound investments, for growth as there are insufficient alternative water sources and infrastructure to meet present and future demands currently.			
Land Use			
Goal The maintenance and enhancement of Upcountry's unique and diverse rural land use character with sensitivity to existing land use patterns, natural resource values, and economic and social needs of the region's residents.			
Objectives and Policies			
1. Recognize the value of open space, including agricultural lands and view planes to preserve the region's rural character			X
2. Establish land use patterns which recognize the "Right to Farm," in order to minimize conflicts between existing agricultural operations and urban-related activities.			X
3. Discourage speculation in agricultural lands.			X
4. Encourage land use patterns which will: • Support the long-term viability of agriculture. • Discourage "urban sprawl". • Discourage heavy industrial activities. • Discourage large scale hotels.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
• Preserve and respect the Haleakala National Park, and protect the region's open space character. • Maintain a separation of character between the Upcountry and the Kihei-Makena regions.			
5. Encourage and support the development of land use performance and subdivision standards such as cluster development which will encourage viable farm operations and discourage estate subdivisions on agricultural lands such as Kula 200 or Kula Glen	X		
6. Encourage new residential developments in areas which are contiguous extensions of, or infills within the established residential pattern, and which do not adversely affect agricultural uses.			X
7. Ensure that adequate lands are set aside for recreational and open space purposes			X
8. Preserve and enhance the "country" atmosphere in all communities by maintaining the small-scale, unique and independent character of each of the three sub-regions. "Country" atmosphere is defined by building style, a low density mix of residences, ranches, open spaces, greenways, plantings and cultivated lands.			X
9. Encourage the use of mechanisms such as land trusts and farm trusts to preserve open space and agricultural activity.			X
10. Support the development of a regulatory review process which encourages and facilitates public participation in all major land development activities.			X
11. Make available agricultural lands for those who wish to farm.	X		
12. Eliminate pseudo-agricultural lots such as Kula 200 and Kula Glen, through recognition of such lots as rural residential subdivisions.			X
13. Support requests for Special Permits in the State Agricultural and Rural Districts as follows: (a) limited public and quasi-public uses in the more remote areas; (b) public facility uses such as utility installation, landfills, and wastewater treatment plants whose location is determined by technical considerations; (c) uses which are clearly accessory and subordinate to a permitted agricultural use on the property; and (d) extractive industries, such as quarrying, where the operation does not adversely affect the natural environment or Upcountry character.			X
14. Discourage additional development of large scale retail outlets and encourage uses which support neighborhood retail stores.			X
15. Discourage heavy industrial uses in the Makawao-Pukalani-Kula region.			X
16. Recognize the four (4) semi-urban centers of Makawao Town, Pukalani, Hali'imaile and Waiakoa Village. Within them, support the following land use and circulation patterns: a. Within Makawao Town: • Business use on Baldwin and Makawao Avenues around the established central core • Public use to support public and quasi-public needs • Open space areas which enhance the Makawao Town's country town ambiance. • Pedestrian, equestrian, and bicycle pathways which provide alternative linkages among the various sections of Makawao • Residential use including elderly housing. b. Within Pukalani: • Diverse business uses in centralized, consolidated locations • Limited multi-family use located adjacent to open space resources and consistent in scale and character with surrounding single family uses. • Single-family expansion contiguous with existing residential uses • Parks and open spaces within and surrounding commercial and residential areas. c. Within Hali'imaile: • Future neighborhood commercial use.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
• Single-family expansion contiguous with existing residential uses • Public and park uses reflecting existing uses and areas for expansion • Existing agricultural operations and baseyard. d. Within and surrounding Waiakoa: • Agricultural uses and open space. • Low density, rural residential uses • Village center at Waiakoa. • Single family use surrounding Waiakoa Village. • Public and park uses reflecting existing land uses and areas for expansion. • Projects which avoid "urban sprawl".			
17. Support the centralization of business activities and avoid the expansion of strip commercial development.			X
18. Where appropriate, support the reclassification of State Land Use districts to ensure consistency between State Land Use designations and land use designations defined by the Makawao-Pukalani-Kula Community Plan land use map.			X
19. Encourage the development of land use performance and subdivision standards which are compatible with the agricultural Upcountry character.			X
20. Require the development of a comprehensive rezoning program to implement the land use objectives of the Makawao-Pukalani-Kula Community Plan.			X
21. Ensure an adequate supply of lands designated for residential use to address the affordable and elderly housing needs of the region's residents.			X
22. Maintain the open space areas along the Makawao-side of Haleakala Highway Bypass to allow a distinct separation between Pukalani and Makawao.			X
23. Recognize Pukalani as the geographic, public service and commercial hub of the region.			X
24. Ensure an adequate supply of land designated for residential use to provide opportunity for residents to participate in housing market "trade-ups".			X
25. Establish water resource availability as a major criteria in establishing land uses.	X		
26. Support land use spatial patterns which enhance the functional viability of pedestrian-oriented town and village centers			X
27. Ensure and encourage the long-term viability of "Mom and Pop" stores through establishment and availability of appropriate land use designations			X
28. Support a new Rural land use designation with a minimum two-acre lot size which recognizes large-lot residential land use patterns within the backdrop of a semi-rural setting. The use would be typified by "Gentleman Estate" housing or "Pseudo Agricultural" uses in which the residence would be the primary use and any non-intrusive agricultural activities would be secondary			X
29. Explore the development of an additional Ag park.	X		
30. Utilize the Rural classification to provide a transition and buffer between the Urban and Rural districts			X
31. Support the establishment of religious institutions and other community-oriented centers near growing population centers.			X
Implementing Actions: 1. Revise the subdivision ordinance to require bona-fide agricultural use for agricultural subdivisions. 2. Pursue programs to discourage speculation in agricultural lands including: • Land banking. • Dedication of lands for agricultural use supported by County tax policies and State programs. • County applied subzone provisions in the State Agricultural District which strictly limit certain lands to agricultural uses. • Transfer of development rights .			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
3. Adopt zoning standards which use varying minimum lot sizes or other means to differentiate rural residential and agricultural land uses; and implement a program to rezone existing pseudo-agricultural subdivisions to the two-acre rural district. 4. Adopt alternative subdivision standards, in regards to roadway widths, street lights, etc., that reflect the rural and agricultural character of the region. Such standards shall at a minimum, provide for sidewalks on one side of the street for County roads within a 3/4-mile radius of developed or proposed school sites. 5. Develop guidelines for rural cluster development and planned unit development as part of a comprehensive growth management and open space protection program. Minimum lot size and unity density requirements for specific property designations in this Plan shall be superseded by sizes and densities specified in ordinances that are enacted establishing comprehensive rural zoning and/or agricultural or rural district cluster development standards and procedures. 6. Implement cooperative public and private land use activities (e.g., Hale Mahaolu programs) which address the region's social welfare needs. 7. Undertake a comprehensive zoning program to implement the Makawao-Pukalani-Kula Community Plan Land Use Map in order to phase out "Interim" zoning within 18 months of the adoption of this plan. 8. Utilize the land productivity inventory and assessment (i.e., Land Study Bureau "D" and "E" lands and ALISH) to identify low productivity lands which may be suitable for housing development. 9. For areas along the Pukalani Bypass Highway and along Kula Highway, provide for a minimum 50-foot open space buffer (i.e., no structures) on each side of the highway pavement. Vehicular access onto the Pukalani Bypass Highway should be prohibited. Access should be from Makani Road, Makawao Avenue or Haleakala Highway. 10. As a condition of zoning for the Hui No'eau property, limit public/quasi-public uses to those uses directly related to art display, education, performance, crafting and ancillary activities. 11. Determine the need for an additional school site(s) within the planning region at the time of LUC boundary amendments and/or zoning applications for additional housing projects. Special consideration should be given in this regard to additional housing in Hali'imaile Town. 12. Support the project district zoning and commercial development of the old Crook Estate in Makawao as follows: approximately two acres for commercial development along Makawao and Baldwin Avenues to a depth of 200 feet, with the remaining land to be divided between park/open space and elderly housing. 13. Require the dedication to the County of a 3-acre park at Kealahou at the time of single-family zoning and Rural land use classifications are granted for the Raymond von Tempsky property mauka of Kula Highway. 14. Require that the development and dedication (pursuant to parks and playgrounds assessment requirements) of the 15.01-acre park and the development of the 5.11-acre public/quasi-public area and 5-acre multi-family/elderly housing in the vicinity of the proposed Kulamalu development along Kula Highway be developed concurrently with the development of the 20-acre commercial site. The commercial site shall be Country-Town Business at the time of zoning. 15. The Rural Kula lands in the Crater Road area shall have one-acre lots with one house per lot. 16. The 3.75-acre DePonte parcel in Keokea shall be Rural with one-acre lots. 17. The approximately 45-acre Gomes/Phillips subdivision shall be Rural with one-half acre lots. 18. Access to the .75-acre Tam parcel between the Lower Kula Road and the Kula Highway shall be from the Lower Kula Road only. 19. The commercial sites for, and adjacent to, the Ulupalakua Ranch Store and the Tedeschi Winery shall be Country-Town Business at the time of zoning. 20. The .38-acre parcel which houses Maui Island Real Estate shall be used for "low impact" (e.g., traffic and noise) commercial operation(s) during daylight hours only. 21. The 21-acre Malama Pacific property shall have an appropriate buffer and one row of Rural uses on the mauka side.			

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
22. New commercial development along Haleakala Highway in Pukalani should be discouraged out of concern over the impacts on traffic flow and the residential neighborhood. New commercial development along Makawao Avenue in Pukalani should be limited to professional services with minimal traffic and noise impacts.			
Discussion: The Proposed Action will support the Land Use objectives and policies of the Makawao-Kihei-Makena Community Plan. The Proposed Action will allow for the continued conveyance of water through the EMI Aqueduct System. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Upcountry Maui Water System is the second largest on the island and the County anticipates the population dependent on the water system will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~. Issuing the Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan for population growth as there are insufficient alternative water sources and infrastructure to meet present and future demands (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020).			
Environment			
Goal Protection of Upcountry's natural resources and environment as a means of preserving and enhancing the region's unique beauty, serenity, ecology, and productivity, in order that future generations may enjoy and appreciate an environment of equal or higher quality.			
Objectives and Policies			
1. Preserve environmental resources by maintaining important agricultural lands as an integral part of the open space setting in each community.			X
2. Recognize agricultural lands as an essential ingredient to the Upcountry atmosphere. Criteria for determining such lands may include: • Land Study Bureau productivity ratings for agricultural lands. • Lands presently in cultivation • Agricultural Lands of Importance to the State of Hawai'i (ALISH).			X
3. Recognize and protect rare, endangered and unique biological resources in the region			X
4. Encourage Federal, State and County cooperation in the preparation of a comprehensive Haleakala summit master plan to promote orderly and sensitive development which is compatible with the natural and native Hawaiian cultural environment of Haleakala National Park.			X
5. Support efforts for a comprehensive watershed management program which shall incorporate, as key components, soil conservation, forest management and reforestation/replanting which: a. Utilizes endemic and indigenous plant species; b. Protects the environment from exotic plants and animals; and c. Prevents the introduction and establishment of non-native species within this native forest region that may ultimately threaten water supply and native ecosystems.			X
6. Preserve the existing visual, noise, odor and air quality characteristics found in agricultural/rural neighborhoods of the Makawao-Pukalani-Kula region.			X
7. Preserve the health and welfare of the region's residents by encouraging a balanced approach in utilizing man-made pesticides, herbicides and fertilizers.			X
8. Encourage and support the use of organic farming as a means of maintaining the integrity of Upcountry's environment.			X
9. Promote landscaping which utilizes endemic and indigenous plant species.			X
Implementing Actions: 1. Conduct a regional land resource assessment to identify areas suitable for revegetation and reforestation with native plant species.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
2. Implement a forest planting program to achieve a goal of an additional 10,000 acres of forested land to enhance the Makawao-Pukalani-Kula region's natural environment (e.g., watershed recharge, soil erosion mitigation). 3. Assist State and Federal government efforts to prevent establishment and spread of invasive alien species. 4. Encourage agencies and educational institutions to increase instructional programs in organic farming and integrated pest management. 5. Identify and implement ways to mitigate aircraft noise which adversely affects Upcountry's rural residential areas and Haleakala National Park.			
Discussion: The Proposed Action will not affect the Environment objectives and policies of the Makawao-Kihei-Makena Community Plan.			
Cultural Resources			
Goal The identification, preservation and where appropriate, restoration and promotion of cultural resources and practices which reflect the rich and diverse heritage found in the Upcountry region.			
Objectives and Policies			
1. Recognize the importance of historically and archaeologically sensitive sites, both known and undiscovered, and encourage their preservation and protection.	X		
2. Support public and private efforts to inventory, evaluate, classify, register, and protect, as appropriate, cultural resources to increase public knowledge of the region's rich and diverse cultural character.			X
3. Promote community awareness of the Makawao-Pukalani-Kula region's cultural and historic backgrounds through the establishment of museums, cultural centers and educational programs.			X
4. Recognize and respect the Upcountry region's multi-cultural heritage.			X
5. Maintain the integrity of Upcountry's cultural and historical resources through implementation of a controlled access program to designated sites.			X
6. Encourage and support the publication of an Upcountry newspaper			X
7. Promote distinct cultural resources as an identifying characteristic of the region			X
8. Protect the visual integrity of upcountry cultural landscapes.			X
9. Legitimize indigenous architecture as viable spaces for living, work and recreation.			X
Implementing Actions: 1. Expand and update the County Cultural Resource Management Program to identify significant cultural resources and provide recommendations for their protection and preservation. 2. Promote significant cultural events such as the Makawao Rodeo, Holy Ghost Feast, Obon festivals, Seabury Hall Craft Fair and Makawao Parade. 3. Seek funding to establish and maintain an Upcountry cultural center which will document the rich and diverse heritage of the region. Components of the cultural center should include: a. A Paniolo museum which documents the rich Paniolo history of Makawao Town; b. A cultural practices center which documents and perpetuates ancient arts and crafts of the host culture that are unique the region (e.g., dryland agriculture and adz making); c. A rural history center which records and promotes the history of Kula, Ulupalakua and other rural settlements which were important in the development of the Upcountry area; d. An Upcountry community theater to provide a forum for the practice, preservation and perpetuation of cultural and performing arts. 4. Modify restrictive building code requirements to allow new buildings and renovations to be consistent with historic designs, such as balconies and canopies which protrude over the sidewalk, or others, which do not compromise public safety. 5. Develop a County ordinance for indigenous architecture.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
6. Adopt standards for indigenous architecture.			
Discussion: The Proposed Action will not affect the Cultural Resources objectives and policies of the Makawao-Kihei-Makena Community Plan. The proposed action will also insure that the EMI Aqueduct System, which has been in operation for more than 100 years, will be preserved.			
Department of Hawaiian Home Lands			
Goal The immediate implementation of programs and settlement of Native Hawaiians on lands of the Department of Hawaiian Home Lands that diversifies and enriches the Upcountry community.			
Objectives and Policies			
1. Encourage and support planning and implementation of Department of Hawaiian Home Lands projects that benefit native Hawaiians, that include a variety of land uses in order to form a complete community, and that are in harmony with the goals and objectives of the Makawao-Pukalani-Kula Community Plan.	X		
2. Recognize and support the allocation of water resources for Department of Hawaiian Home Lands projects, consistent with applicable State and Federal laws.	X		
3. Encourage cooperative planning programs between the State, the County, the DHHL and the native Hawaiian community which will foster a desired lifestyle and perpetuate the culture.			X
4. Coordinate and integrate the development of Department of Hawaiian Home Lands' projects with surrounding Upcountry communities.			X
5. Encourage the development of cooperative planning programs between the State and County and the Department of Hawaiian Home Lands to ensure that infrastructure and public service needs adequately address the needs of the entire Upcountry community. For example, consideration shall be given to the identification and development of new school sites, facilities, and programs which will provide adequate choices for education for Upcountry residents.			X
6. Encourage the development of cooperative agricultural development programs between the County and the Department of Hawaiian Home Lands to support diversified agricultural pursuits (i.e., programs, for example, which may identify opportunities for creating efficiencies in scale which will benefit all Upcountry farmers).			X
7. Support educational facilities and programs development by the Department of Hawaiian Home Lands.			X
8. Recognize the Department of Hawaiian Home Lands' Waiohuli-Keokea region as a potential agricultural and affordable housing community and the eventuality of a Hawaiian sovereign entity.			X
Implementing Actions: 1. Encourage the creation of a Department of Hawaiian Home Lands-County Task Force to study and identify opportunities for developing cooperative programs and projects. 2. Develop alternate subdivision standards for infrastructure which: (a) ensure public health, safety and welfare; (b) are consistent with the desired lifestyle of the Native Hawaiian community; (c) reduce construction costs; and (d) speed the settlement of the project area.			X
Discussion: The Proposed Action will support the Department of Hawaiian Home Lands objectives and policies of the Makawao-Kihei-Makena Community Plan. The Water Lease will include a reservation of water for the DHHL. Non-potable water needs for the DHHL's lands in Ke'anae-Wailuānui amount to 6,868,000 gpd. Although the DHHL holds a reservation for 3,000 gpd of potable water for this area for development over the next 20 years, another 7,000 gpd of potable water may be required for longer-term development. Thus, a potential reservation for this area amounts to 6,875,000 gpd. Ke'anae is fed by Pi'ina'au and Palauhulu Streams; Wailuānui is fed by Wailuānui and Waiokamilo Streams. These four streams are, or will soon be, fully restored. The proposed Water Lease, therefore, would not be affected by such reservations of water for the DHHL.			

