



Technical Memorandum

2261 Aupuni Street, Suite 201
Wailuku, Maui, HI 96793

T: 808.442.3306

Prepared for: County of Maui, Department of Water Supply, Water Resources & Planning Division

Project Title: Feasibility Study for East Maui Source Development

Project No.: 159082

FINAL Technical Memorandum No. 4

Subject: Phase 4: Ha'ikū Stream Restoration Program

Date: January 6, 2025

To: Ms. Eva Blumenstein, DWS Planning Program Administrator

From: Michelle Sorensen, P.E.

Prepared by: _____
Lauren Armstrong, AICP

Reviewed by: _____
Michelle Sorensen, P.E.

Dean Nakano

Limitations:

This document was prepared solely for the County of Maui in accordance with professional standards of the environmental consulting industry at the time the services were performed and in accordance with the contract between County of Maui and Brown and Caldwell dated 06/28/2023. This document is governed by the specific scope of work authorized by County of Maui; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by County of Maui and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Table of Contents

List of Figures	ii
List of Tables	iii
List of Abbreviations	iv
Executive Summary	1
Section 1: Background Information	4
1.1 Legal Context	4
1.2 Stream Restoration Definition and Background in Hawai'i.....	4
1.3 Study Area Streams and Gulches	6
1.4 Hydrogeology of the Ha'ikū Region	7
1.5 Climate Change and Precipitation Patterns	9
1.6 Native Hawaiian Traditions and Historical Accounts.....	10
1.7 Land Use History and Watershed Conditions.....	11
1.8 Streamflow Data	13
1.9 Surface Water Diversions and Irrigation System	17
1.9.1 Ha'ikū Ditch Flow Analysis.....	20
1.9.2 Lowrie Ditch Flow Analysis.....	22
1.9.3 Kauhikoa Ditch Flow Analysis.....	24
1.9.4 Regional Low-Flow Analysis	27
1.10 Agricultural and Municipal Surface Water Use	27
1.11 Monitoring and Data Collection Programs.....	28
1.12 Planning, Regulatory and Legal Framework	28
1.12.1 Maui County Department of Water Supply	28
1.12.2 'Aha Wai o Maui Hikina Regional Community Board.....	29
1.12.3 State of Hawai'i Commission on Water Resource Management.....	29
1.12.4 State of Hawai'i Department of Land and Natural Resources	33
1.12.5 Other Actions Affecting Water Lease	33
1.12.6 State Historic Preservation Division	33
1.12.7 U.S. Fish and Wildlife Service	33
1.12.8 U.S. Army Corps of Engineers	34
Section 2: Stakeholder Consultation.....	35
2.1 Outreach Methods and Participants	35
2.2 Stakeholder Input.....	35
2.2.1 Activities in and Around Ha'ikū Streams and Gulches	35

2.2.2 Problems With Current Experiences and Conditions that Should be Addressed in a Stream Restoration Program.....36

2.2.3 Suggestions for Developing a Ha'ikū Stream Restoration Program.....37

Section 3: Stream Restoration Program38

3.1 Restoration.....38

3.2 Proposed strategies38

 3.2.1 Collaborate with Stakeholders39

 3.2.2 Restore Watersheds Mauka to Makai.....39

 3.2.3 Collect and Share Water Resource Data.....40

 3.2.4 Modify Interim Instream Flow Standards41

3.3 Data Needed to Amend IIFS.....41

 3.3.1 Surface Water Hydrologic Unit Characteristics.....41

 3.3.2 Hydrology.....41

 3.3.3 Maintenance of Fish and Wildlife Habitat42

 3.3.4 Outdoor Recreational Activities42

 3.3.5 Maintenance of Ecosystems42

 3.3.6 Aesthetic Values.....42

 3.3.7 Navigation42

 3.3.8 Instream Hydropower Generation42

 3.3.9 Maintenance of Water Quality.....43

 3.3.10 Conveyance of Irrigation and Domestic Water Supplies43

 3.3.11 Protection of Traditional and Customary Native Hawaiian rights.....43

 3.3.12 Non-Instream Uses.....43

3.4 Next Steps.....44

3.5 Conclusion.....44

References45

Attachment A: Stakeholder ConsultationA-1

List of Figures

Figure 1. Kuiaha Bay.....

Figure 2. Ha'ikū Stream Restoration Program Strategies2

Figure 3. Kahana Stream before and after restoration project.....5

Figure 4. Ha'ikū Region Streams and Gulches.....6

Figure 5. Variably of saturated groundwater system west of Ke'anae.....8

Figure 6. Projected Change in Mean Annual Groundwater Recharge.....9

Figure 7. Map of Moku and Aquifer Sectors.....10

Figure 8. Kakipi Gulch aerial view 13

Figure 9. East Maui Watershed Partnership area13

Figure 10. Perennial, intermittent and ephemeral streams.....14

Figure 11. Surface water gaging stations, springs, and dry, losing and gaining sections of selected streams16