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
For its agricultural and residential lots in Keokea-Waiohuli, the DHHL has already secured a potable water reservation from the CWRM. Non-potable water demand amounts to 10,428,000 gpd for which a water reservation would have to be secured. Until 2016, the DHHL's Pulehunui lands in Central Maui had been leased to HC&S, cultivated in sugarcane ~~sugar cane~~, and, thus served by the HC&S irrigation system in existence at the time. The DHHL's current plans for these lands include agricultural, commercial, industrial and civic uses. A reservation of 1,734,000 gpd of ground water has already been secured from the CWRM. A non-potable water demand of 1,027,510 gpd has been identified, and water delivered through the EMI Aqueduct System has been identified as a potential source of this water. The DHHL staff and Hawaiian Homes Commission has identified 11,455,510 gpd (10,428,000 gpd for Keokea-Waiohuli + 1,027,510 gpd for Pulehunui) of water as their recommendation for a reservation of water rights sufficient to support current and future homestead needs related to this proposed Water Lease. See Section 2.1.1 (Department of Hawaiian Homelands Water Reservation). The DHHL has indicated that reserved water may be available for other purposes until the DHHL has an actual need for the water. In addition, for its Keokea-Waiohuli and Pulehunui lands, the DHHL will be dependent on the EMI Aqueduct System collecting and transporting East Maui stream waters, in order to get waters to these lands. However, the DHHL has cautioned that in light of the fact that no water leases have been issued under HRS § 171-58, and the manner in which reservations are to be actualized has yet to be determined, in addition to any specifications made by the CWRM and BLNR regarding the Water Lease, a separate agreement between the lessor and the DHHL will be necessary to allow any temporary use of water reserved for DHHL.			
Urban Design			
Goal Recognition and preservation of the unique design characteristics of the Makawao, Pukalani and Kula communities in order to enhance Upcountry's man-made environment.			
Objectives and Policies			
1. Encourage urban design concepts which promote and produce pedestrian orientation, town centers, mixed land uses and energy conservation principles to enhance the identity and livability of new and existing communities			X
2. Support the revision of subdivision and roadway design criteria and standards to be more compatible with the rural character of the Upcountry region.			X
3. Utilize design standards for multi-family residential uses which respect Upcountry's rural residential lifestyle.			X
4. Encourage commercial building scales which are compatible with the low-scale character of existing commercial structures.			X
5. Preserve the unique characteristics of all of the Upcountry towns by recognizing and respecting architectural styles as described in the Country Town Design Guidelines.			X
6. Support the development of pedestrian, equestrian and bikeway connections which provide safe and convenient linkages within and between Upcountry communities.			X
7. Encourage the use of appropriate landscaping, with greenways where possible, along major roadways, parking areas and land use transition areas to establish and maintain landscape themes which are consistent with the character of the each Upcountry community			X
8. Enforce a two-story or 35-foot height limitation throughout the region, except for public/quasi-public uses such as auditoriums, gymnasiums, and fire stations.			X
Implementation Action: 1. Maintain Makawao Avenue and Baldwin Avenue as the primary roadways serving the Makawao Town center. 2. Provide continuous sidewalks and encourage protective overhangs along Baldwin and Makawao Avenues. 3. Provide continuous sidewalks along Lower Kula road within Waiakoa Village, from the Kula Community Center to Calasa Road. 4. Areas designated for multi-family use should adhere to the following design guidelines:			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
a. Building heights should combine one and two story structures limited to 35 feet which are compatible with surrounding single-family residences; b. Exterior materials should emphasize natural materials such as wood, with earth-tone colors; c. Private open spaces should be provided and maintained for each unit; and d. Generously landscaped common areas should be provided. 5. Develop and implement alternate rural standards for public facilities and privately. sponsored building improvements, roadways and subdivisions. 6. Develop appropriate street lighting standards for agricultural and rural areas.			
Discussion: The Proposed Action will not affect the Urban Design objectives and policies of the Makawao-Kihei-Makena Community Plan.			
Physical Infrastructure			
Goal The timely and environmentally sensitive development and maintenance of infrastructure systems which protect and enhance the safety and health of Upcountry's residents and visitors, including the provision of domestic water, utility and waste disposal services, and effective transportation systems which meet the needs of residents and visitors while maintaining the region's rural character.			
Objectives and Policies			
Transportation			
1. Ensure the safe and convenient movement of people and goods by providing maintained roadways having adequate carrying capacities.			X
2. Give priority consideration to the "no-build" alternative of the proposed Upcountry-Kihei connector highway, and give secondary consideration to the alternative route with the least negative impact to the Upcountry lifestyle and character by locating the Upcountry terminus in the vicinity of the intersection at Hali'imaile Road and Haleakala Highway.			X
3. Support the planning of new roadways provided that there would be minimal impact to the Upcountry lifestyle and character.			X
4. If the "no-build" alternative is not chosen, facilitate agricultural traffic movements at the intersection of the proposed Kihei-Upcountry highway and Omaopio Road, and at the intersection of the proposed Kihei-Upcountry highway and Pulehu Road by requiring an overpass and/or underpass for both intersections.			X
5. Provide adequate off-street parking and a loading zone to serve the business center in Makawao Town.			X
6. Improve the road through Hali'imaile or provide an additional access road between the terminus of the proposed Upcountry-Kihei Highway, if built, and the communities east of Baldwin Avenue, in order to relieve traffic congestion in Makawao town.			X
7. Encourage and support alternative transportation programs that could include various methods of land use planning and urban design, which reduce reliance on the automobile as the primary mode of travel.			X
8. Support the establishment of a limited service public transportation system to key destinations within the Upcountry area to meet the needs of youth, after school needs of students, seniors and physically disabled.			X
9. Establish safe pathways connecting schools, recreation facilities, and commercial and residential centers for use by walkers, joggers, equestrians and bicyclists.			X
10. Provide transportation improvements in accordance with the Americans with Disabilities Act, including sidewalks, bikeways and other traffic safety improvements at existing and proposed school areas to ensure student safety.			X
11. Promote traffic safety through provision of roadway safety and maintenance improvements, and traffic control improvements throughout the region.			X
12. Recognize the need to establish designated truck traffic routes.			X
Implementing Actions: 1. If the "no-build" alternative is not chosen, establish an alignment for the Upcountry-Kihei Connector road which provides a connection to Haleakala Highway near its intersection with Hali'imaile Road			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
2. Establish an additional roadway connection to Haleakala Highway from Pukalani Terrace through the 65-acre single-family area located north of and adjacent to the existing Pukalani Terrace residential subdivision. The alignment of this new roadway shall not displace existing residences. 3. Construct pedestrian, equestrian and bikeway facilities which connect major origin and destination points. Such facilities should include: a. a. Pedestrian/equestrian/bikeway routes which link the Makawao Town center, Eddie Tam Memorial Gym, Kalama Intermediate School, and continuing along Makani Road to Haleakala Highway. b. b. Pedestrian/equestrian/bikeway routes which link Pukalani residential areas with the Pukalani Community Center, Pukalani Elementary School, and the Pukalani Terrace Center, along Pukalani Street from Haleakala Highway to the Pukalani Country Club, with a future extension to the Kulamalu project. c. c. Pedestrian/bikeway route along the Pukalani Bypass and Kula Highway from Makani Road to Ulupalakua. 4. Eliminate as a capital improvement project, the planning, design and funding for the Makena-Ulupalakua connector road. 5. Develop and implement a County user fee for commercial bicycle tours which shall be used to fund bikeway improvements. 6. Provide roadway shoulder improvements to improve bicycling safety, but do not detract from the rural atmosphere. 7. Prepare and implement an Upcountry master plan for bikeways, equestrian trails and pedestrian ways, including a capital improvements program which can be funded by Federal, State and County monies. 8. Prepare a roadway master plan for the Upcountry region, including the development of appropriate road standards for agricultural and rural areas. 9. Prepare and implement a public bus or van transportation system plan for the Upcountry area. 10. Establish a "park and ride" site(s) in the Upcountry area. Sites should be identified to facilitate carpooling to Wailuku-Kahului and to Kihei-Makena. 11. Improve the safety of Omaopio and Pulehu Roads. 12. Improve upper Kealaloa Avenue, particularly at its intersection with Haleakala Highway, to facilitate movement of heavy weight vehicles. Once such improvements are made, heavy weight vehicles (30,000 GVW) should not be permitted as through traffic between Makawao Avenue and Meha Road. Any improvements shall preserve the scenic qualities of the route to the greatest extent possible. 13. Prohibit vehicular access onto the Pukalani Bypass Highway. Access should be from Makani Road, Makawao Avenue or Haleakala Highway. 14. New commercial development along Haleakala Highway in Pukalani should be discouraged out of concern over the impacts on traffic flow and the residential neighborhood. New commercial development along Makawao Avenue in Pukalani should be limited to professional services with minimal traffic and noise impacts.			
Water			
1. Prioritize the allocation of water as new resources and system improvements become available as follows: (a) for maintenance and expansion of diversified agricultural pursuits and for the Department of Hawaiian Homes projects; and then (b) for other uses including development of new housing, commercial and public/quasi-public uses.	**X**		
2. Encourage a flexible and comprehensive water management approach that recognizes the various collection and delivery improvements as one cohesive system.	**X**		
3. The Department of Water Supply shall expand water supply and distribution systems, including catchment systems, in accordance with the directions set forth in the Makawao-Pukalani-Kula Community Plan.			**X**

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
4. Restrict the use of any water developed within or imported to the Upcountry region to consumption within the Upcountry region, with exception provided for agricultural use.			X
5. Recognize and support the immediate allocation of water resources for Department of Hawaiian Home Lands projects and agriculture.	X		
6. Seek expanded municipal withdrawal from the lowest cost source to serve the Upcountry region.			X
7. Support the development of separate domestic and irrigation water systems.			X
8. Explore the development of alternative water sources (e.g., grey water, catchment systems, etc.) to meet the needs of diversified agriculture, businesses and residents			X
9. Encourage the construction of additional storage capacity by the Department of Water Supply, commercial developers, and individual farmers to help alleviate the inadequate water supply			X
10. Recognize the importance of the forested watershed areas and that their health and well-being are vital to all the residents of the Upcountry area.	X		
11. Explore a comprehensive reforestation program to increase and catch more rainwater for the Upcountry area.			X
12. Encourage cooperative efforts among Federal, State, and County agencies, and developers to ensure that water storage and delivery needs of the region are met in a timely and orderly manner.			X
Implementing Actions: 1. Increase catchment efficiency and storage capacity on the upper Kula line to achieve 4 mgd sustained delivery to farms and residences. 2. Increase the deliverable capacity of the lower Kula line to 7.5 mgd and extend the line to Keokea to serve Department of Hawaiian Home Lands projects. 3. Systematically improve and upgrade the existing water delivery system. 4. Provide incentives for water conservation practices. 5. Provide tax and/or water rate incentives for construction of agricultural water storage facilities. 6. Increase the pumping capacity from low cost sources to upper areas to supplement the surface water supply. 7. Develop and execute an agreement which ensures for the County, long-term rights to water from the lowest cost sources. 8. Conduct a groundwater development feasibility study for the Upcountry region. 9. Implement a water conservation and education program.			X
Liquid and Solid Waste Disposal			
1. Improve existing solid waste disposal facilities and services.			X
2. Maintain a waste transfer station site in the Makawao-Pukalani-Kula region			X
3. Support wastewater reclamation and grey water alternatives as a means of reducing demands upon limited water resources in the Upcountry region.			X
4. Support solid waste reduction, recycling and reuse programs in the Upcountry area			X
Implementing Actions: 1. Continue and expand a pro-active County waste management strategy which includes reduction, recycling and reuse of solid waste and wastewater as major components. 2. Construct a wastewater collection and treatment system for the Waiakoa, Makawao, Pukalani and all new urban developments. 3. Utilize treated effluent for irrigation of farms, golf courses, parks and highway landscaping.			
Drainage			
1. Respect and preserve natural drainageways as part of good land development practices and recognize their value as open-space corridors.			X
2. Implement comprehensive drainage improvements and maintenance procedures to ensure that the overall system will meet public safety and welfare needs of the region's residents.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
3. Reduce the threat of property loss and environmental degradation attributed to stormwater runoff through a comprehensive reforestation and revegetation program.			X
4. Support the Soil and Water Conservation Districts in their efforts to implement soil erosion and drainage control management programs.			X
5. Prepare a drainage master plan for the Upcountry region, including appropriate standards for drainage systems.			X
6. Plan, program, budget and construct drainage system capital improvement projects to improve safety.			X
Energy			
1. Promote conservation and efficiency as the energy resource of first choice			X
2. Develop incentives and requirements for energy efficient building design and site development practices through modifications to building, zoning, and subdivision codes.			X
3. Encourage urban design concepts which promote pedestrian orientation and mixed land uses in order to reduce automobile travel and promote energy conservation.			X
4. Prohibit geothermal energy development that would negatively impact the Upcountry region or diminish culturally sensitive resources.			X
5. Encourage the development and location of public facilities within or in close proximity to the Makawao, Pukalani, and Kula Communities, thereby reducing energy expenditures.			X
6. Achieve the energy efficient movement of people and goods through improvements to the transportation systems serving the planning area			X
Implementing Actions: 1. Adopt standards and regulations for the use of solar water heating, low flush toilets and other conservation fixtures in new building construction. 2. Develop and adopt an integrated energy functional plan for the County of Maui. 3. Use energy efficient street lights and develop appropriate street lighting standards for agricultural and rural areas. 4. Study and identify opportunities, including tax incentives, for developing alternative energy sources such as wind, biomass, solar and water driven electricity in the Upcountry region.			X
Discussion: The Proposed Action will support the Physical Infrastructure objectives and policies for water of the Makawao-Kihei-Makena Community Plan. The Proposed Action will allow for the continued conveyance of water through the EMI Aqueduct System. The EMI Aqueduct System conveys water to the MDWS, which in turn provides water for domestic and agricultural needs in Upcountry Maui, including KAP and the planned 262-acre KAP expansion. The Upcountry Maui Water System is the second largest on the island and the County anticipates the population dependent on the water system will grow to approximately ~~43,675~~ 44,000 by 2035 ~~2030~~Issuing the Water Lease will ensure the County has a reliable water source to provide for Upcountry Maui and to adequately plan for population growth as there are insufficient alternative water sources and infrastructure to meet present and future demands (Draft Maui Island Water Use and Development Plan, March 2019, Updated July 2020). Non-potable water needs for the DHHL's lands in Ke'anae-Wailuānui amount to 6,868,000 gpd. Although the DHHL holds a reservation for 3,000 gpd of potable water for this area for development over the next 20 years, another 7,000 gpd of potable water may be required for longer-term development. Thus, a potential reservation for this area amounts to 6,875,000 gpd. Ke'anae is fed by Pi'ina'au and Palauhulu Streams; Wailuānui is fed by Wailuānui and Waiokamilo Streams. These four streams are, or will soon be, fully restored. The proposed Water Lease, therefore, would not be affected by such reservations of water for the DHHL. For its agricultural and residential lots in Keokea-Waiohuli, the DHHL has already secured a potable water reservation from the CWRM. Non-potable water demand amounts to 10,428,000 gpd for which a water reservation would have to be secured. Until 2016, the DHHL's Pulehunui lands in Central Maui had been leased to HC&S, cultivated in sugarcane ~~sugar cane~~, and, thus served by the HC&S irrigation system in existence at the time. The DHHL's current plans for these lands include agricultural, commercial, industrial and civic uses. A reservation of 1,734,000 gpd of ground water has			

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
already been secured from the CWRM. A non-potable water demand of 1,027,510 gpd has been identified, and water delivered through the EMI Aqueduct System has been identified as a potential source of this water. The DHHL staff and Hawaiian Homes Commission has identified 11,455,510 gpd (10,428,000 gpd for Keokea-Waiohuli + 1,027,510 gpd for Pulehunui) of water as their recommendation for a reservation of water rights sufficient to support current and future homestead needs related to this proposed Water Lease. See Section 2.1.1 (Department of Hawaiian Homelands Water Reservation). The DHHL has indicated that reserved water may be available for other purposes until the DHHL has an actual need for the water. In addition, for its Keokea-Waiohuli and Pulehunui lands, the DHHL will be dependent on the EMI Aqueduct System collecting and transporting East Maui stream waters, in order to get waters to these lands. However, the DHHL has cautioned that in light of the fact that no water leases have been issued under HRS § 171-58, and the manner in which reservations are to be actualized has yet to be determined, in addition to any specifications made by the CWRM and BLNR regarding the Water Lease, a separate agreement between the lessor and the DHHL will be necessary to allow any temporary use of water reserved for DHHL. The Water Lease under the Proposed Action will include a requirement for watershed management for East Maui, recognizing the importance of the forested watershed areas as discussed in Section 2.1.			
Housing			
Goal Housing opportunities for the residents of Makawao-Pukalani-Kula, to include all income and age groups, which are affordable, safe, and environmentally and culturally compatible.			
Objectives and Policies			
1. Encourage the use of tools such as low-rise planned unit development or rural cluster housing approaches which will allow housing projects to be more compatible with the natural setting and preserve open space			X
2. Provide increased opportunities for affordable housing through: • Coordinated government assistance programs including the Department of Hawaiian Home Lands • Provision of variable housing densities in areas designated for residential use • Encourage housing rehabilitation through programs offering loans, grants, and/or technical assistance and community outreach.			X
3. Provide a mixture of housing types, smaller lot sizes, and coordinated assistance programs aimed at lowering housing costs and expanding housing opportunities.			X
4. In keeping with public health and safety principles, and consistent with the Upcountry character, develop zoning, subdivision and design standards which will facilitate the development of affordable housing			X
5. To establish an efficient settlement pattern, discourage a dispersed pattern of development, thereby reducing public service, infrastructure and maintenance costs.			X
6. Provide independent living and assisted living elderly housing with support facilities and services to meet the needs of the region's elderly residents			X
7. Seek the timely and orderly development of lands designated by the Community Plan for residential purposes.			X
Implementing Actions: 1. Establish a housing rehabilitation program, including loans, grants, and/or technical assistance and community outreach. 2. Provide programs such as home-ownership counseling and self-help housing to enhance home ownership opportunities for Upcountry residents. 3. Provide housing opportunities for independent living for Upcountry's elderly within the Kulamalu project along Kula Highway and the new Project District 3/Crook Estate in Makawao Town. 4. Explore provisions to provide assisted living services for the elderly and physically disadvantaged at Keokea, provided that water is available for farming and for the Department of Hawaiian Home Lands.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
5. Rewrite the existing Maui County Building Code and subdivision code to reduce home construction costs in rural and remote areas and to ensure that development is compatible with the Upcountry area. 6. Develop and adopt guidelines for rural cluster developments. 7. Consider the development of rules which would allow the use of house trailers for temporary residential use while construction of permanent residence is in progress. Such use would be allowed only for a period of two (2) years from issuance of the building permit.			
Discussion: The Proposed Action will not affect the Housing objectives and policies of the Makawao-Kihei-Makena Community Plan.			
Social Infrastructure			
Goal An efficient and responsive system of people-oriented public services which enable residents to live a safe, healthy and enjoyable lifestyle, and offer the youth and adults of the region opportunities and choices for self and community improvement.			
Objectives and Policies			
Recreation			
1. Develop a system of parks serving dispersed residential areas, including a regional park of at least 50 acres in the Upcountry region			X
2. Establish youth centers and programs at locations suitable for and accessible by the youth of the region			X
3. Improve park utility and operations by expanding organized sports programs and encouraging use of facilities.			X
4. Pursue the development of equestrian trails, pathways, greenways and related facilities which will meet the recreational needs of runners, joggers, walkers, horseback riders and cyclists.			X
Implementing Actions: 1. Prepare an Upcountry Greenway Master Plan to identify routing alternatives and capital programming requirements for equestrian trails, jogging and walking paths, and bikeways. The Master Plan shall address the following planning elements: a. Identification of user needs; b. Identification of greenway physical requirements (e.g. rights-of-way, slopes, etc.); c. Definition of user characteristics by user groups; d. Landownership, land use, physical and environmental opportunities and constraints in the Upcountry area which shall be considered in greenway routing analysis; e. Development of alternative routing scenarios which address the planning parameters noted above; f. Evaluation of the alternative routing scenarios and recommendation for a preferred scenario; g. Recommendations for phasing and capital programming. 2. Expand the developed area at Mayor Eddie Tam Memorial Center to provide for additional parking and recreational facilities. 3. Provide public swimming pools in Makawao and Kula. 4. Explore the use of the old Keokea School as a community recreation resource. 5. The County shall condemn or negotiate for a regional park of at least 50 acres in the Upcountry region, and shall appropriate necessary funding for such condemnation or purchase.			X
Health and Public Safety			
1. Establish a centrally located comprehensive health center with full emergency services to all communities.			X
2. Improve street lighting and security around schools, parks and other public facilities.			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
3. Improve police protection services by providing a police sub-station in the Upcountry region.			X
4. Provide public restroom facilities in Makawao Town.			X
Implementing Actions: 1. Develop an Upcountry public safety center centrally located in Pukalani which will provide facilities for comprehensive health and emergency services, and a police sub-station. 2. Explore the establishment of general hospital services at Kula San Hospital. 3. Move ambulance service from Kula San to the Kula Fire Station.			X
Education and Family Services			
1. Encourage shared use of school facilities with the community to include such facilities as a community-school library, gymnasium, and public service rooms.			X
2. Support the development of higher education programs and facilities which complement Upcountry's economic, natural resources and cultural base including an institution of higher learning.			X
3. Support development of adequate child care facilities to assist working families.			X
4. Provide adequate school facilities to ensure an effective, efficient and comfortable learning environment for the region's children.			X
5. Coordinate the establishment of child care facilities, senior citizen centers, religious institutions and social service offices to benefit from complimentary and mutually beneficial combination of service delivery.			X
6. Encourage the expansion of programs and facilities for early childhood education, family day care, and youth services.			X
7. Recognize and support the traditional role of religious institutions and their related functions as a central part of the Upcountry community			X
Implementing Actions: 1. Provide additional elementary schools, as required and establish a student enrollment limit of 700 for each school. 2. Provide a new intermediate school when student enrollment at Kalama Intermediate School reaches 1,200. The new intermediate school would serve students from Pukalani and Kula, with Kalama Intermediate School serving students from Makawao and Haʻikū. 3. Construct permanent school buildings to replace existing temporary classrooms.			X
Discussion: The Proposed Action will not affect the Social Infrastructure objectives and policies of the Makawao-Kihei-Makena Community Plan, but it is noted that the Water Lease will allow for the continued provision of water from EMI to MDWS for the Upcountry Maui Water System, which provides water to the Kula hospital.			
Government			
Goal The provision of accessible, cost effective and responsive government services and programs which meet the needs of Upcountry residents.			
Objectives and Policies			
1. Establish de-centralized government services for Upcountry residents			X
2. Pursue the streamlining of the development permit process through means such as consolidating public hearings and concurrent processing of applications			X
3. Use the County's budgeting process as a means of carrying out the policies and priorities of the Community Plan by targeting important projects designated by the plan for funding.			X
4. Use the County's real property tax function as a mechanism for encouraging private development, rehabilitation or preservation in keeping with the goals, objectives and policies of the Makawao-Pukalani-Kula Community Plan. This function should also be used for monitoring the Community Plan and establishing a computerized land use information base.			X
5. Encourage a program for agricultural management and open space preservation			X
Implementing Actions:			X

Table 5-15: Makawao-Pukalani-Kula Community Plan (1996)	S	NS	N/A
1. Formulate and implement a comprehensive directed and managed growth program, consistent with the adopted Makawao-Pukalani-Kula Community Plan and the Maui County General Plan. This would include methodologies such as rural cluster guidelines, farm trusts, phased development in accordance with available infrastructure, the development of urban growth boundaries, transfer of development rights and open space easements. 2. Prepare a progress report five years after the adoption of this plan for review by the public and Maui County Council describing the status of general and community plan implementation and actions taken to comply with same. 3. Explore modifications to building and subdivision codes and standards such as minimum lot sizes, and compact parking ratios which will reduce the ultimate cost of housing. 4. Continue the review of and modifications to permit management and processing procedures to improve operational efficiencies of regulatory processes. 5. Schedule public meetings and hearings on days and at times most convenient to the general public. For proposals located within the Makawao-Pukalani-Kula region, meetings and hearings relating to such proposals shall be held in the Upcountry region.			
Discussion: The Proposed Action will not affect the Government objectives and policies for the Makawao-Kihei-Makena Community Plan.			

5.7.4 Wailuku-Kahului Community Plan (2002)

The Wailuku-Kahului Community Plan is one of nine (9) community plans for the County of Maui. The plan reflects current and anticipated conditions in the Wailuku-Kahului region, and advances the community's planning goals, objectives, policies, and implementation to guide the future of the region. The Wailuku-Kahului region is located on north shore of Maui and encompasses the eastern portion of the agricultural fields in Central Maui. The following is a discussion of the relevant objectives and policies of the Wailuku-Kahului Community Plan that relate to the Proposed Action.