Figure 12. Ha'ikū Region Irrigation System and Gages.....19

Figure 13. Ha'ikū Ditch Monthly Average Flow Volumes at Māliko and Honopou20

Figure 14. Difference in Ha'ikū Ditch flow from Honopou to Māliko.....21

Figure 15. Lowrie Ditch Monthly Average Flow Volumes at Māliko and Honopou22

Figure 16. Difference in Lowrie Ditch Flow between Honopou and Māliko23

Figure 17. Kauhikoa Ditch Monthly Average Flow Volumes at Māliko and Honopou24

Figure 18. Difference in Kauhikoa Ditch Flow between Honopou and Māliko.....25

Figure 19. Monthly Surface Water Gaging Data: Kamole Weir26

Figure 20. Central Maui Agricultural Fields in 2020 27

Figure 21. Data Needed for IIFS Amendment30

Figure 22. IIFS Status.....31

Figure 23. Ha'ikū Stream Restoration Program Strategies.....38

List of Tables

Table 1. Ha'ikū Stream Restoration Program Strategies 3

Table 2. Ha'ikū Region Streams and Gulches..... 7

Table 3. Irrigation Systems and Stream Diversions17

Table 4. Ha'ikū Stream Restoration Program Strategies39

List of Abbreviations

A&B	Alexander & Baldwin	USGS	United States Geological Survey
BC	Brown and Caldwell	WOTUS	waters of the United States
BLNR	Board of Land and Natural Resources	WTF	Water Treatment Facility
County	County of Maui	WUDP	Water Use and Development Plan
CWA	Clean Water Act		
CWRM	Commission on Water Resource Management		
DAR	Division of Aquatic Resources		
D&O	Decision and Order		
DHHL	Department of Hawaiian Home Lands		
DLNR	Department of Land and Natural Resources		
DOH	Department of Health		
DWS	Department of Water Supply		
EMI	East Maui Irrigation		
EMWP	East Maui Watershed Partnership		
EPA	Environmental Protection Agency		
ESA	Endangered Species Act		
GIS	Geographic Information System		
HC&S	Hawaiian Commercial & Sugar Company		
HCA	Ha'ikū Community Association		
HRS	Hawaii Revised Statutes		
HSA	Hawai'i Stream Assessment		
IFS	Instream Flow Standards		
IFSAR	Instream Flow Standard Assessment Report		
IIFS	Interim Instream Flow Standards		
IPaC	Information for Planning and Consultation		
ITP	incidental take permit		
MDWS	County of Maui Department of Water Supply		
mgd	million gallons per day		
SCAP	Stream Channel Alteration Permit		
SDWP	Stream Diversion Works Permit		
SHPD	State Historic Preservation Division		
SPAM	Stream Protection and Management		
SWMA	Surface Water Management Area		
SWUP	Surface Water Use Permit		
T&C	Traditional and Customary		
UH	University of Hawai'i		
USACE	United States Army Corps of Engineers		
USFWS	United States Fish and Wildlife Service		

Executive Summary

Brown and Caldwell (BC) supported the County of Maui Department of Water Supply (MDWS) with the development of a stream restoration program in the Ha'ikū region from Kakipi Gulch to Kailua Gulch. This report is a roadmap identifying potential stream restoration measures that may be undertaken based on current data, regulations, and community input. It summarizes available information about stream flows, stream diversions, ditch flows, and uses of stream water and identifies future data needs. Through the process of creating the program, community members were consulted about guiding principles for stream restoration and actions that can be taken to restore the streams and watersheds of the Ha'ikū region. Their input is reflected in the proposed strategies.

The maintenance of instream flows is important to the protection of traditional and customary (T&C) Native Hawaiian rights, as they relate to the maintenance of stream resources for gathering, recreation, and the cultivation of kalo. Water has great significance to Native Hawaiians and others consulted during the study. The flow of water from mountain to ocean is integral to the health of the land. Healthy land makes for healthy people, and healthy people can sustain themselves.

In modern times, streams in the Ha'ikū region are primarily intermittent, flowing only during rainy periods. Based on the most recent available data from 1999, flow in Waiohiwi Gulch, a tributary to Māliko Gulch, was perennial between about 2,000 feet and 4,000 feet elevation. At lower elevations in Māliko Gulch, flow was perennial at only a few spots downstream of springs and near the coast.



Figure 1. Kuiaha Bay

Credit: Starr

The Kuiaha and Kaupakulua Gulch systems were usually dry from sea level to an elevation of 350 feet and gained water from about 350 feet to about 900 feet elevation. The two main branches of the Kaupakulua Gulch system alternately gained and lost water as high as 2,400 feet elevation. Kakipi Gulch had perennial flow over much of its length but was often dry near the coast below 400 feet elevation. With climate change reducing precipitation in the Ha'ikū region, it is anticipated that flows will be lower than measured in 1999.

Stream diversions send water from some of the Ha'ikū region streams to individual users in the Ha'ikū region and to the East Maui Irrigation (EMI) system for agricultural and municipal uses in Upcountry and Central Maui. During the first half of 2024 an estimated 1.55 million gallons per day (mgd) of surface water entered the EMI system between Honopou Stream and Māliko Stream (EMI, June 2024). Most of the surface water enters the ditch system only during rainy periods when streams are experiencing high flow conditions. During low flow conditions, most of the diversions do not remove water from the streams, many of which do not flow during dry times.

Restoring mauka-makai streamflow is not likely to be achieved only by modifying or abandoning stream diversions. Watershed restoration through the removal of invasive species and replanting of native forests is a key activity to improve stream flows in Ha'ikū. Native vegetation holds rainfall on the ground surface for longer, allowing it to infiltrate and saturate the stream beds and maintain a more continuous flow. Native vegetation holds soil in place more than invasive plants, preventing sediment from running off the land and downstream into the ocean.

This program identifies strategies, lead agencies/organizations, potential funding, and timeline for stream restoration in Ha'ikū. To initiate one aspect of a Stream Restoration Program, MDWS may file a petition to amend interim instream flow standards (IIFS) for applicable Ha'ikū area streams. The petition may trigger further data collection by the Commission on Water Resource Management (CWRM) regarding the status of stream diversions and observations of stream flows. However, the CWRM presently has limited capacity to prioritize setting amended IIFS for streams with intermittent flow. Additional data may be collected by monitoring stations to identify whether water flows in streams over time.

Future steps may include detailed studies for each of the applicable streams in the study area. The IIFS proceedings including public hearings may be conducted for perennial reaches, and the CWRM may take action to amend the IIFS. The action to amend the IIFS may require parties presently diverting water from streams to modify or abandon diversions to reduce current withdrawals, potentially impacting individual users as well as companies.

Stream restoration can also include bank stabilization, removal of invasive species and planting of native species to reduce erosion and improve habitat for aquatic species. If stream channel modifications are proposed as part of the restoration effort, or if federal funds will be used, additional permitting requirements will apply.

Figure 2 shows potential strategies in a Ha'ikū Stream Restoration Program.

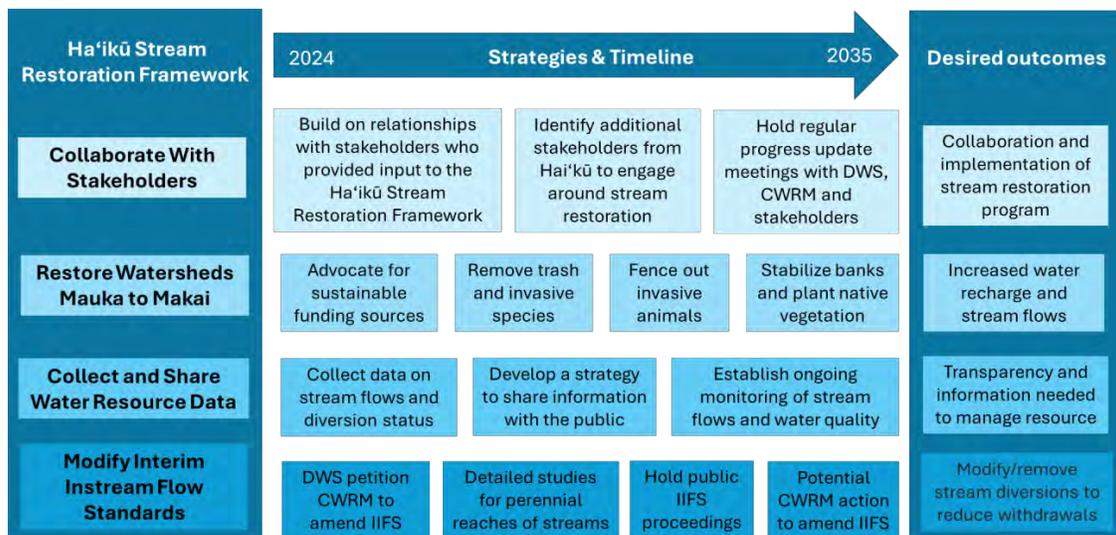


Figure 2. Ha'ikū Stream Restoration Program Strategies

Alongside the IIFS amendment process for applicable streams/reaches, there are other important strategies to improve the health of Ha'ikū streams. Watershed restoration is a critical component of restoring water that feeds Ha'ikū streams. Current efforts by the State, County, and East Maui Watershed Partnership (EMWP) to install fences, remove invasive species and replant native forest should be continued and expanded.

Data on stream flows, stream diversions, and ditch flows should be collected and made available to the CWRM and to the public to provide transparency around water resources in the Ha'ikū region and foster informed public participation in the stream restoration program.

Table 3 summarizes proposed stream restoration program strategies with potential funding sources, lead entities, and timeline.

Id no.	Strategy	Funding	Lead	Timeline
1	Continue work to restore Hāmākualoa Open Space in support of healthy makai watersheds and streams.	County, State, Federal, non-profit, private	Malama Hamakua	Ongoing
2	Continue work to protect mauka watersheds and control negative impacts of erosion on streams, water supplies, and nearshore environment.	County, State, Federal, non-profit, private	EMWP	Ongoing
3	Submit a petition for amended IIFS for applicable streams that had perennial reaches in 1999.	County	DWS	2024
4	Hold regular progress meetings to share information on ditch flows, stream diversions, and status updates on the stream restoration program.	County, State, non-profit, private	DWS, CWRM, HCA, Mahi Pono	2025
5	Monitor surface water quality and quantity.	State, Federal, County, non-profit	CWRM, DWS, USGS, HCA	Ongoing
6	Collect preliminary data on stream diversion status and stream flows.	State	CWRM	2025
7	Conduct hydrological studies of applicable streams as potential candidates for amended IIFS.	County, State, Federal	DWS, CWRM, USGS	2026
8	Identify streams/reaches that are candidates for physical modifications to reduce erosion and improve aquatic species habitat, and develop permitting plans and designs for channel alterations in applicable locations.	County	DWS, HCA	2027
9	Conduct public IIFS proceedings to provide more opportunities for stakeholder involvement and collect more information about T&C uses of stream water.	State	CWRM	2028
10	Consider adoption of amended IIFS for applicable streams.	State	CWRM	2030
11	Modify or abandon stream diversions as necessary to comply with amended IIFS and provide status updates to CWRM and community.	Private	EMI	2035

Abbreviations: CWRM = Commission on Water Resource Management, DWS = Department of Water Supply, EMI = East Maui Irrigation, EMWP = East Maui Watershed Partnership, HCA = Ha'ikū Community Association, IIFS = Interim Instream Flow Standards, USGS = United States Geological Survey

Section 1: Background Information

The 2003 Consent Decree requires a stream restoration program as part of any further water development in East Maui. It specifies that as agricultural water needs decrease, the County of Maui (County) must study, develop, and initiate stream restoration efforts in partnership with community members.