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
Economic Activity			
Goal A stable and viable economy that provides opportunities for growth and diversification to meet long-term community and regional needs and in a manner that promotes agricultural activity and preserves agricultural lands and open space resources.			
Objectives and Policies			
1. Support agricultural production so agriculture can continue to provide employment and contribute to the region's economic well-being.	X		
2. Support the revitalization of the Wailuku commercial core and adjacent areas by expanding the range of commercial services; improving circulation and parking; enhancing and maintaining the town's existing character through the establishment of a Wailuku Town design district; redevelopment of the Wailuku Municipal Parking Lot with emphasis on additional public parking; establishing urban design guidelines; and providing opportunities for new residential uses. Improve Wailuku's image and level of service as a commercial center for the region's population. A combination of redevelopment and rehabilitation actions is necessary to meet the needs of a growing center.			X
3. Allow opportunities for hotel accommodations within the region at Kahului and Wailuku--at the existing hotel district by Kahului Harbor; near the Kahului Airport; and within the Wailuku Town core.			X
4. Provide industrial growth opportunities through the expansion of existing industrial centers associated with the airport and harbor, and in Wailuku and Kahului. Encourage the fee simple ownership of lots provided by private developers			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
5. Recognize the importance of small businesses to the region's economy			X
6. Encourage the development of affordable business incubator spaces with public subsidies or incentives, as necessary, similar in concept to that of the Maui Research and Technology Park.			X
7. Provide for the establishment of centralized business districts within the region, in order to minimize the extensive migration of commercial projects into light industrial developments.			X
8. Accommodate mixed use residential/commercial development as a "transition" between residential districts and the civic center and business/commercial districts compatible with a residential scale and character and subject to a new zoning classification. Lands intended for this use shall be designated Service Business/Residential on the Community Plan land use map.			X
9. Support the establishment of agricultural parks for truck farming, piggery operations, bee keeping and other diversified agricultural operations within larger unsubdivided agricultural parcels and in locations that are compatible with residential uses.	X		
Implementing Actions: 1. Place a high priority on the planning, design and construction of a multi-level parking facility at the Wailuku Municipal Parking Lot with potential opportunities for mixed use development, such as residential, commercial, park and other public uses. 2. Establish zoning regulations to implement a Service Business/Residential (SBR) land use designation provided for in the Community Plan policies.			X
Discussion: The Proposed Action will support the Economic Activity objectives and policies of the Wailuku-Kahului Community Plan. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui to specialty and beverage crops, irrigated and non-irrigated livestock, tropical fruit crops and nuts, community gardens, diversified annual crops, and energy crops. The continued reopening ~~Reopening~~ the land for farming would provide employment opportunities and expand the agriculture sector of Maui's economy, as well as for the State of Hawai'i. ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation.			
Environment			
Goal A clean and attractive physical and natural environment in which man-made developments or alterations to the natural environment relate to sound environmental and ecological practices, and important scenic and open space resources are maintained for public use and enjoyment.			
Objectives and Policies			
1. Preserve agricultural lands as a major element of the open space setting that which borders the various communities within the planning region. The close relationship between open space and developed areas is an important characteristic of community form.	X		
2. Protect nearshore waters by ensuring that discharges from waste disposal meet water quality standards. Continuous monitoring of existing and future waste disposal systems is necessary to ensure their efficient operation.			X
3. Protect shoreline wetland resources and flood plain areas as valuable natural systems and open space resources. These natural systems are important for flood control, as habitat area for wildlife, and for various forms of recreation. Future development actions should emphasize flood prevention and protection of the natural landscape.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
4. Preserve the shoreline sand dune formations throughout the planning region. These topographic features are a significant element of the natural setting and should be protected from any actions which would detract from their scenic, environmental, and cultural value.			X
5. Require that new shoreline development respect shoreline resources and maintain public access a. Existing dune formations are important elements of the natural setting and should remain intact. b. Indigenous or endemic strand vegetation should remain undisturbed; new development and landscaping should treat such vegetation as given conditions. c. Planning for new shoreline development, as well as redevelopment, shall consider the cyclic nature of beach processes. Setbacks shall be used to provide a sufficient buffer between the ocean and structures to allow for periodic and long-term accretion and erosion of the shoreline. A Coastal Erosion Rate Analysis shall be developed. The planning commissions are encouraged to incorporate data from the analysis into planning decisions for shoreline areas, especially with respect to shoreline building setbacks. In the interim period prior to the completion of the analysis, the planning commissions are further encouraged to utilize minimum setbacks for multi-family and hotel uses, and any undeveloped property, of 150 feet from any shoreline, or 25 percent of the average lot depth, whichever is greater. For other uses, including single family residences and subdivisions along shoreline property, the Department of Planning staff and the Land Use and Codes Division Plans Examiners are encouraged to consult existing data on shoreline trends when discussing minimum shoreline setbacks with developers. Both episodic and long-term erosion rates should be disclosed to current or prospective purchasers of property to assist with the selection of an adequate shoreline setback. Where shoreline erosion threatens existing structures or facilities, beach replenishment shall be the preferred means of controlling erosion, as opposed to sole reliance on seawalls or other permanent shoreline hardening structures.			X
6. Encourage the use of siltation basins and other erosion control features in the design of drainage systems.			X
7. Mitigate potential hazards associated with oil storage tanks and the bulk containment of other toxic, corrosive or combustible substances.			X
8. Minimize noise, water and air pollution from industrial uses, electric power generating facilities and wastewater treatment plants.			X
9. Maintain coastal open space along the region's shoreline as a scenic amenity and public recreational area.			X
10. Monitor air quality in the planning district and enforce applicable standards with regular public reporting.			X
11. Encourage joint government action in the investigation of seaweed build-up in Kahului Harbor and other affected areas and the implementation of coordinated clean-up and other mitigative actions.			X
12. Promote recycling programs to reduce solid waste disposal in landfills, including convenient drop-off points for recycled material.			X
13. Support energy conservation measures, including the use of solar heating and photovoltaic systems, in conjunction with urban uses.	X		
14. Promote the planting and maintenance of trees and other landscape planting to enhance the streetscapes and the built-environment			X
Implementing Actions: 1. Formulate and adopt a regional landscape planting master plan, including standards, for implementation in conjunction with public and private projects.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
2. Establish and maintain a monitoring program for nearshore water quality. 3. Develop a master plan for a recreational coastline access. 4. Develop and implement a strategy for sand dune protection. 5. New studies should be commissioned that seek to better understand site-specific causes of coastal erosion.			
Discussion: The Proposed Action will support the Environment objectives and policies of the Wailuku-Kahului Community Plan. The Proposed Action will enable ~~for~~ the continued conveyance of water to support conversion to diversified agriculture. Mahi Pono plans to convert the agricultural lands in Central Maui generally to community farms, orchards (citrus, mac nuts, and beverage crops), tropical fruits, row and annual crops, energy crops, irrigated and nonirrigated pasture, and energy crops. ~~Currently the agricultural land is mostly fallow with minimal agricultural activity~~ Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential. Should the Water Lease not be issued, the ongoing agricultural activities may be unfeasible. Issuance of the Water Lease would facilitate the continued transition of the agricultural fields in Central Maui to a productive diversified agricultural operation. Mahi Pono also intends to use power from two hydro-electric facilities to provide power to pumps and wells, and other infrastructure. Mahi Pono is also committing land to the production of solar energy for its own use and the public utility system.			
Cultural Resources			
Goal Identification, protection, preservation, enhancement, and where appropriate, use of cultural practices and sites, historic sites and structures, and cultural landscapes and view planes that: 1. Provide a sense of history and define a sense of place for the Wailuku-Kahului region; and 2. Preserve and protect native Hawaiian rights and practices customarily and traditionally exercised for subsistence, cultural and religious purposes in accordance with Article XII, Section 7, of the Hawai'i State Constitution, and the Hawai'i Supreme Court's PASH opinion, 79 HAW. 425 (1995).			
Objectives and Policies			
1. Preserve the character and integrity of historic sites in the Wailuku-Kahului region.			X
2. Recognize the importance of historically and archaeologically sensitive sites and encourage their preservation through development project review.			X
3. Protect and preserve historic, cultural and archaeological sites and resources through on-going programs to identify and register important sites, and encourage their restoration. This shall include structures and elements that are a significant and functional part of Hawaii's ethnic and cultural heritage.			X
4. Ensure that the proposed projects are compatible with neighboring historic, cultural, and archaeological sites or districts. Such projects should be reviewed by the Cultural Resources Commission, where appropriate			X
5. Require development projects to identify all cultural resources located within the project area as part of initial project studies. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources.			X
6. Support programs for the protection and preservation of historic and archaeological resources and foster an awareness of the diversity and importance of the region's ethnic, cultural, historic, and archaeological resources.			X
7. Encourage community stewardship of historic buildings and cultural resources and educate private property owners about financial benefits of historic preservation in Maui County.			X
8. Preserve and restore historic roads, paths, and water systems as cultural resources, and support public access.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
9. Recognize and respect family ancestral ties to certain sites including burial sites, and establish cultural and educational programs to perpetuate Hawaiian and other ethnic heritages.			X
Implementing Actions: 1. The Cultural Resources Commission shall update, and the Council shall adopt, the County Cultural Resources Management Plan to further identify specific and significant cultural resources in the region and provide strategies for preservation and enhancement. 2. Require development projects to identify all cultural resources located within or adjacent to the project area and consult with individuals knowledgeable about such cultural resources prior to application as part of the County development review process. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources including site avoidance, adequate buffer areas, and interpretation. Particular attention should be directed toward dune areas, known and probable pre-contact habitation areas, and other sites and areas listed in No. 5 below, with review by the Cultural Resources Commission, where appropriate. 3. Implement a historic and cultural overlay ordinance to provide protection for areas with significant archaeological, historical, and cultural resources. 4. Establish recognition of culturally sensitive areas such as Naniloa Bridge, Waiale Bridge, and burial and habitation sites along Lower Main Street and Kahului Beach Road. 5. Significant Wailuku-Kahului region sites and areas include the following: Wahi Pana (Significant Traditional Places), such as: Na Wai Eha (Waihe'e, Waiehu, Wailuku, Waikapu). Waihe'e Dunes Archaeological Complex. Waihe'e Church. Waihe'e Sugar Mill site. Haleki'i-Pihanakalani heiau. Waihe'e Dune complex. Taro lo'i in 'Iao Valley. Traditional surfing sites. Kanaha Pond. Habitation and burial sites along Lower Main Street corridor. Waiale Bridge. Wailuku Civic Center Historic District. Kama Ditch, Spreckels Ditch, and Waihe'e Ditch. Ka'ahumanu Church. Hale Ho'ike'ike (Bailey House Museum). Alexander House (next to Ka'ahumanu Church). Waikapu Stone Church Site. Wailuku School. Pu'unene School. Pu'u One Sand Dune Formation from Kahului Harbor to Waikapu. Coastal sand dunes from Kahului Airport to Baldwin Park. Kahului Railroad System sites (i.e., Roundhouse, Makaweli Rock Crusher Mill Foundation, etc.). Chee Kung Tong Society Hall site. Maui Jinsha Mission. Naval Air Station Kahului Airport (NASKA). Pu'unene Mill/Village. Kahului Railroad Building and Old Kahului Store. Buildings designed by C. W. Dickey-Wailuku Library, the Territorial Building in Wailuku, and the Baldwin Bank (Bank of Hawai'i in Kahului). Wailuku Union Church. Church of the Good Shepherd. 'Iao Theatre. Plantation Manager's Residence in Wailuku.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
St. Anthony's School. Market Street from Main Street through Happy Valley. Vineyard Street from Market Street to end. 'Iao Stream			
Discussion: The Proposed Action will not affect the Cultural Resources objectives and policies of the Wailuku-Kahului Community Plan.			
Indigenous Architecture			
Goal Reserve for future implementation provisions for indigenous architecture as may be adopted from time to time by the County Council and/or the County Cultural Resources Commission.			
Objectives and Policies			
1. To legitimize and amend County Building Codes to allow indigenous architecture as viable spaces for living, work, and recreation.			X
Implementing Actions: 1. Develop a County ordinance for indigenous architecture. 2. Adopt standards for indigenous architecture.			X
Discussion: The Proposed Action will not affect the Indigenous Architecture objectives and policies of the Wailuku-Kahului Community Plan.			
Housing			
Goal A sufficient supply and choice of attractive, sanitary and affordable housing accommodations for the broad cross section of residents, including the elderly.			
Objectives and Policies			
1. Utilize a project district planning approach for major housing expansion areas which will allow flexibility in project planning. This will provide for flexible development standards and a mix of housing types which can result in more efficient site utilization and potential reductions in housing development costs.			X
2. Provide sufficient land areas for new residential growth which relax constraints on the housing market and afford variety in type, price, and location of units. Opportunities for the provision of housing are presently constrained by a lack of expansion areas. This condition should be relieved by a choice of housing in a variety of locations, both rural and urban in character.			X
3. Seek alternative residential growth areas within the planning region, with high priority given to the Wailuku and Kahului areas. This action should recognize that crucial issues of maintaining important agricultural lands, achieving efficient patterns of growth, and providing adequate housing supply and choice of price and location must be addressed and resolved.			X
4. Encourage the creation of elderly housing communities in various parts of the region that address the range of specialized needs for this population group.			X
5. Encourage the formulation of an elderly needs assessment study for Maui County by the State Department of Health, including recommendations for elderly housing projects, facilities and programs.			X
6. Coordinate the planning, design and construction of public infrastructure improvements with major residential projects that have an affordable housing component.			X
7. Plan, design and construct off-site public infrastructure improvements (i.e. water, roads, sewer, drainage, police and fire protection, and solid waste) in anticipation of residential, commercial and industrial developments defined in the Community Plan.			X
8. Promote efficient housing designs in order to reduce residential home energy and water consumption.			X
Implementing Actions:			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
1. Develop a comprehensive housing strategy for low and moderate income groups involving government and private industry cooperation that provides an adequate supply of housing for the various strata of income. This approach would combine the resources of Federal, State, County, and private enterprise to improve the availability of rental and ownership housing targeted to various need groups. Anti-speculation and specification of a percentage of low and moderate income units in major projects are tools which should be considered as part of an overall housing program. 2. Develop procedures and regulations to streamline government review and approval for housing projects. This should result in cost reductions by expediting the time required for implementation. 3. Develop programs to encourage housing rehabilitation in older residential areas. This would designate target areas where low interest loans, grants and flexible code regulations not related to public health, safety and welfare would be available to homeowners. 4. Revise zoning, building and housing codes to allow for specialized elderly housing projects.			
Discussion: The Proposed Action will not affect the Housing objectives and policies of the Wailuku-Kahului Community Plan.			
Social Infrastructure			
Goal Develop and maintain an efficient and responsive system of public services which promotes a safe, healthy and enjoyable lifestyle, accommodates the needs of young, elderly, disabled and disadvantaged persons, and offers opportunities for self-improvement and community well-being.			
Recreation			
1. Provide park and recreation areas as an integral part of project district specifications which will accommodate the needs of population growth.			X
2. Ensure adequate public access to shoreline recreation resources by pursuing access ways identified by the County.			X
3. Provide access for persons with disabilities at all park facilities.			X
4. Provide for a major regional multi-purpose center for the planning district to accommodate resident needs for banquet and meeting facilities with adequate parking.			X
5. Investigate the need for an additional community center facility in Kahului.			X
6. Place high priority on utilizing the 'Iao Theatre as a multi-purpose community facility and develop the adjoining property in a manner that retains the integrity of the town core.			X
7. Place high priority on implementation of Keopuolani Park, including enhancement of the Kahului Harbor shoreline			X
8. Expand shoreline recreation opportunities by extending Kanaha Beach Park and establishing park areas along Spreckelsville, Waiehu and Waihe'e shorelines.			X
9. Enhance existing parks by improving maintenance and expanding the range of facilities provided.			X
10. Maintain lands acquired or designated for recreational purposes exclusively for those uses.			X
11. Provide for additional municipal golf courses.			X
12. Maintain existing recreational uses at the Kahului harbor for canoe club activities. When development occurs, provide alternate sites for canoe club activities at the Kahului Bay area.			X
13. Establish a linear park with bikeways and pedestrian routes along the shoreline between Waihe'e and Pā'ia.			X
14. Establish a permanent fairground site that encourages year-round use as an inter-regional community center and meeting facility.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
15. Establish a linear park, with bicycle and pedestrian facilities where practical, from the Paukukalo oceanfront along 'Iao Stream to Kepaniwai Park.			X
16. Ensure that adequate regional/community park facilities are provided to service new residential developments.			X
17. Ensure that the development of the North Shore greenway project is done in a manner that respects the dune system and cultural sensitivity of the area. Specifically, the project should: a. minimize the excavating, grading, and grubbing for the project, and instead use minimal fill (as necessary to meet engineering standards), especially in the area near Baldwin Beach Park; b. provide appropriate protection to prevent unnecessary traversing of the dune system mauka-makai; c. use the greenway as an opportunity to interpret the significant cultural and historic sites in the area; and d. have the archaeological inventory survey and the design plans for the project reviewed by the Cultural Resources Commission prior to the issuance of the necessary development permits.			X
Implementing Actions: 1. Undertake a site selection study for a permanent fairgrounds site that encourages year-round use. 2. Undertake a regional park master plan study to identify the needs and potential sites for expanded passive and active recreational uses in the planning region. 3. Prepare and implement, as soon as possible, a plan for a major regional multipurpose center to service the entire planning district. Also, investigate the need for an additional community center in Kahului and/or the upgrading and expansion of the existing Kahului Community Center. 4. Continue to implement the plan for Keopuolani Park.			X
Social Services/Health			
1. Support the expansion of services and facilities at the Maui Memorial Medical Center, the major primary care facility on the island, including the construction of a multi-level parking facility and a second roadway access.			X
2. Plan for the expansion of community services facilities, such as the Cameron Center.			X
3. Expand social services for young and elderly persons.			X
4. Continue to assess the social needs in the community and facilitate a coordinated response in the delivery of social services and programs for young, elderly, disabled and disadvantaged persons.			X
5. Support the formulation of an elderly needs assessment study for Maui County by the State Department of Health and lobby for the implementation of needed programs and projects.			X
6. Coordinate the provision of long-term care facilities and programs with other providers, such as Hale Makua and Hale Mahaolu.			X
Implementing Actions: 1. Acquire a minimum of 10 acres of land for expansion of Maui Memorial Medical Center as soon as possible. 2. Provide a second roadway access to Maui Memorial Medical Center. As noted in the section on transportation, this access should precede or be concurrent with the extension of Mahalani Street.			X
Public Safety			
1. Maintain adequate police and fire protection services in the region	X		
2. Encourage communities to establish Neighborhood Crime Watch Programs.			X
Implementing Actions:			

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
1. Study the feasibility of establishing fire and police protection facilities in the proposed Project Districts within the region.			
Education			
1. Allocate sufficient land areas as part of residential project district specifications to meet future school site needs.			X
2. Encourage the Department of Education to provide recreation facilities for schools, thus expanding opportunities for public use of presently shared facilities.			X
3. Coordinate the development of school facilities with the State Department of Education in conjunction with planned residential projects.			X
4. Support the establishment of a four-year university on Maui.			X
5. Encourage apprenticeship or work study programs, in conjunction with higher educational or technical/vocational studies.			X
6. Support efforts to expand the Maui Community College facilities and incorporate desired elements of Hawaiian architectural design.			X
7. Support the improvement and maintenance of existing school facilities.			X
8. Encourage the development of child care and pre-school facilities, in conjunction with major centers of employment.			X
Implementing Actions: 1. Where possible during the zoning process, ensure that applicants contribute to the development, funding, and/or construction of school facilities on a fair-share basis as determined by and to the satisfaction of the State Department of Education. Terms of the contribution shall be agreed upon by the applicant and the State Department of Education prior to the applicant applying for building permits.			X
Discussion: The Proposed Action will support the Social Infrastructure objectives and policies for Public Safety of the Wailuku-Kahului Community Plan. On the agricultural fields in Central Maui, there are numerous reservoirs, in which a portion of the water conveyed from the EMI Aqueduct System is stored ~~in.~~ A&B had, and now Mahi Pono has, a working relationship with the Maui County Fire Department and in times of need the Maui County Fire Department can draw water from the storage to fight fires. Additionally, water from the EMI Aqueduct System is used to support fire suppression needs in and around the Puʻunēnē mill area and adjacent properties.			
Government			
Goal Government that demonstrates the highest standards of fairness; responsiveness to the needs of the community; fiscal integrity; effectiveness in planning and implementation of programs and projects; a fair and equitable approach to taxation and regulation; and efficient, results-oriented management.			
Objectives and Policies			
1. Utilize the County's budgeting process as a means of carrying out the policies and priorities of the Community Plan.			X
2. Utilize the County's real property tax assessment function as both a means to carry out the policies and priorities of the Community Plan and a mechanism for monitoring and updating the Community Plan.			X
3. Streamline the land use, building permit and subdivision approval processes.			X
4. Monitor the implementation of and compliance with the Community Plan.			X
5. Ensure that adequate infrastructure is or will be available to accommodate planned development.			X
6. Support public and private partnerships to fund the planning and construction of infrastructure.			X
7. Encourage students within Maui County to participate in Maui County governmental affairs through such means as the submittal of testimony and resolutions on issues and concerns related to community affairs.			X
8. Encourage cooperation and coordination between agencies, boards and commissions charged with land use planning and urban design and development within Wailuku Town.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
Implementing Actions: 1. Streamline the land use, building permit and subdivision processes through means such as consolidated public hearings and concurrent processing of applications. 2. Adopt a beach-mountain access dedication ordinance pursuant to Chapter 46, Hawai'i Revised Statutes. This should be done as part of an island wide comprehensive mountain and beach access study. 3. Evaluate and modify present zoning and subdivision ordinances to incorporate the land use and design guidelines as well as other recommendations incorporated herein. 4. 4. Establish an additional government complex with adequate public parking in a central location. 5. 5. Maintain the War Memorial Complex for public parking and recreational uses only. 6. Facilitate public access to information through the use of computers, microfiche/microfilm readers, and other tutorial services in County agencies. 7. Re-evaluate the composition, role and boundaries of the Wailuku Redevelopment Agency to support its mission for the revitalization and enhancement of this district and explore ways to coordinate planning for Wailuku Town. 8. Formulate special plans and studies to implement recommendations of the Community Plan. These would include water development and distribution, housing, local and regional circulation, drainage, solid waste and recycling, sewage disposal and treatment, human services, recreation, public safety and other special plans and studies as required. 9. Prepare a progress report five years after the adoption of this plan for review by the public and Maui County Council describing the status of General and Community Plan implementation and actions taken to comply with same.			X
Discussion: The Proposed Action will not affect the Government objectives and policies of the Wailuku-Kahului Community Plan.			
Land Use			
Goal An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of residents and visitors in a manner that provides for the social and economic well-being of residents and the preservation and enhancement of the region's environmental resources and traditional towns and villages.			
Objectives and Policies			
1. Ensure that adequate lands are available to support the region's present and future agricultural activities.	X		
2. Identify prime or productive agricultural lands, and develop appropriate regulations for their protection.			X
3. The direct and cumulative impacts of agricultural subdivisions and the impacts on the community shall be assessed and considered.			X
4. Establish administrative procedures and standards within both the Department of Public Works and Waste Management and the Department of Planning, to ensure that agricultural subdivisions shall not be approved unless their uses are expressly permitted by Chapter 205, Hawai'i Revised Statutes.			X
5. Encourage traditional Hawaiian agriculture, such as taro cultivation, within the agricultural district, in areas which have been historically associated with this cultural practice.			X
6. Establish an adequate supply of urban land use designations to meet the needs of the community over the next 20 years.			X
7. The Community Plan map shall define the urban growth limits for the region.			X
8. Maintain a project district approach for the major residential growth areas adjacent to Wailuku, Kahului, and Waiehu to allow flexibility in master planning. These project districts may contain a variety of residential unit types as well as supporting			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
community services, including business, public, recreational and educational facilities.			
9. Maintain the existing Kahului Airport district boundaries, as defined in the Community Plan Land Use Map and continue to evaluate the air transportation needs of the County to determine future air transportation facility requirements. Create a direct control overlay district in and around Kahului Airport due to the public investment and the economic importance of the facility. The boundaries of this district shall be generally defined by the 60 Ldn isoline (60 decibels, day night average) of the FAA approved noise contour map for the airport. The intent of this district shall be to establish specific guidelines for development within the area which would define uses compatible with the airport and appropriate design standards, particularly with respect to noise attenuation to reduce interior noise levels to the 45 Ldn level or less. Total closure of structures, as well as air-conditioning, are generally required for this purpose. Residential uses should be discouraged within the 60 Ldn isoline.			X
10. All zoning applications and/or proposed land uses and developments shall conform with the planned use designations, as specified in the adopted Community Plan Land Use Map, and be consistent with the Community Plan policies.			X
11. The subdivision ordinance should be revised to provide for public review of projects with significant impacts. Subdivision approval should consider environmental, economic, and social impacts of the project, including impacts on archaeological, historical and cultural resources.			X
12. Establish a Wailuku Town Design District.			X
13. Within the Wailuku Town core, formulate and implement flexible land use guidance policies that enhance the various activity centers and maintain the traditional character of the town. a. Civic Center District: This district defines the government office center and adjacent blocks of commercial use which are functionally related to the government center. This district is generally bounded by Main, South High, Kaohu, Napua, Uluwehi, South Church, Pakahi, South Market and Wells Streets. b. Wailuku Historic District: Protection of this complex of historic structures in a park setting will continue under the provisions of the current Community Plan. c. Commercial and Residential: The following comprise the commercial core, commercial areas, and surrounding residential uses: 1. Commercial Core. This area is generally situated along Central, Wells, Main, High, and Vineyard Streets. It should emphasize commercial uses oriented to serve the business and residential community. Ground floor activities should emphasize commercial retail with expansion of the variety and scope of offerings to serve residents. 2. Mixed Use Areas. These occur in several blocks adjacent to the commercial core and act as a transition between the core and single family residential areas. The business residential mix should be retained with intensification to accommodate multifamily and business uses. Patterns of mixed use could allow vertical mixture (residences over ground floor business) or horizontal mixture (business frontage and residences behind), or residential and business uses on adjacent lots. Maintenance and rehabilitation of existing structures should be encouraged in a manner that respects the residential scale that now exists. Intensification of uses through new development would			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
require consolidation of substandard lots. Performance criteria for rehabilitation and upgrading should be developed to permit more flexibility than present zoning and building code standards allow. 3. Single Family Residential. These areas surround the commercial and mixed use areas. The emphasis should be on preserving and rehabilitating existing housing, providing adequate circulation, and encouraging home maintenance and rebuilding of deteriorating structures. 4. Service Business/Single Family Residential. These uses occur primarily along the Waihe'e side of Kaohu Street, and along the mauka side of South Market Street to permit a mixture of single family and duplex dwellings, with small-scale service and neighborhood oriented businesses which are established in previously utilized residential dwellings or other existing structures. The business use should be compatible with the physical character of the residential neighborhood.			
14. Maintain physical separation between traditional towns and villages in the region. Where possible, provide specific design or landscape elements, such as open space buffers or changes in streetscape, to clearly delineate the boundary between Kahului and Wailuku. Maintain open space around traditional rural areas, such as Waikapu and Waihe'e, to provide a sense of community and to prevent envelopment of these areas by urban expansion.			X
15. Provide a substantial greenway or greenbelt to serve as a buffer zone, line of demarcation, or definition between Wailuku and Waikapu, and between Waikapu and Ma'alaea, in order to prevent the continuation of urban sprawl. Changes in streetscapes could include landscaping and agricultural planting materials that reflect the character of each community, and are utilized to delineate a substantial boundary between Kahului and Wailuku.			X
16. Upon adoption of this plan, allow no further development unless infrastructure, public facilities, and services needed to service new development are available prior to or concurrent with the impacts of new development.			X
Implementing Actions: 1. Establish zoning regulations to implement the land use recommendations in the Community Plan, including but not limited to Service Business/Single Family Residential (SBR), Business/Multi-Family , and Business/Industrial .			X
Discussion: The Proposed Action will support the Land Use objectives and policies of the Wailuku-Kahului Community Plan. The issuance of the Water Lease will allow for the continued conveyance of water to supply the agricultural fields in Central Maui to support Mahi Pono's proposed diversified agriculture operation. Approximately ~~23,000~~ 22,000 acres of the agricultural land in Central Maui are designated as ~~Important Agricultural Land (~~IAL~~)~~ to the State, of which the majority is classified as "Prime Agricultural Land" by ~~Agricultural Land of Importance to the State of Hawai'i (~~ALISH~~)~~. However, Mahi Pono has planted crops in some of its Central Maui agricultural fields and is in the process of preparing more fields for future plantings in accordance with the Mahi Pono farm plan. However, as of November 2020, most of the fields remain unprepared for planting and thus, are not utilized to their full potential ~~currently the majority of the agricultural land in Central Maui is fallow~~. Issuance of the Water Lease would allow for the land to continue to be put back into full cultivation.			
Infrastructure **Goal** Timely and environmentally sound planning, development and maintenance of infrastructure systems which serve to protect and preserve the safety and health of the region's residents, commuters and visitors through the			

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
provision of clean water, effective waste disposal and drainage systems, and efficient transportation systems which meet the needs of the community.			
Objectives and Policies			
Water and Utilities			
1. Coordinate water system improvement plans with growth areas to ensure adequate supply and a program to replace deteriorating portions of the distribution system. Future growth should be phased to be in concert with the service capacity of the water system			X
2. Improve the quality of domestic water.			X
3. Promote water conservation and education programs.			X
4. Protect water resources in the region from contamination, including protecting ground water recharge areas, and wellhead protection areas within a 1.25-mile radius from the wells.			X
5. Coordinate the construction of all water and public roadway and utility improvements to minimize construction impacts and inconveniences to the public.			X
6. Coordinate expansion of and improvements to the water system to coincide with the development of residential expansion areas.			X
7. Promote conservation of potable water through the use of treated waste water effluent for irrigation			X
8. Encourage reasonable rates for water and public utility services.			X
9. Ensure that proliferation of telecommunication towers does not negatively impact the natural beauty of Maui County and the comfort and health of its residents.			X
Implementing Actions: 1. Update the County's Water Use and Development Plan and estimated water use for the Wailuku-Kahului region. 2. Prepare or update a water improvement master plan for the Wailuku-Kahului region to be incorporated as a functional component of the Community Plan. 3. Plan and construct water system improvements, including additional source, transmission, and storage capabilities. 4. Provide incentives for water and energy conservation practices. 5. Coordinate the development of telecommunication towers by developing an ordinance governing telecommunication facilities. 6. Relocate the Kahului Power Generating Facility out of the tsunami zone. 7. Adopt a water allocation plan for the region and require that the use of water from the Central Maui Water System for future development shall be subject to the provisions of this water allocation plan. 8. Promote and implement programs for ground water and wellhead protection.			X
Liquid and Solid Waste			
1. Coordinate sewer system improvement plans with future growth requirements, as defined in the Community Plan.			X
2. As part of a county-wide solid waste management study, address the needs of the planning region for disposal and transfer sites with more convenience to residential areas. The collection system and location of disposal sites need to be improved to better serve residential areas.			X
3. Reduce the disposal of solid waste in landfills through reducing the amount of material for disposal at the source (i.e. home composting of lawn or tree trimmings), reuse and recycling programs, bioconversion (i.e. composting) and the provision of convenient drop-off facilities.			X
4. Reuse the treated effluent from the County's waste water treatment system for irrigation and other suitable purposes in a manner that is environmentally sound.			X
Implementing Actions: 1. Coordinate sewer system improvement plans with future growth requirements, as defined in the Community Plan. 2. As part of a county-wide solid waste management study, address the needs of the planning region for disposal and transfer sites with more convenience to residential areas. The collection system and location of disposal sites need to be improved to better serve residential areas.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
3. Reduce the disposal of solid waste in landfills through reducing the amount of material for disposal at the source (i.e. home composting of lawn or tree trimmings), reuse and recycling programs, bioconversion (i.e. composting) and the provision of convenient drop-off facilities. 4. Reuse the treated effluent from the County's waste water treatment system for irrigation and other suitable purposes in a manner that is environmentally sound.			
Drainage			
1. Establish a storm drain improvement program to alleviate existing problems; implement a continuing maintenance program, and ensure that improvements to the system will meet growth requirements. This addresses safety and property loss concerns as well as the need for comprehensive flood control planning. a. Design drainage systems that protect coastal water quality by incorporating best management practices to remove pollutants from runoff. Construct and maintain, as needed, sediment retention basins and other best management practices to remove sediments and other pollutants from runoff. b. Construct necessary drainage improvements in flood-prone areas. Where replacement drainage is required for flood protection, these systems shall be designed, constructed, and maintained using structural controls and best management practices to preserve the functions of the natural system that are beneficial to water quality. These functions include infiltration, moderation of flow velocity, reduced erosion, uptake of nutrients and pollutants by plants, filtering, and settlement of sediment particles. The use of landscaped swales and unlined channels shall be urged.			X
2. Respect natural drainage ways as part of good land development			X
3. Construct and maintain, as needed, desilting basins along major drainage channels.			X
4. Ensure that storm water run-off and siltation from proposed development will not adversely affect the marine environment and nearshore and offshore water quality. Minimize the increase in discharge of storm water runoff to coastal waters by preserving flood storage capacity in low-lying areas, and encouraging infiltration of runoff.			X
5. Encourage the incorporation of drainage ways, setbacks, and flood protection areas into greenways consisting of open space, pedestrian way and bikeway networks			X
Implementing Actions: 1. Update and implement a drainage master plan for the planning region that considers the cumulative impacts of existing and planned development. The master plan shall guide future development while preventing flooding and providing guidance to reduce the degradation of coastal waters. 2. Establish a comprehensive program of improvements to the storm drainage system; implement a maintenance program; and ensure that safety, property loss, pollutant removal, and the need for comprehensive planning, are considered. Maintain current drainage ways, swales and spillways. 3. Revise the County drainage rules to require that drainage system design shall not adversely affect downstream and coastal water quality.			X
Energy			
1. Promote the use of alternative energy sources, such as biomass, wind and solar.	X		
2. Develop efficient circulation systems, public transportation and promote bicycle and pedestrian travel to reduce energy expenditures for travel.			X
3. Promote energy conservation and awareness programs			X
4. Reduce domestic energy consumption.			X
5. Expand efforts to utilize environmentally and cost effective renewable resources for energy production, such as solar, biomass, and wind energy.	X		
6. Encourage energy efficient building design and site development practices.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
7. Support energy conservation measures, including the use of solar heating and photovoltaic systems, in conjunction with urban uses.			X
8. Promote recycling programs to reduce solid waste disposal in landfills.			X
9. Promote competition among energy providers to increase options and decrease costs to Maui County residents and government facilities.			X
Implementing Actions: 1. Adopt standards and regulations for the use of solar heating, low flush toilets and other conservation fixtures in new building construction. 2. Develop and adopt an integrated energy functional plan for the County of Maui, including but not limited to, strategies for energy conservation, reuse of treated waste water, recycling, reduction in the use of fossil fuels, public education and awareness, and other strategies and actions related to transportation and utilities, housing, environment, urban design and economic activity. 3. Develop incentives and requirements for energy efficient building design and site development practices through various approaches, including modifications to building codes and zoning and subdivision ordinances. 4. Provide incentives to promote the use of alternative energy sources. 5. Develop, compile and disseminate information on new energy technologies, policies, and programs relevant to the community's economy and environment. 6. Identify energy-saving measures for all community buildings and facilities. 7. As part of a County-wide waste management study, pursue the feasibility of utilizing resource recovery systems. 8. Support reduction of entry barriers to distributed generation and other forms of alternative energy.			X
Transportation			
1. Enhance circulation by improving road maintenance; improving or providing traffic signals and turning lanes at congested intersections; and by providing street and destination signs. Important intersections include Lono and Papa Avenues, and intersections along Papa Avenue, Wakea Avenue, and North Market Street. Additional turning lanes, traffic signals and roadway improvements in the Wailuku Town core should be designed to facilitate safe traffic movement and be compatible with the traditional character of the area.			X
2. Provide bikeway and walkway systems in the Wailuku-Kahului area which offer safe and pleasant means of access, particularly along routes accessing residential districts, major community facilities and activity centers, school sites, and the shoreline between Kahului Harbor and Pāʻia .			X
3. Expand parking facilities serving the civic and commercial centers of Wailuku. Parking improvements should include expanding the existing public parking facilities off Market Street and around the civic center, and improving controls over existing civic center parking to reserve it for short-term use. Explore the feasibility of a shuttle service for County employees to remote parking facilities.			X
4. Support private efforts to expand public transit service, with an emphasis on service to the Kahului Airport and Wailuku Civic Center. Future growth in population will warrant an expanded public transportation system.			X
5. For future residential development, prohibit direct lot access from primary roads.			X
6. Accommodate bicycle and pedestrian ways within planned roadway improvements.			X
7. Support the extension of the Kahului Airport runway, access road improvements, and other related facility improvements, including expansion of the adjacent shoreline area for public park uses.			X
8. Support the expansion of Kahului Harbor, the island's primary commercial harbor, to accommodate long-term needs. The State Department of Transportation should be encouraged to allow recreational uses by canoe clubs or provide an alternative site for such uses in its long range master plan. The harbor master plan should also incorporate safe bicycle and pedestrian access. Support the investigation of alternative sites for a second commercial harbor facility on the island of Maui.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
Further, the State Department of Transportation should be strongly encouraged to mitigate its traffic impacts prior to or in conjunction with the Harbor expansion, including, but not limited to, the following: a. improve the intersections between Ka'ahumanu Avenue and Wharf Street and Hobron Avenue; b. provide alternative and bypass routes for vehicular traffic, possibly including a direct route to Kahului Airport; c. provide safe (possibly underpass) routes for pedestrian traffic; d. acquire pockets of land for more efficient facility location within Kahului Harbor; and e. work with the community to plan a second commercial harbor.			
9. Support the extension of Waiale Drive to a new intersection with Honoapiilani Highway south of Waikapu Village.			X
10. Preserve the Waiale Bridge and the significant subsurface archaeological sites in the Waiale Drive corridor, from the Mahalani Street intersection to Lower Main Street, by maintaining the existing roadway width.			X
11. Preserve the character of Honoapiilani Highway between Waikapu and Wailuku by maintaining two travel lanes and the existing trees.			X
Implementing Actions: 1. Establish ordinances to designate truck or other heavy vehicle weight commercial traffic routes to relieve traffic impacts on residential neighborhoods and the traditional town center. 2. Re-establish school bus routes and stops to minimize impacts on residential neighborhoods and provide sheltered stops where appropriate. 3. Study traffic patterns and circulation at intersections adjacent to school sites prior to road construction, to ensure safe access. 4. Study circulation patterns at school sites. 5. Implement the State Department of Transportation Bikeway Master Plan and the County Bikeway Plan. 6. Update and implement the Department of Transportation's Maui Long Range Planning Study: Islandwide Plan and other traffic master plans to implement the Community Plan.			X
Discussion: The Proposed Action will not affect the Infrastructure objectives and policies of the Wailuku-Kahului Community Plan, although Mahi Pono is committing land to the production of solar energy for its own use and the public utility system. With respect to water conservation, Mahi Pono expects to invest over $20 million to increase the efficiency of its private Central Maui Field Irrigation System (i.e. the infrastructure that distributes water from the Kamole-Weir to the agricultural fields and also within those fields). As a part of this upgrade, Mahi Pono's irrigation engineering team is also implementing high-efficiency irrigation systems. These new irrigation systems will reduce water usage by: (1) using automatic, real-time irrigation sensors to deliver precise amounts of water efficiently; (2) recycle and re-use all water used in Mahi Pono's processing plants; and (3) integrate various live technology feeds to constantly monitor plant, soil, and tree health. Reducing water usage through effective irrigation ensures conservation of Hawai'i's natural resources.			
Urban Design			
Goal An attractive and functionally integrated urban environment that enhances neighborhood character, promotes quality design, defines a unified landscape planting and beautification theme along major public roads and highways, watercourses and at major public facilities, and recognizes the historic importance and traditions of the region.			
Objectives and Policies for the Wailuku-Kahului Region in General			
1. Enhance the appearance of major public roads and highways in the region.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
2. Maintain a design quality for commercial and public projects and large-scale master planned developments.			X
3. Improve pedestrian and bicycle access within the region.			X
4. Establish, expand and maintain parks, public facilities and public shoreline areas.			X
5. Integrate stream channels and gulches into the region's open space system for purposes of safety, open space relief, greenways for public use and visual separation. Drainage channels and siltation basins should not be used for building sites, but rather for public open space. Drainage channel rights-of-way and easements may also be used for pedestrian and bikeway facilities.			X
6. Promote a unified street tree planting program along major highways and streets.			X
7. Buffer public and quasi-public facilities and light-heavy industrial/commercial type facilities from adjacent residential uses with appropriate landscape planting.			X
8. Maintain shrubs and trees at street intersections for adequate sight distance.			X
9. Save and incorporate healthy mature trees in the landscape planting plans of subdivisions, roads and other developments.			X
10. Incorporate drought tolerant plant species and xeriscaping in future landscape planting.			X
11. Use native Hawaiian plants for landscape planting in public projects to the extent practicable.			X
12. Existing and future public rights-of-way along roads and parks shall be planted with appropriate trees, turfgrass and ground covers.			X
13. Encourage neighborhoods and community organizations to upgrade and maintain streets and parks in accordance with the Maui County Planting Plan of the Arborist Committee.			X
14. Require all future subdivisions, construction projects and developments to comply with the adopted Maui County Planting Plan.			X
15. Emphasize contrasting earth-tone color schemes for buildings and avoid bright or garish colors. Within Wailuku Town, require buildings that have bright or garish colors to comply with earth-tone color schemes.			X
16. Encourage the review of architectural and landscape architectural plans for major government projects by the County's Urban Design Review Board.			X
Objectives and Policies for Wailuku Town			
1. Maintain the existing character of historic Wailuku Town.			X
2. Support the creation of a Wailuku Town Design District and the adoption of design guidelines for the town core, excluding properties designated for single family residential use. The objective is to integrate the design elements of multifamily, commercial and public properties in Wailuku Town and to retain the traditional town character. The design district boundaries should include the following areas, as depicted on the attached map: a. the area bounded by High, Vineyard, Central and Main Streets, including the Wailuku Redevelopment District; b. the area bounded by High, Main, North Market and Kaohu Streets, including the Civic District; c. both sides of Main Street from Central Avenue to the Wailuku Bridge; and d. both sides of Market Street from Vineyard Street to Piihana Road in Happy Valley.			X
3. Circulation and Parking. a. Provide for the Waiale Drive bypass to Honoapiilani Highway and road connection from Lower Main Street across 'Iao Stream to Kahekili Highway.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
b. Maintain the existing character of streets in the commercial core along Vineyard, Market, Central and Main Streets. c. Expand public parking facilities at the Wailuku Municipal Parking Lot and provide for safe and convenient bicycle parking in Wailuku town. d. Provide a continuous and pleasant pedestrian pathway connecting the Historic District, Civic Center, commercial office areas and park and public facilities.			
4. Building Form and Character. The following design policies shall express the Council's intent as it relates to urban design for properties designated for commercial and business multi-family use along and bounded by Spreckels Ditch and Wells, High, and Vineyard Streets--Wailuku Town's commercial district. They shall serve as a supporting rationale during the development and adoption of design guidelines for the above area. They shall also serve as a reminder of the Council's intent as the guidelines are amended. a. Maintain the area's small-town profile and character to allow present land uses, and to allow mixed use zoning with residential uses above and in back of commercial properties. The identifying core and focus is the County seat with its present government building heights, with decreasing heights through the concepts of "Step Zoning" and "Stepping a Building" as one moves away from the streetscape. A mixture of one, two, three and four story heights is desirable because it will support the type of land use intensity that is needed to encourage investment and economic viability; yet it is compatible with the area's small-town profile and character. b. Where commercial areas abut residential blocks, a transition in height should be required to achieve compatibility with the residential scale. c. Utilize architectural treatments such as facade and roof modulation to break up the mass and reduce the apparent size of the buildings. d. Protect mauka (mountain) and makai (ocean) view planes. e. Foster an interesting and active street scene by developing a community gathering place, providing historically sensitive street furniture and making streetscape enhancements. f. Emphasize the continuity of commercial frontages along the main shopping streets, primarily on Market, Main and Vineyard Streets, by maintaining uniform building setbacks along the street frontages. Commercial displays should continue to emphasize and enhance the pedestrian experience. Interruptions, such as blank facades, should be avoided. g. Emphasize continuity in architectural details and materials through the following facade treatments: 1. Second story balconies and recesses to create interest. 2. Ground floor display windows to heighten visual interest. 3. Compatibility in color by emphasizing earth tones and avoidance of bright or garish building colors which greatly contrast with their surroundings.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
4. A variety of signs which do not compete for attention or distract from the overall street appearance. 5. Awnings or canopies that provide shelter over sidewalk areas and protect store entrances.			
5. Landscape Character: pending adoption of design guidelines for Wailuku Town, utilize the following interim guidelines in the review of projects. a. Maintain the landscape character and open space of the Wailuku entry along South High Street by preserving mature vegetation. b. Establish a unified street tree planting theme for streets within the commercial core which are to be pedestrian oriented. c. Foster the development of mini-parks where appropriate and a community beautification program.			X
6. The Maui Redevelopment Agency shall be encouraged to consult with the Cultural Resources Commission in the formulation of and/or amendments to the Wailuku Town Design Guidelines.			X
Objectives and Policies for Kahului			
1. Within industrial subdivisions, encourage the establishment of design standards for individual projects, including a unified streetscape planting theme and program, in order to enhance the visual quality of industrial developments.			X
2. Circulation: provide and maintain sidewalks and bikeways for convenient and pleasant connections between activity centers, such as shopping centers, schools, Maui Community College and public parks. These pathways should have adequate separation from vehicular traffic for safety purposes.			X
3. Building Form and Character: maintain compatible scale relationships between the existing low-scale character of the area, adjacent public uses and higher buildings. a. Building heights for the hotel-designated district fronting the ocean side of Ka'ahumanu Avenue shall not exceed ten stories in order to provide a dynamic skyline and identifiable hotel district. b. The low-rise character of the central business area should be maintained. Higher building forms up to six stories should be sited in the central portion of commercial blocks. c. Building heights along the perimeter of commercial blocks should provide a transition in scale to adjacent public and quasi-public uses. d. Commercial uses along the perimeter of central business area blocks should be low-rise and provide sufficient setbacks to allow landscaped buffers along street frontages.			X
4. Landscape Character a. A coordinated landscape theme should be established from the airport to Kahului, with landscape buffers established along Keolani Place, Hāna Highway, and Ka'ahumanu Avenue. b. Landscaping along Dairy Road between Keolani Place and Pu'unene Avenue should be established and coordinated with the landscaping of the airport-Kahului roadway approach routes. c. Parkway character should be established along Ka'ahumanu Avenue, from Kahului to Wailuku. Keopuolani Park plans should be updated and made an integral part of the area's landscaping.			X

Table 5-16: Wailuku-Kahului Community Plan (2002)	S	NS	N/A
d. Open parking areas should be landscaped to provide visual screening and shade. e. The perimeters of the central business area blocks should provide landscape buffers as part of a coordinated landscape theme to enhance their visual image. f. The mature landscape character of Kahului's commercial areas should be preserved and incorporated into future development plans, subject to review by the County's Arborist Committee. g. The landscape treatment along streets within the central business area should be extended along major collector roads serving adjacent residential neighborhoods, including Puʻunene, Kamehameha and Lono Avenues.			
Implementing Actions: 1. Implement a unified landscape planting theme along Kaʻahumanu Avenue from Kahului to Wailuku and along other major public roadways. 2. Establish a Wailuku Town Design District with adopted design guidelines. 3. Implement related actions specified in the Transportation section of the Community Plan related to roadways, pedestrian and bikeway improvements. 4. Provide pedestrian and bicyclist amenities within Wailuku Town, including shaded rest stops, bicycle parking, trash receptacles and public restroom facilities.			**X**
Discussion: The Proposed Action will not affect the Urban Design objectives and policies of the Wailuku-Kahului Community Plan.			