1.1 Legal Context

A 2003 Consent Decree between the Coalition to Protect East Maui Water Resources and County set requirements that must be met before water resources in Ha'ikū can be further developed. One of the requirements is a stream restoration program, as described in Section 10 of the Consent Decree (Consent Decree Order: The Coalition to Protect East Maui Water Resources, et al. v. The Board of Water Supply, et al., 2003):

Stream Restoration Shall Be a Component of any East Maui Water Development Plan

The County agrees that as long-term agricultural water needs are reduced, a stream restoration program will be studied, developed and initiated by the County. As such, the County agrees that one component of any plan or program to develop further water resources in the agreed-upon portion of the East Maui Region must include the study, development and initiation, as may be applicable, of a stream restoration program in the agreed-upon portion of the East Maui region.

This report is a stream restoration program for the agreed upon portion of the East Maui Region with actions that can be initiated by the County in partnership with community members.

1.2 Stream Restoration Definition and Background in Hawai'i

Stream “restoration” or “rehabilitation” refers to the return of a degraded ecosystem to a close approximation of its remaining natural potential (U.S. Environmental Protection Agency, 2000). Ecosystem potential is typically based on habitat quality, quantity, or species diversity. Restoration may be an attempt to return an ecosystem to its historic pre-degradation trajectory.

Although this “trajectory” may be impossible to fully determine, the general direction and boundaries may be established through information about the system’s previous state, studies on comparable intact ecosystems, information about regional environmental conditions, and analysis of other ecological, cultural, and historical reference information (Society for Ecological Restoration, 2002).

Stream restoration can provide the benefits of flood risk reduction, improved water quality and habitat for fish and wildlife, recreational opportunities, and erosion control. Restoration of adversely impacted, flood prone streams is accomplished by restoring floodplains and associated wetlands through connectivity and storage, and by modifying the physical stability, hydrology, and biological functions of the impaired stream banks to that of natural stable stream banks (Federal Emergency Management Agency, 2017).

Models of stream restoration in Hawai'i include Kahana Stream and He'eia Stream on O'ahu, Waipi'o Stream on Hawai'i Island, and Wai'oli Stream on Kaua'i. Each of these stream restoration projects involved the removal of invasive plants and replanting of native plants on stream banks, at perennial reaches of the streams near the ocean.

For example, the primary objective of the Kahana Stream restoration project was to improve the mauka to makai connectivity of habitat in Kahana Stream for native and endemic aquatic fauna by manually removing hau trees. The project restored approximately 1,000 linear feet and over one acre of riparian corridor previously dominated by hau. The new stream corridor restored the natural

hydrologic conditions which support stream fauna, including the widening of the stream channel, reduced canopy cover to support algae growth, and a replacement of sediment and leaf litter with cobble and gravel substrate. These benefits all support fish habitat and fish passage. Work was completed by Department of Land and Natural Resources (DLNR) staff, U.S. Fish and Wildlife Service (USFWS) staff and community volunteers. Figure 3 shows Kahana Stream before and after the stream restoration project (DLNR, 2017).



Figure 3. Kahana Stream before and after restoration project

Source: DLNR 2017

In Hawai'i, the term "restoration" has often been used in reference to restoring stream flows by setting amended Interim Instream Flow Standards (IIFS) that require parties withdrawing water from streams to modify or abandon diversions so that more water remains in the streams. In 2018 and 2022, the Commission on Water Resource Management (CWRM) ordered the restoration of flows to East Maui streams to the east of the Ha'ikū area. The decision came after 20 years of studies and hearings, balancing the public trust purposes such as growing kalo, supporting native stream life for gathering purposes, recreation, and off-stream municipal and agricultural uses in Upcountry and Central Maui.

The definition and objectives of stream restoration in Ha'ikū will continue to be shaped by stakeholder input, scientific studies, and collaboration between the government and community. Each stream is unique, and some may warrant physical modifications to stream banks, vegetation and adjacent land use as part of the restoration efforts. Implications for planning, permitting and legal requirements are discussed in Section 1.12.

Potential objectives of Ha'ikū stream restoration based on initial stakeholder engagement include (1) restoring stream flows, (2) improving management of ditch flows, (3) protecting a sense of place and connection to health of streams, (4) enabling the cultivation of kalo and other traditional crops, (5) protecting stream and nearshore habitat and native species, (6) gathering of 'opae, limu, 'opihi, (7) enabling recreation and swimming, (8) addressing the impacts of pollution and erosion on habitats, and (9) increasing communication and opportunities for stakeholder input.