5.8 Permits and Approvals

The Proposed Action constitutes the issuance of a Water Lease after public auction by the DLNR/BLNR. Thus, BLNR approval is necessary to implement the Proposed Action. It is anticipated that the terms of the Water Lease would govern any modifications to the existing EMI Aqueduct System, and there are no reasonably foreseeable plans for the construction of any additional facilities that would expand the EMI Aqueduct System within the License Area in connection with the issuance of the Water Lease. Any work on the EMI Aqueduct System would be limited to repair and maintenance activities. Consequently, no additional permits and approvals are anticipated to be required to implement the Proposed Action.

Should the Water Lease be issued in accordance with the Proposed Action, surface water will become available for the various domestic and agricultural uses. This would, in turn, lead to anticipated secondary effects including construction activities such as for expanding the KAP and building facilities in support of diversified agriculture in Central Maui. Such activities would be subject to various permits and approvals, depending on its location, proposed use and type of construction activity involved, but such permits and approvals are not required for the issuance of the Water Lease. For clarity, the Applicant has no involvement with any existing or proposed uses at KAP or the KAP expansion area. That is a matter entirely under the County's jurisdiction, as that is County land. The County of Maui is solely responsible for the use of that land (which was long used for sugarcane production prior to County ownership) as well as complying with any and all regulatory requirements. The issuance of the Water Lease does not compel the County to take action at the KAP expansion area. Should the Water Lease be issued for the full amount allowed under the CWRM D&O, the County has the option to continue to rely on water from the EMI Aqueduct System. With respect to the Mahi Pono farm plan in Central Maui, as described in Section 2.1.4, limited agriculturally related construction is anticipated on those privately owned land. All such construction will be in compliance with State and County land use laws.

Chapter 6:
Irretrievable and Irreversible Commitments of Resources

6. IRRETRIEVABLE AND IRREVERSIBLE COMMITMENTS OF RESOURCES

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be recovered or reversed. Examples include permanent conversion of wetlands, the loss of cultural resources, soils, wildlife, agricultural production, or socioeconomic conditions. Irreversible is a term that describes the loss of future options for a resource. Irretrievable is a term that applies to the loss of a resource that is not renewable and cannot be recovered for future use.

6.1. Use of Non-Renewable Resources

The ~~issuance of the~~ Proposed Action (issuance of the proposed Water Lease) will not result in the irreversible use of ~~the~~ water resources because the Water Lease will be for a term, and not perpetual. Additionally, the Water Lease will be subject to the CWRM D&O, the provisions of HRS§ 171-58(d),[1] and the reservation in favor of the DHHL as discussed in Section 2.1.1, meaning that the water resource will not be exclusively and permanently committed to the Water Lease. For the term of the Water Lease the water resources will be available to the identified uses, such as providing water to the agricultural fields in Central Maui and continuing to provide water to the MDWS for Upcountry Maui and Nāhiku. To the extent such uses are not made, the water will not be diverted and will remain in the streams.

The use of surface/stream water for domestic and agricultural purposes could be viewed as an irretrievable use of the resources, to the extent that the water has been removed from its natural course. However, the use of this surface water is part of the cycle to return the water to the environment. For example, some of the water applied to land will return to the atmosphere through evaporation and transpiration through plants while water entering the ground will eventually discharge into the ocean or recharge the aquifers. Water consumed by humans and animals, will evaporate through breathing and perspiration, and wastewater effluent from cesspools, septic systems and wastewater treatment plants that discharge into the ground will eventually reach the ocean. Water in the atmosphere, including water evaporating from the ocean and land, will fall as rain, including in East Maui, completing the cycle. This is an open cycle involving the movement of water through the atmosphere, land and oceans of the earth.

As part of a global hydrologic cycle, water is generally considered a renewable resource. In any particular location and time, however, there may only be a limited amount available, for example, to flow in streams or be diverted for other uses. To the extent that a commitment is made as to where that water goes or is used, the result is an irreversible use of that water for that period of time. The Proposed Action is a Water Lease with 30-year commitment to the

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[1] HRS § 171-58(d) provides in relevant part:

> *Subject to the applicable provisions of section 171-37(3), the board, at any time during the term of the lease of water rights, may withdraw from waters leased from the State and from sources privately owned by the lessee so much water as it may deem necessary to (1) preserve human life and (2) preserve animal life, in that order of priority; and that from waters leased from the State the board, at any time during the term of the lease of water rights, may also withdraw so much water as it may deem necessary to preserve crops; provided that payment for the waters shall be made in the same manner as provided in this section.*

proposed uses of water. With careful management and responsible usage, water is a renewable resource and with that understanding the Water Lease would not involve an irretrievable commitment of the water resource.

The impacts of the use of the surface water resources associated with the Proposed Action will be offset by the considerable economic, social, and environmental benefits to the residents of the region, the County of Maui, and the State of Hawai'i that would be supported by the issuance of the subject Water Lease, as discussed in Sections 4.7.2, 4.7.3 and 4.7.4.

The Water Lease does not involve new construction within the License Area. The operation of the EMI Aqueduct System does not require the use of ~~nonrenewal~~ nonrenewable sources because the transmission of water through the EMI Aqueduct System is conducted through gravity rather than through water pumping stations that require the use of non-renewable energy sources for operations. The diversified agricultural operations planned for the Central Maui agricultural fields will involve the commitment of some resources for the modifications and improvements of the Central Maui Field Irrigation System ~~field irrigation system~~ and the construction of fencing, agricultural operating facilities and potentially renewable energy facilities as discussed in Section 2.1.4. Building materials (concrete, wood, metal, etc.) will be used along with energy resources related to the construction of those items. However, similar improvements are planned even if no Water Lease is issued but, on a reduced scale. The use of such fuels and resources is not expected to be significant and the use of the Central Maui agricultural fields for diversified agriculture is considered to be beneficial because there would be considerably more green open space in Central Maui in the form of farms and irrigated pasture and approximately three times as much food production, including greater food self-sufficiency, should the Water Lease be issued. There would also be more local jobs created directly and indirectly from the Proposed Action.

"Resources" also includes natural and cultural resources. The Water Lease will authorize the use of diverted surface water, resulting in certain streams having less flow than under natural conditions. However, the Water Lease will also be subject to the IIFS established under the CWRM D&O, which has identified the streams most important for biological habitat purposes and mandated certain minimum flows to support those streams. Water is also identified as a cultural resource. A Water Lease that authorized the use of all surface waters in disregard to cultural practices would be a commitment involving loss or destruction of the cultural resource. However, the CWRM D&O specifically identified streams important for the cultivation of taro and other community purposes, and ordered an end to all diversions on those streams as discussed in Section 1.3.4. The Proposed Action will be in compliance with the CWRM D&O. As discussed in Section 4.6 of the EIS, stream restoration would address physical mitigation and support cultural and food gathering practices by increasing kalo production. Additionally, mitigation measures recommended by CSH in the CIA include continued monitoring and public reporting of stream flow volumes through maintenance and upgrades to the existing system of optical encoders with float tape and data loggers within the EMI Aqueduct System, notification and appropriate training of any persons required to enter the License Area as part of the Proposed Action regarding the potential for discovery of undocumented cultural sites and the procedures for reporting such finds, and for the facilitation of access via an appropriate access policy and procedure for cultural practitioners who wish to enter the License Area to practice their traditional and customary Native Hawaiian rights in accordance with applicable law. Therefore, it is not expected that the Water Lease, which will implement the appropriate

mitigation measures as determined by the BLNR, and be subject to the CWRM D&O and subject to a reservation in favor of the DHHL, will result in the loss or destruction of cultural resources. The Proposed Action will not include partial or total destruction or alteration of historic properties, detrimental alteration of the surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, nor neglect resulting in deterioration or destruction.

With regard to the non-petitioned streams that are not subject to the 2018 CWRM D&O, all of these streams are located within the Huelo portion of the License Area. Updates in the technical studies have found that there are not any registered taro diversions along the non-petitioned streams, nor is it anticipated that increasing flows in these areas would lead to a significant increase in taro or other community purposes as this area lacks the necessary river-valley characteristics of major taro growing areas. As discussed in Section 4.2.1, under the Proposed Action, the non-petitioned streams will see a decrease in terms of HU from the theoretical Natural Condition. It is anticipated that there will be an approximate reduction of 88.2 percent from the theoretical Natural Condition (and 56.6 percent reduction from the No Action/no Water Lease scenario). However, from a regional perspective, the License Area will see an overall increase in HU from historical diversion rates. Specifically, the License Area will see an overall increase of 13.8 percent in available HU under the Proposed Action when compared to historical diversions under sugarcane operations. Conversely, the License Area will see an approximate 36.1 percent decrease in available HU under the Proposed Action as compared to natural flow conditions.

6.2. Irreversible Curtailment of the Range of Beneficial Uses

The Water Lease will allow the continued use of surface water for recognized beneficial offstream purposes such as domestic, industrial, and agricultural uses. There are also two hydroelectric facilities that utilize this water, one located in the area historically known as Kaheka Village, and the other at Pā'ia. Generation of the hydroelectric power is a non-consumptive use of water and the water can be subsequently used for agricultural purposes after flowing through the hydroelectric facilities. The State Water Code ~~water code~~ (HRS Chapter 174C), emphasizes that maximum beneficial use of the waters of the State includes domestic uses, aquaculture uses, irrigation and other agricultural uses, power development, and commercial and industrial uses, and that there should also be protection of traditional and customary Hawaiian rights, the protection and procreation of fish and wildlife, the maintenance of proper ecological balance and scenic beauty, and the preservation and enhancement of waters of the State for municipal uses, public recreation, public water supply, agriculture, and navigation. The Water Lease will promote the recognized beneficial uses of the water under the Water Code.

The implementation of the Proposed Action is consistent with existing and adjacent land uses, and would not prevent or curtail any uses allowable under applicable land use policies or controls. As discussed in Chapter 5, the diversion of surface water and the use of diverted surface waters allowed under the subject Water Lease is consistent with the goals, policies, and objectives outlined in the Hawai'i State Plan, State Functional Plans, Maui Countywide Policy Plan, Maui Island Plan, and a range of other County sponsored community plans. The Proposed Action also supports the use and preservation of IAL, with approximately 22,000 acres of the approximately 30,000 acres of the Central Maui agricultural fields being designated as IAL.

The amount of water allowed to be diverted by the Water Lease will be significantly less than the amount diverted for sugar cultivation. Mahi Pono's farm plan projects use of the total amount of water available after compliance with the IIFS requirements of the CWRM D&O, although it is understood that the DHHL will eventually convert its water reservation to active use. Mahi Pono's water use will be incremental as diversified agriculture continues to be ~~is~~ brought back to Central Maui. However, the amount of water diverted will be only what is actually needed at that time. However, if more water were available, more crop options would also be available. The issuance of the Water Lease should not curtail the use and access to adjacent lands (e.g., for recreation, environmental research, etc.) as the EMI Aqueduct System has been in place for over 100 years.

6.3. Potential for Environmental Accidents

The implementation of the Proposed Action is not associated with activities that could directly trigger potential environmental accidents, nor pose a significant risk for potentially triggering environmental accidents. Specifically, the Proposed Action constitutes the issuance of a long-term Water Lease, which does not entail ~~and is not associated with~~ any construction or development activities. The EMI Aqueduct System has been operating for over 100 years, and issuance of the Water Lease should ensure continued operations and maintenance of the EMI Aqueduct System.

The use of the Central Maui agricultural fields for diversified agriculture could be associated with potential impacts to soil or groundwater from accidental spillage of pesticides. To mitigate this, Mahi Pono will implement a NRCS & USDA-approved conservation plan that will limit surface water runoff and soil erosion that could carry agricultural chemicals and nutrients offsite. Mahi Pono's use of fertilizers and pesticides will follow BMPs approved by the State of Hawai'i DOH, the U.S. NRCS, the U.S. EPA, the State of Hawai'i DOA and other governmental agencies in regards to the use of chemicals, and controlling dust and erosion and, thus, runoff. The State of Hawai'i DOA's Pesticide Branch also provides regulatory oversight over Mahi Pono's pesticide use. Mahi Pono will ~~also~~ be subject to inspections conducted by the Hawai'i DOA ~~Department of Agriculture (HDA)~~ that will ensure that the equipment used to apply agriculture chemicals is properly calibrated. ~~HDA~~ DOA and the U.S. EPA will also have regulatory oversight over Mahi Pono's application of agriculture chemicals going forward. In accordance with this oversight, records of pesticide use must be kept and made available to the DOA's Pesticide Branch upon request at any time. In addition, Act 45, which was passed by the 2018 Hawai'i Legislature and effective January 1, 2019, required that all Certified Applicators of Restricted Use Pesticides (RUP) submit a report of the RUP that were applied each year. Mahi Pono will also make investments in equipment and storage facilities aimed at developing closed systems to safeguard against agriculture chemical spills. Moreover, since January 2020, Mahi Pono has also committed to foregoing the use of Round-Up and other glyphosate-based products within the Central Maui agricultural fields.

6.4. Unavoidable Impacts

The diversion of surface waters from the License Area in East Maui to the agricultural fields in Central Maui under the Proposed Action, as well as delivery of water to the MDWS to service Upcountry Maui and Nāhiku would not involve the construction of any new facilities, hence, it is not anticipated that there would be any unavoidable impacts or probable adverse effects.

Past access into the License Area to construct, operate and maintain the EMI Aqueduct System may have resulted in the inadvertent introduction of invasive species, as discussed in Section 4.4 and Section 4.17. In the future, with continued access for maintenance of the EMI Aqueduct System, the possibility of inadvertently introducing additional invasive species remains. However, any changes to plant species composition that may occur due to future repair and maintenance activities associated with the Proposed Action would be expected to be insignificant, compared with the conversion from native to invaded forest that occurred over the course of over a century or more. Therefore, the Proposed Action would not be expected to significantly impact the flora of the License Area.

The Water Lease will authorize the use of diverted surface water, resulting in certain streams having less flow than under natural conditions. However, the Water Lease will also be subject to the CWRM D&O, issued in June 2018, which has identified the streams most important for biological habitat purposes and mandated certain minimum flows to support those streams. As such, the biological impacts of the Water Lease are far less than the impacts that were in place at least since the time of the completion of the EMI Aqueduct System (in 1923), if not even earlier, e.g. the completion of the first portion of the EMI Aqueduct System in 1878. As of the date of the DEIS, the EMI Aqueduct System was only diverting approximately 20 mgd; more recently diversions have been up to approximately 26 mgd. Hence, it is expected that should the Water Lease be issued, Mahi Pono's water use will be incremental and will increase over time until full implementation of the farm plan, as diversified agriculture continues to be is brought back to Central Maui. Thus, it is expected that the number of potential HU would gradually decrease to what is expected to be available under the Proposed Action as discussed in Section 4.2.1.

Additionally, Mahi Pono's proposed agricultural operations are anticipated to use less water than what was previously used during sugarcane operations, thereby leaving more water in the streams. However, by using less water to irrigate the Central Maui agricultural fields, it is expected that there will be a lower level of groundwater recharge to the region's groundwater aquifers as discussed in Section 4.2.2. Consequently, the lower level of groundwater recharge in combination with periods of lower rainfall that may result from climate change impacts, could result in lower levels of groundwater supply to serve the agricultural users in Central Maui, as well as other users of that water for domestic or municipal purposes.

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Chapter 7:

Relationship Between Local Short-Term Uses of Humanity's Environment and the Maintenance and Enhancement of Long-Term Productivity

7. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF HUMANITY'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This section discusses the relationship between the Proposed Action's short-term uses of the environment and how those uses may compromise or enhance the long-term productivity of that environment. Explored are the economic, social and cultural gains anticipated from the Proposed Action which are weighed against how the Proposed Action may narrow or expand other comparable long-term opportunities the environment offers, including avoidance of any risks posed to health and safety. In response to comments received on the DEIS, the following sections include discussions that elaborate on the non-petitioned streams and farming in East Maui.

7.1 Tradeoffs Among Short- and Long-Term Gains and Losses

The Proposed Action is a Water Lease for a 30-year commitment of government-owned water collected by the EMI Aqueduct System from the License Area for various uses, including domestic and agricultural uses served by the MDWS in Upcountry Maui, and the KAP ~~and the Nāhiku community in East Maui~~; continued diversified agricultural operations on approximately 30,000 acres in Central Maui; and, preservation of the EMI Aqueduct System. While the utilization of the present configuration of the EMI Aqueduct System has been in place since 1923, ~~this~~ the proposed Water Lease would authorize the use of less water than was diverted in the past during sugar operations because the Water Lease must be in compliance with the CWRM D&O that was issued in June 2018. While the use of the water would primarily go to support the Mahi Pono farm plan, the amount of water actually used by Mahi Pono for its farm plan will vary until the farm plan reaches full implementation (subject, of course, to the maximum diversion amounts that are permitted under the Water Lease), and only the amount of water actually needed, whether for the farm plan, MDWS, or otherwise, will be diverted.

Considering the Water Lease as a short-term use of humanity's environment, the beneficial gains over the term of the Water Lease include the benefits accrued to the various recipients of the water described above for domestic, commercial and agricultural uses. The Water Lease will maintain the lifestyle and livelihood of those who receive their water through the MDWS. These include the communities and agricultural users served by the MDWS in Upcountry Maui and Nāhiku. In Central Maui the Water Lease will provide irrigation water for Mahi Pono to continue to develop diversified agriculture on former sugarcane ~~sugar~~ land, with associated economic gains from the sale of crops and direct and indirect job creation, and increased local food sustainability.

The CWRM D&O established IIFS for 24 streams in the License Area, which includes water arising on both State- and privately-owned lands within East Maui. Therefore, as to those streams subject to the CWRM D&O, the maximum amount of water that can be awarded through the Water Lease is the amount of water that is available for diversion after ~~implementation~~ compliance with ~~of~~ the CWRM D&O. Through the CWRM D&O, the CWRM ordered full restoration of ten streams, primarily for taro growing areas for irrigation and for community and non-municipal domestic uses. Flow in one "habitat" stream was fully restored while five other "habitat streams" were ordered to have 64% of their BFQ_{50} restored, which generally represents the H_{90}, based on the biological diversity and habitat that already exists. Seven streams were ordered to have 20% of their BFQ_{50} restored to provide connectivity for

migrating stream fauna. While the Water Lease would have a term of 30 years, the CWRM D&O and the associated benefits to the kalo growing areas, communities and environment, would not be affected by that term and, if not otherwise revised by the CWRM, the IIFS for the petitioned streams ~~it~~ will continue indefinitely.

Regarding the non-petitioned streams that are not subject to the CWRM D&O, these streams are located in Huelo portion of the License Area. It is assumed under the Proposed Action that these streams will continue to be diverted as they have been in the past. These streams will continue to contribute to beneficial offstream uses accrued to the various recipients of the water described above for domestic, commercial, and agricultural uses. However, since these streams did not receive any flow restoration, as analyzed by the HSHEP model (Appendix A), this group of streams (non-petitioned) will experience the most significant decrease (approximately 88.2 percent) in available HU for native stream species from the theoretical Natural Condition (and 56.6 percent reduction from the No Action/no Water Lease scenario). As discussed in Section 4.2.1 and Appendix A, these native stream species include 'O'opu nākea (*Awaous stamenius*); 'O'opu alamo'o (*Lentipes concolor*); 'O'opu naniha (*Stenogobius hawaiiensis*); 'O'opu nōpili (*Sicyopterus stimpsoni*); 'O'opu akupa (*Eliotris sandwicensis*); 'Ōpae kala'ole (*Atyoida bisulcata*); 'Ōpae 'oeha'a (*Macrobrachium grandimanus*); and Hīhīwai (*Neritina granosa*), all of which are considered cultural gathering resources.

However, from a regional perspective, the License Area (including the petitioned and non-petitioned streams) will see an overall increase in available HU as compared to historical diversion rates. Specifically, the License Area will see an overall increase of 13.8 percent in available HU under the Proposed Action when compared to historical diversions under sugarcane operations. Conversely, the License Area will see an approximate 36.1 percent decrease in available HU under the Proposed Action as compared to the theoretical Natural Condition (and a 20.9 percent reduction from the No Action/no Water Lease condition). Importantly, the CWRM D&O fully restored flow to historical and current areas of significant taro cultivation and community use, reducing or eliminating cultural impacts along the restored streams. Hence, under the Proposed Action, which assumes compliance with the CWRM D&O, numerous instream and offstream beneficial uses are provided for.

7.2 Extent to which the Proposed Action Forecloses Future Options

The Proposed Action is a Water Lease for a 30-year commitment of governmental-owned water for various uses described in this FEIS ~~DEIS~~, and as summarized in the preceding section. Therefore, if the Water Lease is awarded based on this FEIS ~~DEIS~~, any proposed uses of the surface water that deviate significantly from those described herein would be foreclosed. For example, Mahi Pono could not use water obtained from the Water Lease to pursue urban development in the Central Maui agricultural fields without restarting the process for obtaining a new Water Lease, including preparation of a supplemental or new EIS.

The Proposed Action would not foreclose different uses of water obtained through the EMI Aqueduct System after the 30-year term of the Water Lease expires. ~~.~~ All laws regarding the issuance of a new Water Lease at that future time would be applicable.

7.3 Narrows the Range of Beneficial Uses

As discussed in the preceding section, awarding of the Water Lease based on this FEIS ~~DEIS~~ would foreclose options that deviate significantly from those described herein. Some of those uses could be considered beneficial. While such options may be foreclosed during the 30-year term of the Water Lease, they could be pursued through a subsequent Water Lease.

As previously discussed, the amount of government-owned water that may be diverted out of the License Areas has been limited by the CWRM D&O. If the Water Lease is not awarded, government-owned water would be returned to the streams, adding stream flow to all streams in the License Area, including amounts above ~~to~~ the minimum required streamflow in streams subject to the CWRM D&O. For the ten streams that are fully restored, their productivity would remain unchanged and no additional benefit would be gained. For the five "habitat streams" ~~that had~~ the CWRM D&O restored 90% of their habitat thus ~~restored through the CWRM D&O,~~ any additional flow restored would only provide ~~only~~ a relatively small amount of additional ~~marginal improvement~~ in habitat. The seven streams ordered to have 20% of the instream flow ~~BFQ_{50}~~ restored for "connectivity" ~~(CWRM D&O, COL 30)~~ are believed necessary to maintain habitat below the diversion, though connectivity flow (20% of instream flow) across the diversion structures would allow for passage of biota upstream (CWRM D&O, COL 30) ~~those with low biological ratings and or do not have the potential to improve drastically with increased flows.~~ Thus, these streams were determined to have sufficient habitat in their diverted state because of their gaining status. Overall, ~~Any~~ additional flows restored to these streams would also have little ~~marginal~~ benefit with regards to habitat restoration.

With respect to farming in East Maui, the issuance of the Water Lease is not expected to cause any significant change to existing and potential East Maui farming. As shown in the updated analysis provided in Appendix I (Agricultural and Related Economic Impacts report), all or nearly all of the farming would take place in the Honopou, Ke'anae and Wailuā regions, and would rely primarily on the taro streams ordered for full restoration under the CWRM D&O. Taro farms in East Maui (from Honopou to Nāhiku), including farms using water from streams not subject to the CWRM D&O, are assumed to cover about 55 net acres by 2030 (a little over 60 gross acres, and assuming the high estimate of 90% of the land in crop).Further, all or nearly all of the additional taro cultivation will occur in existing/historical taro cultivation areas, not in new areas, given the barriers presented by terrain and the economic challenges of initiating new taro farms. As such, further increases to stream flows would not result in even greater amounts of farming in East Maui.

7.4 Environmentally Significant Consequences

The proposed Water Lease would also provide the lessee access into the License Area during the term of the Water Lease to operate and maintain the EMI Aqueduct System, which is a resource that requires maintenance to retain its integrity as a continually working water system for over a century ~~134 years~~ since its initial construction. Should the Water Lease not be awarded, the EMI Aqueduct System could be abandoned and deteriorate over time, losing its value as an important piece of infrastructure and a historical resource. However, if EMI finds that it is economically feasible to maintain the EMI Aqueduct System to divert non-governmental water, this historic resource could be preserved for as long as it is maintained.

In addition to the historic EMI Aqueduct System, the License Area has a rich archaeological landscape and post-contact history, as discussed in Section 4.5. While the Proposed Action would provide the lessee access into the License Area during the term of the Water Lease to operate and maintain the EMI Aqueduct System, such activities would not result in the partial or total destruction or alteration of historic properties. If the Water Lease is not awarded, EMI could abandon the EMI Aqueduct System and relinquish its management activities in the License Area. As a result, there is a potential that relinquishment of the EMI management activities in the License Area as well as ~~unmanaged~~ unfettered access or, generally an increase in public access into the License Area as discussed in Section 3.2.2.2, could adversely and irreversibly affect documented and undocumented historic and cultural resources in the License Area. If EMI were to continue to maintain the EMI Aqueduct System to divert water from private lands ~~non-governmental water~~, ~~their~~ its role in managing access, into the License Area would have to be worked out with the DLNR, the landowner of the License Area, and that would determine the extent to which access could increase the risk of detrimentally affecting historic and cultural resources.

Access for the operation and maintenance of the EMI Aqueduct System, as well as other sanctioned and unsanctioned activities such as hiking, hunting and gathering in the License Area have introduced alien species of flora and fauna, primarily in the vicinity of the access roadways and trails used for the maintenance and repair activities of the EMI Aqueduct System, as discussed in Section 4.4. The establishment of these alien species in ~~this~~ these areas have likely irreplaceably displaced some native species, which are a biological and cultural resource. As a result of the Proposed Action, it is possible that additional alien species could be unintentionally introduced and if they are particularly invasive, more native species could be displaced. Section 4.4~~.~~ discusses mitigation measures that would reduce the potential for adverse impacts by invasive alien species to flora and fauna resources. If the Water Lease is not awarded, EMI could abandon the EMI Aqueduct System ~~system~~ and relinquish its management activities in the License Area. With less control over access, the potential for introducing alien species in the License Area would likely increase. If EMI continues to maintain the EMI Aqueduct System to divert water from private lands ~~non-governmental water~~, ~~their~~ its role in managing access into the License Area would have to be worked out with the DLNR, the landowner of the License Area, and that would determine the extent to which such access could increase the potential for introducing invasive alien species that could displace native species.

With the awarding of the Water Lease, a reduction from current stream flows would occur over time as more water is used for irrigation to support diversified agriculture in Central Maui. However, the use of steam water for diversified agriculture will always be limited by the amount of diversion allowed by the CWRM D&O and the Water Lease.

Under the Proposed Action, a portion of the water awarded through the Water Lease will be used for diversified agriculture on the approximately 30,000 acres of agricultural land in Central Maui. If the Water Lease is not awarded, EMI may find it economically feasible to continue maintaining the EMI Aqueduct System to divert water from private land ~~non-governmental water~~ for a reduced diversified agricultural operation in Central Maui as described in Table 3-

2 in Section 3.4.13.[1] In such a scenario, Mahi Pono would be unable to take full advantage of the potential long-term productivity that the fields of Central Maui offer for diversified agriculture. If EMI finds that it is economically unfeasible to maintain the EMI Aqueduct System without the Water Lease, there will be little opportunity to realize the potential long-term agricultural productivity of the agricultural fields of Central Maui. The only remaining water source would be the existing groundwater wells which have low SY without input from imported irrigation water provided by the EMI Aqueduct System.

If agriculture in the Central Maui fields is abandoned, the natural arid conditions would return. According to the SWCA's Terrestrial Flora and Fauna Report (Appendix C), there would be succession of weedy plants with few or no native species. More frequent wildfires may occur while reservoirs would dry up and fill in, eliminating nest and foraging habitat for endangered Hawaiian waterbirds and foraging habitat for migrant shorebirds and migrant waterfowl. On the other hand, the potential for tree tobacco to colonize abandoned fields would be beneficial for the endangered Blackburn's sphinx moth because it would increase available breeding habitat.

Regarding the non-petitioned streams that are not subject to the CWRM D&O, these streams are located in Huelo portion of the License Area. It is assumed under the Proposed Action that these streams will continue to be diverted as they have been in the past. These streams will continue to contribute to beneficial offstream uses accrued to the various recipients of the water described herein for domestic, commercial and agricultural uses. However, since these streams will not receive any flow restoration, as analyzed by the HSHEP model (Appendix A), this group of streams (non-petitioned) will experience the most significant decrease (approximately 88.2 percent) in available HU for native stream species from theoretical Natural Condition, and a 56.6 percent reduction from the No Action/no Water Lease condition

However, from a regional perspective, the License Area (including the petitioned and non-petitioned streams) will see an overall increase in available HU as compared to historical diversion rates. Specifically, the License Area will see an overall increase of 13.8 percent in available HU under the Proposed Action when compared to historical diversions under sugarcane operations. Conversely, the License Area will see an approximate 36.1 percent decrease in available HU under the Proposed Action as compared to theoretical Natural Condition, but a reduction of 15.9 percent from the No Action Alternative. Hence, under the Proposed Action, which assumes compliance with the CWRM D&O, numerous instream and offstream beneficial uses are provided for.

7.5 Long-term Risks to Health and Safety

If the Water Lease is not awarded, and even if EMI finds it finds it economically feasible to continue maintaining the EMI Aqueduct System to divert water from private lands ~~non-governmental water~~ for diversified agriculture in Central Maui, there may not be enough water to allocate much or any water to the MDWS. In Upcountry Maui, the loss would exacerbate the

[1] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture.

effects of drought when other surface water sources are unreliable. For the KAP and the Nāhiku community served by the MDWS, this could eliminate their primary source of water since provision of water to the MDWS from EMI is contingent on the issuance of a water lease. Insufficient water for these areas, will likely affect the availability of water for sanitary functions like wastewater disposal, washing and bathing which could pose long-term risks to health.

If agriculture in the Central Maui fields is abandoned, the natural arid conditions would return. Exposed soils in the Central Maui fields would be susceptible to wind erosion and airborne dust could create a nuisance or potential health hazard under windy conditions. Dry windy conditions would also increase the potential for wildfires, which could pose a public safety hazard.

Chapter 8:
Summary of Unresolved Issues

8. SUMMARY OF UNRESOLVED ISSUES

Unresolved issues for the Proposed Action have to do with the steps that must be completed before the Water Lease can be issued, which issues must necessarily be resolved before the "commencement of the action", that is to say, before the BLNR issues any Water Lease.

The Water Lease must accommodate a reservation in favor of the DHHL. ~~The DHHL is formulating the reservation amount that it will ultimately present to CWRM.~~, ~~as~~ As discussed in Section 2.1.1, ~~Chapter 2.~~ the DHHL water reservation process involves several steps. Following DHHL's beneficiary consultation, the reservation request approved by the Hawaiian Homes Commission in May 2019 related to the proposed Water Lease is for 11,455,510 gpd (which is comprised of 10,428,000 gpd of non-potable water for Kēōkea-Waiohuli and 1,027,510 gpd of non-potable water for Pulehunui), which is consistent with the amount of the DHHL reservation identified in the DEIS. It should be noted that at this time, a reservation has not yet been approved by the CWRM, and ~~However,~~ the exact timing for when the DHHL will ~~wish to~~ make use of any reservation or portions thereof is not known at this time. Also as noted in Section 2.1.1, with respect to Water Lease lessee's potential use of the DHHL reservation until such time as DHHL physically claims the use of the water, the DHHL has cautioned that in addition to any specifications made by the CWRM and BLNR regarding the Water Lease, a separate agreement between the lessor and the DHHL will be necessary to allow any temporary use of water reserved for DHHL. In any event, ~~,~~ the Water Lease will be subject to the DHHL's reservation.[1]

Similarly, by law the Water Lease must either contain a covenant requiring the lessee and the DLNR to jointly develop and implement a watershed management plan, or a watershed management plan must be in place at the time of the approval of the Water Lease as discussed in Section 2.1. At the time of the DEIS publication, ~~The~~ the required content and parameters of a watershed management plan related to water leases ~~the proposed Water Lease~~ were ~~are~~ unresolved ~~at this time,~~. On October 11, 2019, the BLNR approved the minimum content requirements for a watershed management plan. A copy of the BLNR-approved DLNR report is enclosed as Appendix O-1 and the components of an acceptable watershed management plan are outlined in Section 2.1. However, the specifics of the watershed management plan in connection with the proposed Water Lease are yet to be determined. However, HRS § 171-58(e) requires that any new lease of water rights "shall contain a covenant that requires the lessee and the department of land and natural resources to jointly develop and implement a watershed management plan. The board shall not approve any new lease of water rights without the foregoing covenant or a watershed management plan." ~~but will be resolved before the BLNR can issue the Water Lease.~~

Other unresolved issues related to the proposed Water Lease will also be resolved before the Water Lease is issued, such as the Water Lease rental rate, the selection of the lessee,

[1] Consistent with the analysis provided in the Agricultural and Related Economic Impacts report (Appendix I), for each 1 mgd reduction of surface water available to Mahi Pono from the Water Lease, whether due to the DHHL reservation or otherwise, in Central Maui there would be an estimated reduction by about 173 acres of land in crops, a reduction by about 15 acres of land in irrigated pasture, an increase of about 188 acres of land in unirrigated pasture.

the amount of water permitted for diversion, the authorized uses of that water, and other terms of the Water Lease. The BLNR must set upset rental through appraisal of fair market value, and disposition of the Water Lease must be by public auction, including extensive public notice and bidder qualification requirements. Therefore, at this point the amount of rental payment that will be required under the Water Lease, the identity of the awarded lessee, and the specific terms of the Water Lease, are unknown, and therefore may be considered "unresolved" for the purposes of this FEIS ~~DEIS~~. However, these issues are expected to be resolved prior to the issuance of the Water Lease.

Chapter 9:
Consultation

9. CONSULTATION

The pre-assessment consultation process included efforts to inform the community and solicit input in scoping the DEIS well beyond the requirements of Chapter 343, HRS. This process included consultation both prior to the publication of the EISPN on February 8, 2017 and during the 30-day public comment period on the EISPN in the form of formal written consultation pursuant to Chapter 343, HRS and Title 11, Chapter 200, HAR; meetings with elected officials, agencies, and stakeholders; and a community outreach process, including two public scoping meetings. These outreach efforts are documented below.

9.1 Early Consultation

The following agencies, organizations, and individuals were sent early consultation letters on November 23, 2016, requesting comments on the Proposed Action prior to the publication of the EISPN (See second column in Table 9-1). Those who provided written responses to the early consultation letters are listed in the third column of Table 9-1. Copies of all written comments received are reproduced herein as Appendix J. Response letters to those who submitted substantive comments during early consultation but did not submit written or oral comments during the 30-day public review period after publication of the EISPN are also included in Appendix J. Response letters to those who submitted substantive comments during early consultation and who also provided written or oral comments during the 30-day public review period are provided in Appendix M.

Table 9-1. Early Consultation Participants

Agency / Organization / Individual Name	Sent Early Consultation Request	Responded to Early Consultation
Federal Agencies		
U.S. Army Corps of Engineers	✓	
U.S. Department of Agriculture, Natural Resources Conservation Service	✓	
U.S. Environmental Protection Agency	✓	
U.S. National Parks Service	✓	
U.S. Fish and Wildlife Service	✓	✓
U.S. National Marine Fisheries Service	✓	
U.S. Department of the Navy	✓	
Federal Transit Administration	✓	
Federal Highways Administration	✓	
U.S. Department of Homeland Security	✓	
National Oceanic and Atmospheric Association	✓	
Federal Aviation Administration	✓	
State Agencies		
Civil Defense	✓	
Department of Agriculture	✓	✓
Department of Accounting and General Services	✓	✓
Department of Accounting and General Services Archives Division	✓	
Department of Business, Economic Development and Tourism (DBEDT)	✓	

Agency / Organization / Individual Name	Sent Early Consultation Request	Responded to Early Consultation
DBEDT, Research Division Library	✓	
DBEDT, Strategic Industries Division	✓	
DBEDT, Hawaiʻi State Energy Office	✓	
DBEDT, Land Use Commission	✓	
DBEDT, Office of Planning	✓	✓
Department of Defense	✓	
Department of Education	✓	
Department of Hawaiian Homelands	✓	✓
Department of Health (DOH)	✓	
DOH, Environmental Management Branch	✓	
DOH, Environmental Planning Office	✓	✓
DOH, Clean Water Branch	✓	✓
DOH, Hazard Evaluation and Emergency Response Office	✓	
DOH, Maui District Office		✓
DOH, Office of Environmental Quality Control	✓	
Department of Land and Natural Resources (DLNR)	✓	✓
DLNR, Historic Preservation Division	✓	✓
DLNR, Na Ala Hele, Trails & Access Program		✓
DLNR, Land Division Administration	✓	✓
DLNR, Land Division, Maui District Land Agent		✓
DLNR, Division of Forestry and Wildlife		✓
DLNR, Engineering Division		✓
DLNR, Commission on Water Resource Management		✓
DLNR, Division of Aquatic Resources	✓	
Department of Transportation	✓	
Department of Transportation, Airports Division	✓	
Hawaiʻi State Library	✓	
Hawaiʻi State Library, Kahului Regional Library	✓	
Office of Hawaiian Affairs	✓	
University of Hawaiʻi Environmental Center	✓	
County of Maui Agencies		
Department of Fire and Public Safety	✓	
Department of Environmental Management	✓	
Department of Housing and Human Concerns	✓	✓
Department of Parks and Recreation	✓	
Department of Planning	✓	✓
Department of Public Works	✓	✓
Department of Transportation	✓	
Department of Water Supply	✓	✓
Office of Economic Development	✓	
Department of the Corporation Counsel	✓	✓
Police Department	✓	✓

Agency / Organization / Individual Name	Sent Early Consultation Request	Responded to Early Consultation
Other Organizations		
Maui Electric Company	✓	
Verizon Hawaiʻi	✓	
Hawaiʻi Gas	✓	
Hawaiian Telcom	✓	
Oceanic Time Warner Cable	✓	
Hawaiʻi Farm Bureau Foundation	✓	
Maui Tomorrow Foundation		✓ (through I. Hall, Esq.)
Native Hawaiian Legal Corporation - Camille Kalama, Esq. & Summer Sylva, Esq.	✓	✓ (on behalf of NāMoku Aupuni o Koʻolau Hui and others)
Public Access Trails Hawaii		✓
Individuals		
Senator Kalani English	✓	
Representative Kyle Yamashita	✓	
Representative Lynn DeCoite	✓	
Edward Wendt, Nā Moku Aupuni O Koʻolau Hui, Inc.	✓	
Isaac Hall, Esq.	✓	✓ (on behalf of Maui Tomorrow Foundation)
Jeffrey Paisner	✓	
John Blumer-Buell	✓	
Lucienne de Naie	✓	
Napua Puaoi		✓
Randy Cabral	✓	
Robert Thomas, Esq.	✓	
Elaine Wender		✓

9.2 Summary of Applicant's Community Outreach and Consultation Efforts During the EISPN Comment Period

The following agencies, organizations, and individuals were consulted following publication of the EISPN. Consultation was conducted to solicit comments from agencies, organizations, and individuals regarding any concerns with the Proposed Action and agency requirements. Notice of the availability of the EISPN was published in the February 8, 2017 issue of *The Environmental* Notice. Copies of all written comments received during the EISPN comment

period along with response letters are reproduced in Appendix M. Table 9-2 lists the agencies, organizations, and individuals who were provided a copy of the EISPN or otherwise participated in the EISPN consultation process. Table 9-2 also indicates the agencies, organizations, and individuals who will receive notice of the DEIS.

Public input on the EISPN was provided via oral testimony at two public scoping meetings, as well as by e-mail, fax, and letters received during the 30-day EISPN comment period. Substantive comments on the EISPN related to scoping of the DEIS were carefully evaluated during the preparation of this DEIS and incorporated, as appropriate, into the document. Full consideration was given to the concerns, suggestions, information, and documentation provided by the commenting individuals, groups, and agencies. In addition, although the 30-day public comment period provided on the EISPN ended on March 10, 2017, public comments received after that date were also considered. Transcripts for both scoping meetings comprise Appendix K-2 and L-2 of this document.

As a key component of the DEIS outreach process for the Proposed Action, the applicant hosted two scoping meetings to engage stakeholders and solicit input on the EIS process. Both scoping meetings were held on the island of Maui in February of 2017.

Notification of the EIS scoping meetings was published in the Maui News on February 19, 2017, as shown on Figure 9-1. In addition, a comprehensive effort was made to reach out to engage as many neighborhood stakeholders and community members as possible to participate in each scoping meeting. At each meeting, more than 100 participants made up of neighborhood residents, general community members, community stakeholders and leaders, and City and State officials were in attendance.

EIS Scoping Meeting #1: The first community scoping meeting was held at the Maui Electric Company Community Meeting Room in Kahului on the evening of February 22, 2017.

EIS Scoping Meeting #2: The second community scoping meeting was held on the evening of February 23, 2017, at the Haʻikū Park and Community Center in Pāʻia.

The format for each meeting was identical. Each meeting was facilitated by a meeting facilitator who introduced the EIS preparers from WOC, set courtesy rules for comment and/or response interaction, notified participants that a court stenographer was present to record the meeting, notified participants that those who signed up to give oral comments would be called upon to speak, and encouraged participants to submit comments before the comment deadline. Project display materials and hand-out sheets, comment forms with submittal information, and a comment drop box were provided at each meeting.