Table 2. Ha'ikū Region Streams and Gulches

Aquifer Sector	Watershed/ Hydrologic Unit	CWRM Surface Water Hydrologic Unit Code ^a	DAR Stream/Tributary Name ^b
Central	Kailua	6026	Kailua, Keahua, Pukalani
Central	Māliko	6027	Māliko, Kahakapao, Waiohiwi, 'Alelele, Hāmākuapoko, Kanemoeala, Kuau, Paholo
Ko'olau	Kuiaha	6028	(West) Kuiaha, East Kuiaha, Liliiko, Pauwela, Ohia, Huluhulunui, Kapua'aho'ohui
Ko'olau	Kaupakulua	6029	Kaupakulua, Awalau, 'Ōpaepilau, Kalākohi, Kolealea, Konanui
Ko'olau	Manawai'iao	6030	Manawai'iao, Holumalu, Manawai, 'Ōpāna, Ulumalu
Ko'olau	Uaoa	6031	Uaoa
Ko'olau	Keali'i	6032	Keali'i
Ko'olau	Kakipi	6033	Peahi, Kakipi, 'Ōpāna, Koale, Palama, Halehaku, Maka'a, Kaulu, Waihe'e, Pi'iloi, Papalua, Kapala'alea

Notes:

a. CWRM provided to Hawai'i State GIS Program, August 2022. Updated in 2023 and 2024.

b. DAR Streams (perennial and non-perennial) of the State of Hawai'i as of 2008.

1.4 Hydrogeology of the Ha'ikū Region

In 1999—in cooperation with CWRM and Department of Water Supply (DWS)—the USGS investigated the interaction between groundwater and surface water in the Ha'ikū area between Kakipi Stream and Māliko Gulch. Historic streamflow and groundwater data were collected and analyzed to determine gains and losses of streamflow in selected areas, and a conceptual model of the groundwater system in the study area was formulated (Gingerich, 1999).

The study area contains two geologic units, Honomanu Basalt which is overlaid by Kula Volcanics. Fresh groundwater occurs in two main forms: (1) as perched high-elevation saturated zone underlain 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 Volcanics and the underlying Honomanu Basalt and above the freshwater lens appear to be unsaturated. More than 90 percent of the recharge to the study area is estimated to flow downward through the perched high-level water body to reach the freshwater lens. Figure 5 shows an illustration of the variably saturated groundwater system in East Maui west of Ke'anae.

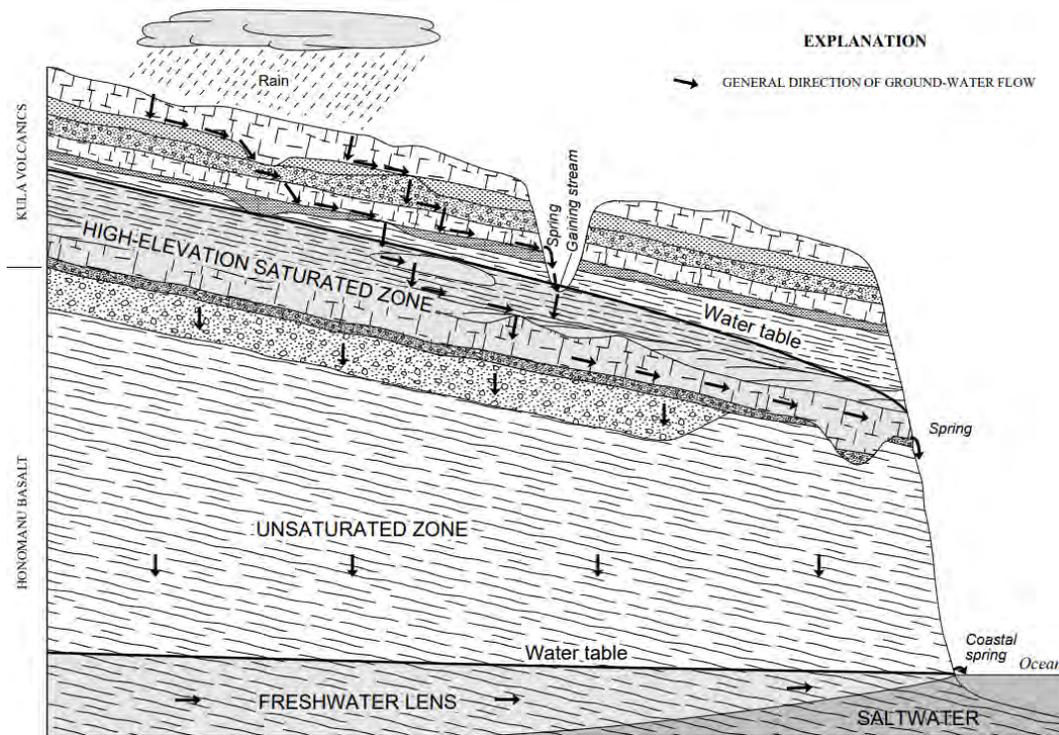


Figure 5. Variably of saturated groundwater system west of Ke'anae

Source: Gingerich, 1999

The water levels measured in shallow wells and the presence of springs indicate that a water table lies several tens of feet below the ground surface in the thick lava flows and interbedded soils of the Kula Volcanics. Where the ground surface is incised into the high-level water table, ground water discharges at springs or directly into streambeds. Conversely, streamflow infiltrates into the aquifer in several places where a stream bottom lies above the high-level water table and is sufficiently permeable. Perennial discharge of ground water to streams has been measured at elevations greater than 2,400 feet in the Kakipi Gulch system. Volcanic dikes, which commonly impound water because of their low permeability, do not appear to be a major factor in controlling the shape of the high-level water table below about 2,000 feet in the study area.

Within the high-permeability rocks of the Honomanu Basalt, a lens of freshwater floats on denser underlying saltwater. The freshwater lens system is often referred to as "basal ground water" in Hawai'i. The source of freshwater in the lens is groundwater recharge from overlying high-level groundwater areas and infiltration of rainfall. Fresh groundwater flows from inland recharge areas to the coast where it discharges at springs and by diffuse seepage at and below sea level.