~~Figures 9-2 and 9-3~~ Appendix K-1 and Appendix L-1 reflect the number of participants who signed in at each scoping meeting and the number of speakers who signed up to share oral comments. The number of registered participants is based on the number of individuals who signed an attendance sheet upon arriving at each hearing. A total of 114 people signed the attendance sheet for the February 22, 2017 meeting at the Maui Electric Company Community Meeting Room in Kahului and a total of 36 people signed up to share oral comments although not everyone that signed up spoke. Only 34 people shared oral comments for the scoping

meeting held on February 22, 2017. A total of 140 people signed the attendance sheet for the February 23, 2017 at the Haʻikū Park and Community Center in Pāʻia and a total of 47 people signed up to share oral comments although not everyone spoke. Only 34 people were able to share oral comments for the scoping meeting held on February 23, 2017. The total attendance for both meetings was higher than the number of those who registered as not everybody signed the attendance sheet. A total of 144 written comments were received during the EISPN comment period. However, not every person that commented on the EISPN provided an address (physical or electronic mailing address). Therefore, response letters, including the DEIS ~~Draft EIS~~ Notification, could not to be sent to those people. Nonetheless, comments from those that did not provide an address are reproduced with an appropriate response letter in Appendix M. These people are indicated below, in Table 9-2, without a checkmark in the "Draft EIS Notification" column.

Table 9-2: List of Agencies, Organizations, and Individuals Consulted During the 30-Day EISPN Comment Period

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Federal Agencies				
U.S. Army Corps of Engineers	✓			✓
U.S. Coast Guard	✓			✓
U.S. Department of Agriculture, Natural Resources Conservation Service	✓			✓
U.S. Environmental Protection Agency	✓			✓
U.S. National Parks Service	✓			✓
U.S. Fish and Wildlife Service	✓			✓
U.S. National Marine Fisheries Service	✓			✓
U.S. Department of the Navy	✓			✓
Federal Transit Administration	✓			✓
Federal Highways Administration	✓			✓
U.S. Department of Homeland Security	✓			✓
National Oceanic and Atmospheric Association	✓			✓
Federal Aviation Administration	✓			✓
State Agencies				
Aha Moku o Hāmākua Loa/Hāmākua Poko – Joyclynn Costa		✓	✓	✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Aha Moku o Kaupo – Jade Alohalani Smith		✓	✓	✓
Department of Agriculture				✓
Department of Accounting and General Services				✓
Department of Accounting and General Services Archives Division				✓
Department of Business, Economic Development and Tourism (DBEDT)	✓			✓
DBEDT, Research Division Library	✓			✓
DBEDT, Strategic Industries Division	✓			✓
DBEDT, Hawaiʻi State Energy Office	✓			✓
DBEDT, Land Use Commission	✓			✓
DBEDT, Office of Planning	✓	✓		✓
Department of Defense	✓			✓
Department of Education	✓			✓
Department of Hawaiian Homelands				✓
Department of Health (DOH)	✓			✓
DOH, Environmental Management Branch	✓			✓
DOH, Environmental Planning Office				✓
DOH, Clean Water Branch		✓		✓
DOH, Office of Environmental Quality Control	✓	✓		✓
DOH, Maui District Health Office		✓		✓
Department of Land and Natural Resources (DLNR)				✓
DLNR, Historic Preservation Division				✓
DLNR, Na Ala Hele, Trails & Access Program				✓
DLNR, Land Division, Maui District Land Agent				✓
DLNR, Division of Forestry and Wildlife				✓
DLNR, Engineering Division				✓
DLNR, Commission on Water Resource Management				✓
Department of Transportation, Highways Division	✓			✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Department of Transportation, Airports Division	✓			✓
Department of Transportation, Harbors Division	✓			✓
Office of Hawaiian Affairs	✓	✓		✓
University of Hawaiʻi Honolulu Community College				✓
University of Hawaiʻi Environmental Center	✓			✓
University of Hawaiʻi Sea Grant				✓
Hawaiʻi State Library	✓			✓
Hawaiʻi State Library – Kahului Regional Library	✓			✓
County of Maui Agencies				
Department of Fire and Public Safety	✓			✓
Department of Environmental Management	✓	✓		✓
Department of Housing and Human Concerns				✓
Department of Parks and Recreation	✓			✓
Department of Planning				✓
Department of Public Works				✓
Department of Transportation	✓			
Department of Water Supply				✓
Office of Economic Development	✓			
Department of the Corporation Counsel				✓
Maui County Council – Kelly T. King		✓		✓
Police Department				✓
Other Organizations				
Aurora Foundation – Jeffrey Bronfman		✓		✓
Clifton Hasegawa & Associates, LLC – Clifton M. Hasegawa		✓		✓
Hawaiʻi Farm Bureau Foundation	✓			✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Hawaiʻi Gas	✓			✓
Hawaiian Telcom	✓			✓
Kipahulu ʻOhana, Inc. – Scott Crawford		✓		✓
Maui Electric Company	✓			✓
Maui Tomorrow – Albert Perez		✓	✓	✓
Native Hawaiian Legal Corporation – Camille Kalama & Summer Sylva		✓		✓
Nāhiku Community Association – Kamalu Kahoʻokele, Maluhia Stoner		✓	✓	✓
Na Moku Aupuni O Koʻolau Hui Inc. – Edward and Māhealani Wendt	✓	✓	✓	✓
Oceanic Time Warner Cable (Now Spectrum Hawaiʻi)	✓			✓
Public Access Trails Hawaii				✓
Sierra Club Maui Group – Adrianne Raff Corwin		✓	✓	✓
Verizon Hawaiʻi	✓			✓
Individuals				
Senator Kalani English	✓			✓
Representative Kyle Yamashita	✓			✓
Representative Lynn DeCoite	✓			✓
Adam Lonig		✓	✓	
Al		✓		✓
Alana Dandrea		✓		✓
Alan Bradbury		✓		✓
Alex Beers		✓		✓
Alex Franco			✓	✓
Alex Haller			✓	✓
Alice Lee		✓	✓	✓
Alvin Kalehuawehe		✓	✓	✓
Andrew Isoda		✓		✓
Ann Lentz		✓		✓
Arianna Feinberg		✓		✓
Aubrie Murphy		✓	✓	✓
Barbara Barry		✓		✓
Barbara Best		✓		✓
Bob Ferguson		✓		✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Bob Martin		✓	✓	✓
Brendan Balthazar		✓	✓	✓
Brian Wittman		✓	✓	✓
Cal Shinyama		✓		
Charlotte O'Brien			✓	✓
Chelsea Huddleston		✓		✓
Cheryl Kekahuna			✓	
Chi Guyer		✓		✓
Christina Hemming			✓	
Christine Carter		✓	✓	✓
Clive Drew		✓		✓
Cody Nemet			✓	✓
Corinna Kekahuna		✓		✓
Dan Clark		✓	✓	✓
Darrell Tanaka		✓	✓	✓
Darren Strand			✓	✓
David-John Fernandez		✓		✓
David Prais			✓	
Debra Nix		✓		✓
Denise Boisvert		✓		✓
Devika Ghai		✓		✓
Diana Dahl		✓		✓
Diane Hakamatsu			✓	✓
Dianne Shimizu			✓	✓
Donald Erway		✓		✓
Douglas Berry		✓		✓
Douglas Sheehan		✓	✓	✓
Dwight Baldwin			✓	✓
Edie Van Hoose		✓		✓
Edwin Young			✓	✓
Elaine Wender		✓	✓	✓
Elden Liu			✓	✓
Eileen Naaman		✓		✓
Erika Disalvo		✓		✓
Eva Roberts		✓		✓
Faith Chase		✓	✓	✓
Frank Caprioni			✓	✓
Gabe Johnson		✓		✓
George Vierra		✓		✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Grace Woods		✓		✓
Harriet Witt		✓	✓	✓
Haweookalani Johnson		✓		✓
Helen Barrow		✓		✓
His Highness Kialoa		✓		✓
Isaac Hall		✓	✓	✓
Jack Rollens		✓		✓
Jacquelyn Ching		✓		✓
Jacqui Skill		✓		✓
James Coon		✓	✓	✓
James Falconer		✓		✓
James Franzen		✓		✓
James Padgett		✓		✓
Jean Power		✓		✓
Jeffrey Paisner	✓			✓
Jennifer Ahia		✓		✓
Jessica Mitchell		✓		✓
Jette Slater		✓		✓
Jill Blakeley		✓		✓
Joan Heartfield		✓		✓
Joel Kubby		✓		✓
John Blumer-Buell	✓			✓
John Gelert		✓	✓	✓
John Naylor		✓		✓
John Nix		✓		✓
John Norman		✓		✓
Joseph Kohn		✓		✓
Judith Michaels		✓		✓
Justin Tombe			✓	✓
Kahikina Kahiamoe			✓	
Kaleikoa Kāʻeo			✓	✓
Kamalani Pahukoa			✓	
Kamaile Aipa		✓		✓
Kapulani Antonio		✓		✓
Katharyn Morgan		✓		✓
Kathy Pang		✓	✓	✓
Kawika Stoner			✓	✓
Keith Ranney		✓		✓
Kelli Medeiros		✓		✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Kim Jorgensen		✓		✓
Konaneakamahina de la Nux		✓		✓
Konnie Fox		✓		✓
L. Cummings		✓		✓
Lafayette Young		✓	✓	✓
Lany Young			✓	
Larry Koss			✓	✓
Lauren Tyler		✓		✓
Lauri Fritsch		✓		✓
Leialoha Medeiros		✓		✓
Lehua Simon		✓		✓
Leslie Kuloloio			✓	
Lezley Jacintho		✓		✓
Lina Gooley		✓		✓
Lipoa Kahaleuahi		✓		✓
Lisa Ann Pauahi		✓		✓
Lloyd Fischel			✓	
Lory Ono		✓		✓
Lorrin Pang			✓	✓
Lucienne de Naie	✓		✓	✓
Lurlyn Scott		✓		✓
Madeleine Migenes		✓		✓
Madelynn Kanakaole		✓		✓
Malia Datr		✓		✓
Maluhia Stoner		✓	✓	✓
Mapu Kekahuna			✓	
Mavis Oliveira-Medeiros			✓	✓
Marc Drehsen		✓		✓
Mark Kijima		✓		✓
Mark Sheehan		✓		✓
Martha Martin			✓	✓
Matthew Nall		✓		✓
Matti Christensen		✓		✓
Megan Loomis Powers		✓	✓	✓
Melanie Padgett		✓		✓
Melanie Ulman		✓		✓
Michelle Anderson		✓		✓
Michelle Ramos		✓		✓
Michael Pasco			✓	✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Michelle Waikīkī		✓	✓	✓
Mikiala Puaʻa-Frietas			✓	✓
Miranda Camp		✓		✓
Moke Kahiamoe			✓	
Mugs Ivanovich		✓		✓
Nalani Kaninau			✓	✓
Napua Puaoi				✓
Nicholi Stoyanoff		✓		
Nicole Harrell		✓		✓
Nik Hilawanda			✓	✓
Patricia Lailey		✓		✓
Penny Levin		✓		✓
Randall Rospond		✓		✓
Randy Cabral	✓			
Responsible Citizenry Response		✓		✓
Ricardo Padilla		✓		✓
Robert Thomas	✓			
Rosalind McKevitt		✓		✓
Rose Reilly			✓	✓
Roxy Duarte		✓		✓
Sallyjane Bodnar		✓		✓
Sean Lester			✓	✓
Sesame Shim			✓	✓
Shannon Rudolph		✓		✓
Shari Rospond		✓	✓	✓
Sherri Mora		✓		✓
Stacey Sills			✓	✓
Steve Slater		✓	✓	✓
Susan Byrne		✓		✓
Susan Douglas		✓		✓
Suzan Wilson		✓	✓	✓
Sylvia Litchfield		✓		✓
Tammy Luat-Huen			✓	
Terese Wormser		✓		✓
Tiare Lawrence			✓	✓
Timothy Hills		✓		✓
Tom Blackburn-Rodriguez		✓	✓	✓
Tony Angelini		✓		✓
Valerie Toro		✓		✓

Agency / Organization / Individual Name	Provided Notice of Availability of EISPN	Provided Written Comments on the EISPN	Provided Comments at Public Scoping Meeting (Written or Oral)	Draft EIS Notification
Zack Williams			✓	
Zen Kekoa Powers		✓		✓
Unidentified speaker			✓	

9.3 Draft EIS Consultation

Pursuant to Chapter 343, HRS and Title 11, Chapter 200, HAR, the DEIS was made ~~will be~~ available for public review in OEQC's September 23, 2019 issue of *The Environmental Notice*. The deadline for written comments received or postmarked was November 7, 2019 ~~during the 45-day DEIS comment period to solicit comments from public agencies, elected officials, and community organizations regarding their concerns and agency requirements~~. Copies of all written comments received, along with their respective responses, are ~~will be~~ reproduced and included in the FEIS as Appendix N ~~Final EIS~~.

Hard copies of the DEIS were made available for public review at the Hawaiʻi State Library (Hawaiʻi Documents Center), the Kahului Public Library, and upon request at the Hāna Public Library, the Kula Community Association, and the Maui County Council Office. The DEIS was also made available for viewing and/or download on OEQC's website and through publication of *The Environmental Notice*.

Notification of the DEIS' availability and period for receiving comments was also emailed and/or physically mailed out to the agencies (Federal, State, and County), organizations, and individuals identified in Table 9-2 above. Several written comments were received from various agencies at the Federal, State, and County levels, as well as organizations, and individuals. A listing of those parties that provided comments in response to the DEIS is provided below in Table 9-3.

Table 9-3: List of Agencies, Organizations, and Individuals that Provided Comments During the 45-Day DEIS Comment Period

Agency / Organization / Individual Name	Draft EIS Notification	Draft EIS Comment	Final EIS Notification
Federal Agencies			
U.S. Army Corps of Engineers	✓		✓

U.S. Department of the Interior, Geological Survey, Pacific Islands Water Science Center	✓		✓
U.S. Coast Guard	✓		✓
U.S. Department of Agriculture, Natural Resources Conservation Service	✓		✓
U.S. Environmental Protection Agency	✓		✓
U.S. National Parks Service	✓		✓
U.S. Fish and Wildlife Service	✓	✓	✓
U.S. National Marine Fisheries Service	✓		✓
U.S. Department of the Navy	✓		✓
Federal Transit Administration	✓		✓
Federal Highways Administration	✓		✓
U.S. Department of Homeland Security	✓		✓
National Oceanic and Atmospheric Association	✓		✓
Federal Aviation Administration	✓		✓
State Agencies			
Department of Agriculture	✓	✓	✓
Department of Accounting and General Services	✓		✓
Department of Accounting and General Services Archives Division	✓		✓
Department of Business, Economic Development and Tourism (DBEDT)	✓		✓
DBEDT, Research Division Library	✓		✓
DBEDT, Strategic Industries Division	✓		✓
DBEDT, Hawaiʻi State Energy Office	✓		✓
DBEDT, Land Use Commission	✓		✓
DBEDT, Office of Planning	✓		✓
Department of Defense	✓		✓
Department of Education	✓		✓
Department of Hawaiian Homelands	✓	✓	✓
Department of Health (DOH)	✓		✓
DOH, Environmental Health Administration	✓		✓
Office of Planning and Sustainable Development - Environmental Review Program (Formerly the DOH, Environmental Planning Office)	✓		✓
DOH, Clean Water Branch	✓		✓
DOH, Maui District Health Office	✓		✓

Department of Land and Natural Resources (DLNR)	✓		✓
DLNR, Land Division		✓	✓
DLNR, Engineering Division		✓	✓
DLNR, Office of Conservation and Coastal Lands		✓	✓
DLNR, State Historic Preservation Division	✓		✓
DLNR, Na Ala Hele, Trails & Access Program	✓		✓
DLNR, Land Division, Maui District Land Agent	✓		✓
DLNR, Division of Forestry and Wildlife	✓	✓	✓
DLNR, Engineering Division	✓		✓
DLNR, Commission on Water Resource Management	✓		✓
State Department of Transportation (DOT)			✓
DOT, Highways Division	✓		✓
DOT, Airports Division	✓	✓	✓
DOT, Harbors Division	✓		✓
Office of Hawaiian Affairs	✓	✓	✓
University of Hawaiʻi, Office of Capital Improvement			✓
University of Hawaiʻi Environmental Center & Water Resources Center	✓	✓	✓
University of Hawaiʻi Sea Grant	✓		✓
Libraries and Depositories			
Hawaiʻi State Library & Hawaiʻi Documents Center	✓		✓
Legislative Reference Bureau Library	✓		✓
University of Hawaiʻi Thomas H. Hamilton Library	✓		✓
University of Hawaiʻi Maui College Library	✓		✓
University of Hawaiʻi at Hilo Edwin H. Moʻokini Library	✓		✓

University of Hawaiʻi Kauaʻi Community College Library	✓		✓
Hawaiʻi State Library – Kahului Regional Library	✓		✓
Hāna Public Library			✓
County Agencies			
Department of Fire and Public Safety	✓		✓
Department of Environmental Management	✓		✓
Department of Housing and Human Concerns	✓		✓
Department of Parks and Recreation	✓		✓
Department Planning Department	✓	✓	✓
Department of Public Works	✓		✓
Department of Transportation	✓	✓	✓
Department of Water Supply	✓	✓	✓
County of Maui Board of Water Supply		✓	✓
Office of Economic Development			✓
Department of the Corporation Counsel	✓		✓
Police Department	✓		✓
Media			
Honolulu Star Advertiser	✓		✓
Hawaiʻi Tribune Herald	✓		✓
West Hawaiʻi Today	✓		✓
The Garden Island	✓		✓
Maui News	✓		✓
Molokaʻi Dispatch	✓		✓
Honolulu Civil Beat	✓		✓
Organizations			
Aurora Foundation – Jeffrey Bronfman	✓		✓
Arts of Hawaiʻi – Leo Thiner		✓	✓
Teens on Call / Teenforce – Brian McCafferty		✓	✓
Haʻikū Community Association – Maile Davis		✓	✓
Kula Community Association – Gina Flammer		✓	✓

Tropical Orchid Farm, Inc. – Jeffrey Parker		✓	✓
Hui o Nā Wai ʻEhā – Board of Directors		✓	✓
Clifton Hasegawa & Associates, LLC – Clifton M. Hasegawa	✓		✓
Haʻikū ʻĀina Permaculture Initiative – Mark Sheehan		✓	✓
Hawaiʻi Farm Bureau Foundation	✓		✓
Hawaiʻi Farmers Union United, Hāna Chapter – Matthew Van Paepeghem & Jeffrey Bronfman		✓	✓
Hawaiʻi Gas	✓		✓
Hawaiian Telcom	✓		✓
Hui O Mālama ʻĀina – Simon Russell		✓	✓
Kipahulu ʻOhana, Inc. – Scott Crawford	✓		✓
Mary McClung Law		✓	✓
Maui Electric Company	✓		✓
The Maui Miracle – Nicholas Drance		✓	✓
Maui Tomorrow Foundation – Albert Perez	✓	✓	✓
Native Hawaiian Legal Corporation – Vincient Raboteau	✓	✓	✓
Nāhiku Community Association – Kamalu Kahoʻokele, Maluhia Stoner	✓		✓
Na Moku Aupuni O Koʻolau Hui Inc. – Edward and Māhealani Wendt	✓		✓
North Shore Hydrological Services – Matt Rosener		✓	✓
Oceanic Time Warner Cable (Now Spectrum Hawaiʻi)	✓		✓
Public Access Trails Hawaii	✓		✓
Sierra Club Maui Group – Adrianne Raff Corwin	✓		✓
Sierra Club of Hawaiʻi – Marti Townsend		✓	✓
Verizon Hawaiʻi	✓		✓
Young Progressives Demanding Action – Jun Shin		✓	✓
Elected Officials			
Former Senator Kalani English	✓		
Senator Brian Schatz	✓		✓
Senator Mazie Hirono	✓		✓
Senator Gilbert Keith-Agaran			✓

Representative Ed Case	✓		✓
Former Representative Tulsi Gabbard	✓		
Representative Kaialiʻi Kahele			✓
Representative Kyle Yamashita	✓		✓
Representative Lynn DeCoite	✓	✓	✓
Representative Justin Woodson			✓
Aha Moku o Hāmākua Loa/Hāmākua Poko – Joyclynn Costa	✓		✓
Aha Moku o Kaupo – Jade Alohalani Smith	✓		✓
Maui County Councilmember – Kelly T. King	✓	✓	✓
Maui County Vice Chair – Keani Rawlins Fernandez		✓	✓
Maui County Councilmember – Tamara A. Paltin		✓	✓
Maui County Councilmember – Shane Seneci		✓	✓
Individuals			
Al	✓		✓
A.L. Steiner		✓	✓
Alana Dandrea	✓		✓
Alan Bradbury	✓	✓	✓
Allan Chen		✓	✓
Aleks Kosowicz		✓	✓
Allen Greenfield		✓	✓
Allison Alberts		✓	✓
Alex Beers	✓		✓
Alex Franco	✓		✓
Alex Haller	✓		✓
Alice Lee	✓		✓
Alison Simmons		✓	✓
Alvin Kalehuawehe	✓		✓
Amanda Gordon		✓	✓
Amanda Niles		✓	✓
Amanda Smock		✓	✓
Amber H.		✓	✓
Amy Chant		✓	✓
Amy Harlib		✓	✓
Amy Pick		✓	✓
Amy Stephens		✓	✓
Amy Walton		✓	✓
Andrew Isoda	✓	✓	✓

Angela Domagalski		✓	✓
Angela Huntemer		✓	✓
Ann Lentz	✓		✓
Anna Friedman		✓	✓
Anna Lieding		✓	✓
Annalea Fink		✓	✓
Anne Allison		✓	✓
Anuhea Dudoit		✓	✓
Ariana Flores		✓	✓
Arianna Feinberg	✓		✓
Arnie Koss		✓	✓
Arnie Kotler		✓	✓
Aubrie Murphy	✓		✓
Barb Morrison		✓	✓
Barbara Barry	✓		✓
Barbara Best	✓		✓
Barbara Nosaka		✓	✓
Beverly Shamblin		✓	✓
Beverly Young		✓	✓
Bill Fuhrmann		✓	✓
Blake Wu		✓	✓
Bob Ferguson	✓		✓
Bob Martin	✓		✓
Bobbie Numata		✓	✓
Brendan Balthazar	✓		✓
Brett Gobar		✓	✓
Brian Burdt		✓	✓
Brian Gibbons		✓	✓
Brian Wittman	✓		✓
Brianna Craig		✓	✓
Bridget Mowat		✓	✓
Brooks Obr		✓	✓
Bryan Stewart		✓	✓
Caleb Laieski		✓	✓
Caleb Merendino		✓	✓
Camille Gilbert		✓	✓
Carla Hess		✓	✓
Carli Gardner		✓	✓
Carlos Echevarria		✓	✓
Carol Collins		✓	✓
Carol Joan Patterson		✓	✓
Casey Morondos		✓	✓
Casey Takayama		✓	✓
Cathy O`Leary Carey		✓	✓
Charles Morales		✓	✓