The CWRM hydrologists confirmed that information in the 1999 USGS report accurately reflects the area's hydrologic condition and is still regarded as the best available data for the area, particularly with regards to determining the location of perched aquifers based on seepage runs. According to the report, properly constructed basal wells would not be anticipated to impact streamflow in the Ha'ikū area. The effects of pumping from the basal freshwater lens will be immeasurable at streams that are separated from the freshwater lens by more than 100 feet of the unsaturated basalt because of the very low hydraulic conductivity expected. Additional data should be collected to confirm the understanding of the groundwater flow system in the study area (Gingerich, 1999).

1.5 Climate Change and Precipitation Patterns

Rainfall has declined over the last century, particularly from 1984 to 2013. Based on records from the 1984-2013 period, following implementation of the 2018 and 2022 IIFS, water availability from the entire East Maui Irrigation (EMI) system is roughly 69 million gallons per day (mgd) at median flow and about 13 mgd at extreme low flows (CWRM, 2022). Using monthly rainfall maps, Frazier and Giambelluca (2017) identified regions that have experienced significant long-term decline in annual, dry season, and wet season rainfall from 1920 to 2012 and from 1983 to 2012. On Maui, much of the windward side of Haleakalā experienced a significant decline in annual and seasonal rainfall from 1920 to 2012, and for most of the island from 1983- 2012.

As rainfall patterns shift with climate change, longer periods with little to no rainfall impact water resources. High intensity rain events lead to high stream flows and flooding at irregular intervals. Changing precipitation patterns impact surface water and groundwater resources. A 2023 USGS study projected changes to groundwater recharge across the state of Hawai'i for three future-climate scenarios: mid-century (2041), dry-climate (2071), and wet-climate (2080). Groundwater recharge is projected to decrease by 5 to 55 percent for mid-century and dry-climate scenarios but may increase by 2 to 43 percent for the wet-climate scenario (Kāne, 2023). Recharge of the Ha'ikū aquifer is expected to decrease by four percent by mid-century. Changes in groundwater recharge could affect water availability, groundwater levels, and salinity, impacting drinking water and ecosystems. Figure 6 shows the projected change in mean annual groundwater recharge for aquifer systems on Maui.

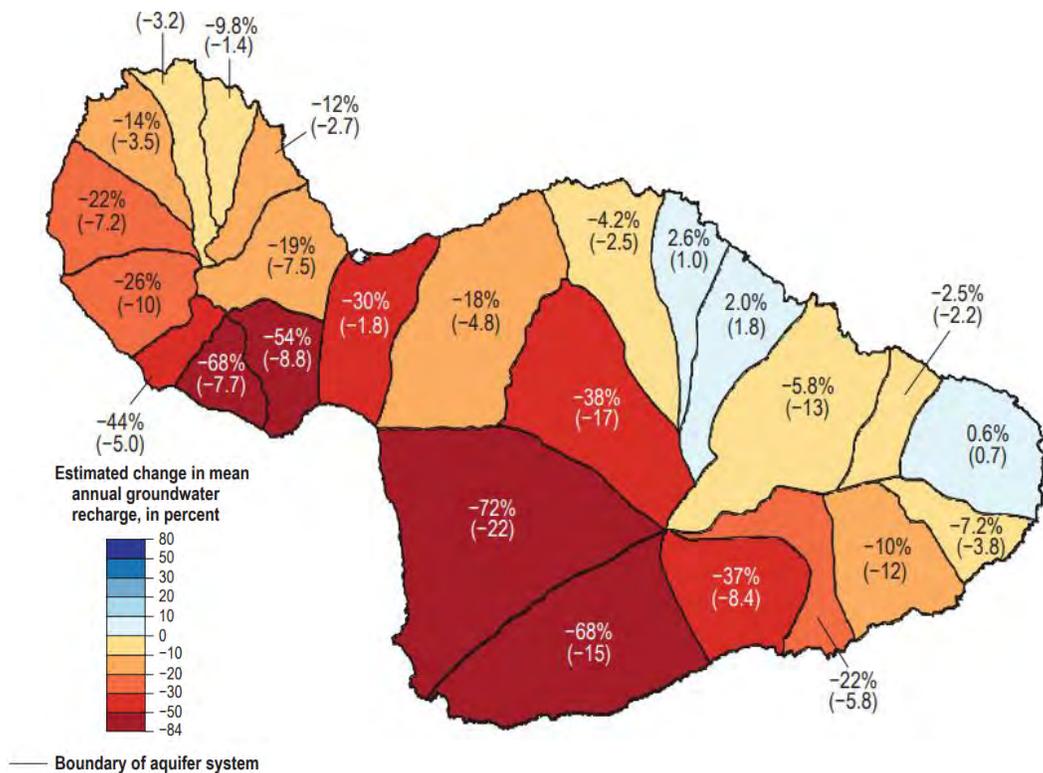


Figure 6. Projected Change in Mean Annual Groundwater Recharge

Source: Timm 2015 and Kāne, 2023

The number of very narrow ahupua'a used this way along the whole Hāmākua coast indicates that there must have been a very considerable population. It was a favorable region for banana, breadfruit, sugar cane, arrowroot, 'awa, and yams. The low coast is indented by many small bays offering good opportunity for fishing. The Alaloa or "Long Road" that went around Maui passed through Hāmākua close to the shore, crossing streams where the gulches opened to the ocean (Kumu Pono 2001).

Historic source documents also describe the region and farming activities related to water use and rights during the 18th and 19th centuries. A few examples are shared below:

- "The Hawaiians of this place are strong in their planting of their gardens, planting large fields of uala (sweet potatoes) and various crops. The people join together (huliamahi) and cultivate the land (Newspaper Mea Hou o Hāmākuapoko, March 30, 1867)."
- "Māliiko is a place with a good stream, it is also an anchorage for seafaring boats, and there is a wharf on one side. The cliff is quite steep, but the flat lands below, are beautifully adorned with groves of kukui. On one side, there is the ramp on which sugar is taken down from the sugar mill (A journey to Wailuku, Ha'ikū, Makawao, Ulupalakua, Makena and Lahaina, November 14, 1868)."
- "...a grant has already been given to the Ha'ikū Sugar Company and others to take and draw the water from the streams in the said District of Hāmākualoa and known as Naili'ilihale, Kailua, Hoalua, Huelo, Holawa, and Honopou, but the undersigned believes there are other streams in the said District of Hāmākualoa that can be utilized although at great expense (James Makee; to His Excellency W.L. Moehonua, Minister of the Interior; [applies for right to draw water from Hāmākualoa to lands of the Makawao-Waikapū region] November 20, 1876)."

1.7 Land Use History and Watershed Conditions

Prior to western contact, all land and natural resources were held in trust by the high chiefs, who gave rights or use to the commoners. People living within each ahupua'a were responsible for the wise use of resources within their homeland. The forest zone where clouds regularly rested on the mountain slopes and brought moisture to the land was called wao akua, region of the gods.

Native forests would have included 'ōhi'a and hāpu'u (Malama Hamakua, 2024). The Hawaiian ecosystem evolved without large, hoofed animals. Polynesian settlers brought pigs and dogs for food and ceremonial practices. They were smaller than their European counterparts and were kept in enclosures near the kauhale, or homesteads. In 1778, Captain Cook brought European boars, goats, and sheep, and in 1793, Captain Vancouver brought cattle. The population of ungulates increased rapidly and became a problem to the native population and forests. By the 1840's, cattle had invaded the Hāmākua region, and people had to protect their homesteads with walls or even abandon certain areas.

Ranching interests were developed in the Huelo-Ha'ikū vicinity of Hāmākualoa and across the district of Hāmākuapoko, extending up the mountain slopes and out into the Kula and Wailuku districts. Kingdom laws and business interests brought the cattle population under control and large independent ranches were able to supply more than enough meat for the local market.

Sugar plantation interests expanded from around 1875 onwards, primarily due to the development of reliable water sources for irrigation. The grazing range in the Hāmākua region kula lands decreased and cattle were forced into the higher elevations. While the cattle and pigs were making their way into higher elevations, other economic pursuits also led to the clearing of large tracts of land. In the early 1800's, 'iliahi, or sandalwood, was cut from the forests for export, leading to significant damage and erosion of the watersheds (Kumu Pono, 2001).

Sugar plantations grew to control thousands of acres in Hāmākua and Central Maui. The largest was owned by Claus Spreckels, who commissioned the construction of the EMI system to convey water from East Maui to Central Maui sugar plantations. The system included 40 miles of ditches and 21,000 feet of iron piping to cross the gulches. Completed in 1880, the irrigation system was key to the success of sugar cultivation in Central Maui. The removal of hundreds of millions of gallons of surface water from East Maui streams for over 100 years negatively affected stream health, kalo farming and the traditional Native Hawaiian way of life (Knudson, 2023).

Land use in the Hāmākua region below 4,000 feet changed from (1) primarily livestock grazing prior to the 1920's, to (2) pineapple cultivation in the 1920's and 1930's, and then to (3) pineapple cultivation mixed with livestock grazing and some residential areas from the 1940's to early 2000's. At higher elevations, much of the land is forested State conservation land or used for livestock grazing (East Maui Watershed Partnership, 2024).



Figure 8. Kakipi Gulch aerial view

Credit: Starr

Invasive species in the watershed can have significant effects on water quality and aquatic ecosystem health, including bank stability and the volume and pollution levels in runoff (Environmental Protection Agency [EPA], 2024). Invasive flora and fauna in the watersheds associated with the Consent Decree area have negatively impacted streams and catchments. Figure 8 shows an aerial image of Kakipi Gulch with invasive vegetation and pastures.

The East Maui Watershed Partnership (EMWP) is an environmental effort

between federal, state, and private landowners to preserve the native forest. The EMWP wants to ensure that Maui's residents have a clean source of water for domestic, commercial, and agricultural uses for this and future generations. The overall mission of EMWP is to protect the watershed from degradation by protecting native forests and their component native species as well as educating the local community about conservation and other issues relating to watershed protection.

Since 1991, significant progress has been made to protect the pristine areas of the East Maui Watershed. The partner agencies and staff of EMWP have:

- Constructed over 7 miles of fence in the remote areas of the watershed
- Initiated animal control and invasive plant species programs above the fence lines
- Implemented a hunting program to increase access for hunters
- Developed a monitoring and management plan for the EMWP area (EMWP 2024).

Figure 9 shows the EMWP area with Consent Decree area added by Brown and Caldwell (BC) to indicate the approximate extent of the Ha'ikū stream restoration program area.



Figure 9. East Maui Watershed Partnership area

Note: Consent Decree area label added by BC.

1.8 Streamflow Data

Streamflow in the Ha'ikū area consists of direct precipitation runoff, baseflow (gained from groundwater), and flow added to some streams from the network of irrigation ditches that cross the area.