Charlotte O'Brien	✓	✓	✓
Chelsea Ann Furtado		✓	✓
Chelsea Huddleston	✓		✓
Cheryl Hendrickson		✓	✓
Cheryl Reeser		✓	✓
Chi Guyer	✓		✓
Chris Gaarder		✓	✓
Chris Hazynski		✓	✓
Chris Mentzel		✓	✓
Chris Myers		✓	✓
Christi Dillion		✓	✓
Christina Hemming		✓	✓
Christina Williams		✓	✓
Christine Carter	✓		✓
Christine Davis		✓	✓
Christopher Dean		✓	✓
Christopher Helekahi		✓	✓
Christopher Kasak		✓	✓
Christopher Seymour		✓	✓
Claire Ackland		✓	✓
Cliff Devries		✓	✓
Clive Drew	✓		✓
Co Pegg		✓	✓
Cody Nemet	✓	✓	✓
Corinna Kekahuna	✓		✓
Cory Harden		✓	✓
Crystal Hart		✓	✓
Dan Clark	✓		✓
Dana Bleckinger		✓	✓
Daniel Christener		✓	✓
Daniel Grantham		✓	✓
Daniel Kanahele		✓	✓
Daniel O`Brien		✓	✓
Daniel Smith		✓	✓
Darrell Tanaka	✓		✓
Darren Strand	✓		✓
Daryl Boeche		✓	✓
Daviann McClurg		✓	✓
David-John Fernandez	✓		✓
David Perreira		✓	✓
Deb Horan		✓	✓
Deb Mader		✓	✓
Debra Nix	✓		✓
Denise Boisvert	✓	✓	✓
Denise Lytle		✓	✓

Denise Romesburg		✓	✓
Dennis O`Shea		✓	✓
Devika Ghai	✓		✓
Diana Dahl	✓		✓
Diane Ethridge		✓	✓
Diane Hakamatsu	✓		✓
Diane Kent		✓	✓
Dianne Shimizu	✓		✓
Dick Mayer		✓	✓
Dominic Libby		✓	✓
Don Cooke		✓	✓
Donald Erway	✓		✓
Donna Fischer		✓	✓
Dorothy Bach		✓	✓
Douglas Berry	✓		✓
Douglas Sheehan	✓		✓
Dwight Baldwin	✓		✓
E. Neal		✓	✓
Earle Medeiros		✓	✓
Edie Van Hoose	✓		✓
Edwin Young	✓		✓
Elaine Becker		✓	✓
Elaine Benjamin		✓	✓
Elaine Wender	✓		✓
Elden Liu	✓		✓
Elisa Plauche		✓	✓
Elizabeth Hueu		✓	✓
Elizabeth Watts		✓	✓
Eileen Naaman	✓		✓
Emily Behrendt		✓	✓
Emily Garland		✓	✓
Emily Van Alyne		✓	✓
Eric Leventhal		✓	✓
Erik Schreiner		✓	✓
Erika Disalvo	✓	✓	✓
Eva Roberts	✓		✓
Eve Powers		✓	✓
Faith Chase	✓	✓	✓
Fay		✓	✓
Fay Forman		✓	✓
Frank Caprioni	✓		✓
G. Roy		✓	✓
Gabe Johnson	✓		✓
Gail Roberts		✓	✓
Gary Goetz		✓	✓

Gaylene Barron		✓	✓
George Vierra	✓		✓
Grace Pretre		✓	✓
Grace Woods	✓		✓
Haley Molnar		✓	✓
Harlow Todaro		✓	✓
Hekayat Hajijafari		✓	✓
Harriet Witt	✓		✓
Haweookalani Johnson	✓		✓
Helen Barrow	✓		✓
Hinano Keleleiki		✓	✓
His Highness Kialoa	✓		✓
Isaac Hall	✓		✓
Ivan Kekahuna		✓	✓
Jack Fisher		✓	✓
Jack Rollens	✓		✓
Jacquelyn Ching	✓		✓
Jacquelyn Frost		✓	✓
Jacqui Skill	✓	✓	✓
Jade Smith		✓	✓
James Coon	✓		✓
James DiMunno		✓	✓
James Falconer	✓		✓
James Franzen	✓		✓
James Klein		✓	✓
James Padgett	✓		✓
James Sagawint		✓	✓
Jamie Green		✓	✓
Jamie Shultz		✓	✓
Jan Elliot		✓	✓
Jane Leatherman Van Praag		✓	✓
Janet Forman		✓	✓
Janice Palma-Glennie		✓	✓
Javier Mendez		✓	✓
Jean Power	✓		✓
Jeff Gray		✓	✓
Jeffrey Friedman		✓	✓
Jeffrey Paisner	✓		✓
Jen Collins		✓	✓
Jennifer Ahia	✓		✓
Jennifer Chrupalyk		✓	✓
Jennifer Hayes		✓	✓
Jennifer Valentine		✓	✓
Jenny Pell		✓	✓
Jessica Mitchell	✓		✓

Jessie Kekiwi-Aweau		✓	✓
Jette Slater	✓		✓
Jhalani Aweau		✓	✓
Jhianna Aweau		✓	✓
Jill Blakeley	✓		✓
Jim Head		✓	✓
Joan Heartfield	✓	✓	✓
Joann Koch		✓	✓
Jody Gibson		✓	✓
Joe Ritter		✓	✓
Joel Kubby	✓		✓
Joelle Lambiotte du Lac		✓	✓
John Blumer-Buell	✓	✓	✓
John Gelert	✓		✓
John Little		✓	✓
John Meier		✓	✓
John Naylor	✓		✓
John Nix	✓		✓
John Norman	✓		✓
John Oda		✓	✓
John Rita Shockley		✓	✓
Jon Krueger		✓	✓
Jonathan Boyne		✓	✓
Jono Knight		✓	✓
Joseph Kohn	✓	✓	✓
Jordan Tabura		✓	✓
Joyce Shiffrin		✓	✓
Joyclynn Costa[1]		✓	✓
Judith Hazelton		✓	✓
Judith Michaels	✓		✓
Julia Landress		✓	✓
Julie Ford		✓	✓
Justin Tombe	✓		✓
Justine King		✓	✓
K. Danowski		✓	✓
Kaleikoa Kāʻeo	✓		✓
Kamaile Aipa	✓		✓
Kapulani Antonio	✓	✓	✓
Katharyn Morgan	✓		✓
Kathy Pang	✓		✓
Karen Kirschling		✓	✓

[1] Please note that we assume that the Aha Moku councilmember Joyclynn Costa commented in her individual capacity to the Draft EIS.

Karen Winslow		✓	✓
Katherine Ayers		✓	✓
Katherine Leahy		✓	✓
Kathleen Smith		✓	✓
Kathy Olavarri		✓	✓
Katrina Shortridge		✓	✓
Kauʻi Pratt-Aquino		✓	✓
Kirsten Lear		✓	✓
Korynn Grenert		✓	✓
Kristin Gillette		✓	✓
Kristina Lamons		✓	✓
Kristine Peterson		✓	✓
Kristyn MacPhail		✓	✓
Kawika Stoner	✓		✓
Kecia Joy		✓	✓
Keith Ranney	✓		✓
Kelli Medeiros	✓		✓
Kim Jorgensen	✓	✓	✓
Konaneakamahina de la Nux	✓		✓
Konnie Fox	✓		✓
Ku Kahakalau		✓	✓
Kyle Nakanelua		✓	✓
L. Cummings	✓		✓
L. M.		✓	✓
Laʻakea Kaufman		✓	✓
Lacey Levitt		✓	✓
Lafayette Young	✓	✓	✓
Larry Koss	✓		✓
Lauae Lind		✓	✓
Laura Gray		✓	✓
Laura Johnson		✓	✓
Laura Kaakua		✓	✓
Laura Ramirez		✓	✓
Lauren Amick		✓	✓
Lauren Murdock		✓	✓
Lauren Richie		✓	✓
Lauren Tyler	✓		✓
Lauri Fritsch	✓		✓
Lea Giddens		✓	✓
Leialoha Medeiros	✓		✓
Leigh Emerson Smith		✓	✓
Lehua Simon	✓		✓
Lehua Slater		✓	✓
Lezley Jacintho	✓		✓
Lilli Ross		✓	✓

Lina Gooley	✓		✓
Linda Andersen		✓	✓
Linda Cahill		✓	✓
Linda Somera		✓	✓
Lipoa Kahaleuahi	✓		✓
Lisa Ann Pauahi	✓		✓
Lisa Chang		✓	✓
Lisa Gheradi		✓	✓
Lisabette Brinkman		✓	✓
Liza H.		✓	✓
Lonna Richmond		✓	✓
Lorenz Steininger		✓	✓
Lori Buchanan		✓	✓
Lori Feiteira		✓	✓
Lorraine Zane		✓	✓
Lory Ono	✓		✓
Lorrin Pang	✓		✓
Lucas Costner		✓	✓
Lucienne de Naie	✓		✓
Lurline Bettencourt		✓	✓
Lurlyn Scott	✓		✓
Lynne C.		✓	✓
Madeleine Migenes	✓		✓
Madelynn Kanakaole	✓		✓
Maile Magalianes		✓	✓
Maka O Kalani Miinihan		✓	✓
Malia Datr	✓		✓
Maluhia Stoner	✓		✓
Marcy Gordon		✓	✓
Maria Asteinza		✓	✓
Marie Michl		✓	✓
Marina Drummer		✓	✓
Mark Blandford		✓	✓
Mark Hordyszynski		✓	✓
Mark Hyde		✓	✓
Mark Reback		✓	✓
Mavis Oliveira-Medeiros	✓	✓	✓
Marc Drehsen	✓		✓
Mark Kijima	✓		✓
Mark Sheehan	✓		✓
Marta Greenleaf		✓	✓
Martha Martin	✓	✓	✓
Mary Lou Zeis		✓	✓
Mary Masters		✓	✓
Mary Trotto		✓	✓

Maryellen Redish		✓	✓
Matthew McDonald		✓	✓
Matthew Nall	✓		✓
Matti Christensen	✓		✓
Megan Loomis Powers	✓		✓
Melanie Padgett	✓		✓
Melanie Park		✓	✓
Melanie Ulman	✓		✓
Melia Leslie		✓	✓
Melissa Heithaus		✓	✓
Melissa Verbena		✓	✓
Michelle Anderson	✓		✓
Michelle Ramos	✓		✓
Michael Bondoc		✓	✓
Michael Daddario		✓	✓
Michael Donahoe		✓	✓
Michael Gach		✓	✓
Michael Henderson		✓	✓
Michael Pasco	✓		✓
Michael Stauber		✓	✓
Michael Tomczyszyn		✓	✓
Michael White		✓	✓
Michele Halligan		✓	✓
Michelle Waikīkī	✓		✓
Midi Cox		✓	✓
Mikala Minn		✓	✓
Mike Ottman		✓	✓
Mikiala Puaʻa-Frietas	✓		✓
Mikki Chalker		✓	✓
Miranda Camp	✓		✓
Molly Mamaril		✓	✓
Momi Fortune		✓	✓
Momi Ventura		✓	✓
Mugs Ivanovich	✓		✓
Myrtle Sue Cross		✓	✓
Nadine Awana		✓	✓
Nalani Kaninau	✓		✓
Nakota Crumbo		✓	✓
Nancy Cohn		✓	✓
Nanea Lo		✓	✓
Nanikoki Hoopii-Pascua		✓	✓
Napua Puaoi	✓		✓
Natalie Santiago		✓	✓
Natalie Van Leekwijck		✓	✓
Nathan Crumbo		✓	✓

Nathan Yuen		✓	✓
Neil Quarles		✓	✓
Nichole Inouye-Nohara		✓	✓
Nicole Harrell	✓		✓
Nija Rosamond		✓	✓
Nik Hilawanda	✓		✓
Noelani Ahia		✓	✓
Olaf Behrendt		✓	✓
Patricia Blair		✓	✓
Patricia Dion		✓	✓
Patricia Lailey	✓		✓
Paul Cullen		✓	✓
Paula Alcoseba		✓	✓
Paul-David Burns		✓	✓
Penny Levin	✓		✓
Peter Kafka		✓	✓
Philip Kitamura		✓	✓
Philip Ratcliff		✓	✓
R. Momi Vee		✓	✓
Rachel Wolf		✓	✓
Rae Griffith		✓	✓
Raphiell Nolin		✓	✓
Raphael Sharpe		✓	✓
Randall Rospond	✓		✓
Randy Ching		✓	✓
Rath Kaikala		✓	✓
Raymond Zahra		✓	✓
Rebecca Reynolds		✓	✓
Responsible Citizenry Response	✓		✓
Rhonda Holtz		✓	✓
Ricardo Padilla	✓		✓
Richard Booth		✓	✓
Richard Kite		✓	✓
Rik Masterson		✓	✓
Riley Canada II		✓	✓
Robert Cole		✓	✓
Robert Quartero		✓	✓
Robin Voorhies		✓	✓
Robin Winn		✓	✓
Robyn Blaisedell		✓	✓
Rona Bennett		✓	✓
Ronald Bogin		✓	✓
Ronni Pratt		✓	✓
Rosalind McKevitt	✓		✓
Rose Reilly	✓		✓

Roxy Duarte	✓		✓
S. Nam		✓	✓
Sallyjane Bodnar	✓		✓
Sandra Toliver		✓	✓
Sandra Remilien		✓	✓
Sarah Naone		✓	✓
Scott Crawford		✓	✓
Scott Heller		✓	✓
Sean Lester	✓		✓
Sesame Shim	✓		✓
Serafina Gajate		✓	✓
Shannon Keifner		✓	✓
Shannon Rudolph	✓		✓
Shari Rospond	✓		✓
Sharyn Stone		✓	✓
Shawn Shafer		✓	✓
Shay Chan Hodges		✓	✓
Sherri Mora	✓		✓
Sherry Pollack		✓	✓
Shyla Boeche		✓	✓
Sophia Janssen		✓	✓
Spencer Hyde		✓	✓
Stacey Johnston		✓	✓
Stacey Jones		✓	✓
Stacey Sills	✓		✓
Star Carlin		✓	✓
Steve Slater	✓	✓	✓
Steven Kuailani		✓	✓
Steven Van Paepeghem		✓	✓
Stevensdrake Hookano		✓	✓
Stewart Wiggers		✓	✓
Susan Babbitt		✓	✓
Susan Byrne	✓		✓
Susan Douglas	✓		✓
Susan Halas		✓	✓
Susan Head		✓	✓
Susan Storch		✓	✓
Susanna Pol		✓	✓
Suzan Wilson	✓		✓
Sylvia Litchfield	✓	✓	✓
Sylvia Rodriguez		✓	✓
Tammy Lettieri		✓	✓
Tara Grace		✓	✓
Teresa Iovino		✓	✓
Terese Wormser	✓		✓

Terez Amato		✓	✓
Teri Skillman		✓	✓
Terrie Williams		✓	✓
Terry Deegan		✓	✓
Terry Tedesco		✓	✓
Tia Pearson		✓	✓
Tiare Lawrence	✓		✓
Tiffany Haverfield		✓	✓
Timothy Hills	✓		✓
Therese DeBing		✓	✓
Thomas Bacon		✓	✓
Tom Blackburn-Rodriguez	✓	✓	✓
Tom Walsh		✓	✓
Toni Eaton		✓	✓
Tony Angelini	✓		✓
Tracy Ouellette		✓	✓
Trinette Furtado		✓	✓
Val Sanfilippo		✓	✓
Valerie Toro	✓		✓
Vanessa Baggs		✓	✓
Vernon Batty		✓	✓
Vince Saures		✓	✓
Wailani Stoner		✓	✓
Wendy Green		✓	✓
Wendy Oakes		✓	✓
William Church		✓	✓
William Greenleaf		✓	✓
Yarrow Walsh		✓	✓
Yvette Celiz		✓	✓
Zach Williams		✓	✓
Zen Kekoa Powers	✓		✓
Zoe Pastorfield-Li		✓	✓

9.5 FEIS Distribution

This FEIS has been prepared for the Proposed Lease (Water Lease) for the Nāhiku, Ke'anae, Honomanū, and Huelo License Areas (Proposed Action), taking into consideration the comments received during the 45-day public review and comment period for the DEIS. Notice of availability of the FEIS is being published in the Office of Planning and Sustainable Development - Environmental Review Program's and (formerly OEQC) *The Environmental Notice*.

Hard copies of the FEIS have been made available at the Hawai'i State Library (Hawai'i Documents Center), the Kahului Public Library, and the Hāna Public Library. The FEIS is also

available for viewing and/or download on OEQC's website[2] and publication of *The Environmental Notice*. A link to OEQC's main website page is provided below where the FEIS document can be searched.

https://health.hawaii.gov/oeqc/

Notice of availability of the FEIS have been sent to those who participated in the EIS public review periods, as well as those required for distribution prescribed by HRS Chapter 343 as identified above in Table 9-3. Parties that receive this notice of availability are directed to a link on OEQC's website where the FEIS can be searched and downloaded.

[2] Please note that the Office of Planning and Sustainable Development - Environmental Review Program website is still hosted on OEQC's website housed under the Department of Health and will eventually transfer under the Office of Planning. However, we are not aware when that transition will occur.

AFFIDAVIT OF PUBLICATION

STATE OF HAWAII, }
County of Maui. } ss.

Rhonda M. Kurohara being duly sworn deposes and says,that she is in Advertising Sales of the Maui Publishing Co., Ltd., publishers of THE MAUI NEWS, a newspaper published in Wailuku, County of Maui, State of Hawaii; that the ordered publication as to

PUBLIC NOTICE

of which the annexed is a true and correct printed notice, was published 1 times in THE MAUI NEWS, aforesaid, commencing on the 19th day of February, 2017, and ending on the 19th day of February, 2017, (one day inclusive), to-wit: on

February 19, 2017

and that affiant is not a party to or in any way interested in the above entitled matter.

This 1 page Public Notice, dated February 19, 2017, was subscribed and sworn to before me this 21st day of February, 2017, in the Second Circuit of the State of Hawaii, by Rhonda M. Kurohara.

Notary Public, Second Judicial Circuit, State of Hawaii

BETTY E. UEHARA
My Commission expires 09-26-2019

BETTY E. UEHARA NOTARY PUBLIC No. 83-344 STATE OF HAWAII

PUBLIC NOTICE

Alexander & Baldwin, Inc./ East Maui Irrigation Company, Limited (A&B) will be conducting public scoping meetings in conjunction with the thirty-day public review and comment period on the EIS Preparation Notice for the Proposed Lease (Water Lease) for the Nāhiku, Ke'anae, Honomanū, and Huelo License Areas (East Maui Water Lease). The purpose of the meetings is to provide an overview of the EIS process and solicit input pertaining to the scope of the Draft EIS. The meetings will be held on: Wednesday, February 22, 2017 from 5:00 p.m. to 7:00 p.m. at the Maui Electric Company Community Meeting Room (210 W. Kamehameha Avenue), and Thursday, February 23, 2017 from 5:00 p.m. to 7:00 p.m. at the Ha'ikū Park and Community Center (2830 Hāna Highway - Hāna Highway at Pilialoha Street). The EISPN for the East Maui Water Lease is published in the February 8, 2017 edition of the Office of Environmental Quality Control's The Environmental Notice.

(MN: Feb. 19, 2017)

AFFIDAVIT OF PUBLICATION

STATE OF HAWAII,
County of Maui. } ss.

Rhonda M. Kurohara being duly sworn deposes and says,that she is in Advertising Sales of the Maui Publishing Co., Ltd., publishers of THE MAUI NEWS, a newspaper published in Wailuku, County of Maui, State of Hawaii; that the ordered publication as to

PUBLIC NOTICE

of which the annexed is a true and correct printed notice, was published 1 times in THE MAUI NEWS, aforesaid, commencing on the 19th day of February, 2017, and ending on the 19th day of February, 2017, (one day inclusive), to-wit: on

February 19, 2017

and that affiant is not a party to or in any way interested in the above entitled matter.

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BETTY E. UEHARA
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(MN: Feb. 19, 2017)

Chapter 10:
List of Preparers

10.0 LIST OF PREPARERS

This FEIS ~~DEIS~~ was prepared by Wilson Okamoto Corporation, 1907 South Beretania Street, #400, Honolulu, Hawaiʻi 96826. Key technical consultants involved in the preparation of the FEIS ~~DEIS~~ and their company affiliations and specialties are listed below:

Firm	**Area of Expertise**
Akinaka & Associates, Ltd.	Hydrology
Cultural Surveys Hawaiʻi, Inc.	Cultural Impact Assessment; Archaeological Literature Review and Field Inspection
Sea Engineering, Inc.	Stream and Ocean Chemistry
Marine Research Consultants, Inc.	Stream and Ocean Chemistry
Earthplan	Social Impact Assessment
Mason Architects, Inc.	Historical Structure Assessment
Munekiyo & Hiraga, Inc.	Economic and Fiscal Impact Assessment
Plasch Econ Pacific, LLC	Agricultural and Related Economic Impacts Assessment
SWCA Environmental Consultants	Terrestrial Flora and Fauna
Trutta Environmental Solutions, LLC	Environmental Impact of Stream Diversions

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Chapter 11:
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11. REFERENCES

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Proposed Lease (Water Lease) for the
Nāhiku, Keʻanae, Honomanū, and Huelo
License Areas

Corrected Final Environmental Impact Statement

WILSON OKAMOTO
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