Perennial streams flow continuously throughout the year, supported by baseflow from groundwater or runoff from precipitation. Intermittent streams contain water for only part of the year. They flow only when there is enough groundwater discharge and/or rainfall to support flows. There are times when the groundwater table drops below the stream channel and streamflow recharges the underlying groundwater. If channel leakage is high, all or portions of the channel become dry for a period. Ephemeral streams only flow in response to precipitation events when there is enough runoff from rain, since the groundwater table generally remains below the channel bottom (Woessner, 2020).

Figure 10 shows a diagram of perennial, intermittent and ephemeral streams. Long blue solid and dashed lines show the stream channels, small black arrows show general flow of groundwater into the stream channel, and orange arrows show surface water entering the ground. In a perennial stream (a), groundwater discharges to the stream and streamflow is maintained year-round. Intermittent streamflow (b) is driven by precipitation and groundwater discharge. In the left diagram, sections of the stream may be gaining or losing during periods of full channel flow. In the right diagram, during dry periods groundwater inflows decrease, and stream leakage increases such that all or portions of the channel will become dry. Ephemeral streams (c) contain no streamflow until precipitation causes runoff and streamflow seeps into the channel. Channels become dry when runoff ceases and/or seepage rates exceed streamflow (Woessner, 2020).

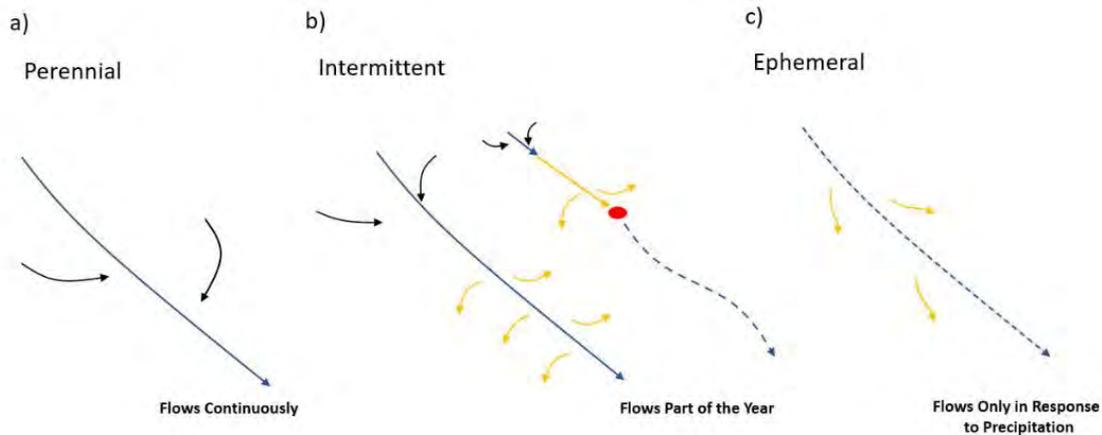


Figure 10. Perennial, intermittent and ephemeral streams

Source: Woessner, 2020

There are no active stream gages in the Ha'ikū area, but the USGS historically maintained several gages on Kakipi Gulch. Māliko and Kakipi gulches are the major drainage features of the Ha'ikū region. Twelve minor stream valleys enter the ocean between these two gulches and the largest of these minor streams are the Kuiaha and Kaupakulua Gulch drainages.

A 1999 USGS study collected data on streamflow in the Ha'ikū area for 17 sites along Māliko Gulch in 1993, 31 sites in the Kuiaha watershed in 1997, and 22 sites in the Kaupakalua watershed in 1997. Streamflow was measured at sites determined by accessibility and the location of the streamflow diversions. The study also estimated the baseflow component of selected streams using historical records from five surface water gaging stations that were operated for various lengths of time on Opana, Halehaku, and Awalau Gulches (Gingerich, 1999).

According to the 1999 study, streamflow was perennial in a few sections of Māliko and Kakipi gulches, but most reaches of the Ha'ikū area streams were intermittent or ephemeral. Flow in Waiohiwi Gulch, a tributary to Māliko Gulch, was perennial between about 2,000 feet and 4,000 feet elevation. At lower elevations in Māliko Gulch, flow was perennial at only a few spots downstream of springs and near the coast. The total measured discharge from springs in Māliko Gulch was about 0.4 mgd, nearly all of which occurs from the Kula Volcanics.

The Kuiaha and Kaupakulua Gulch systems were usually dry from sea level to an elevation of about 350 feet. The three branches of the Kuiaha Gulch system gained water from about 900 feet to about 350 feet elevation. The two main branches of the Kaupakulua Gulch system alternately gained and lost water from 2,400 feet to 900 feet elevation. The total amount of groundwater discharge measured in the Kuiaha Gulch and Kaupakulua Gulch systems was about 1.0 mgd and 1.4 mgd, respectively, all of which is discharged from the Kula Volcanics.

Kakipi Gulch had perennial flow over much of its length but was often dry near the coast below 400 feet elevation. Five surface-water gaging stations were operated for various lengths of time on branches of Kakipi Gulch above 1,200 feet elevation to record daily streamflow. A gaging station at 3,100 feet elevation showed that the stream had gone dry after periods of low rainfall, but at 2,400 feet elevation, streamflow was continuous from 1966 to 1998 and averaged about 1.1 mgd.

In all the drainage systems of the study area, all of the groundwater discharge from the Kula Volcanics not captured by surface water diversions eventually returns to the groundwater system through streambed seepage prior to reaching the ocean (Gingerich, 1999).

Figure 11 shows a map of surface water gaging stations, springs, and dry, losing and gaining sections of selected streams.

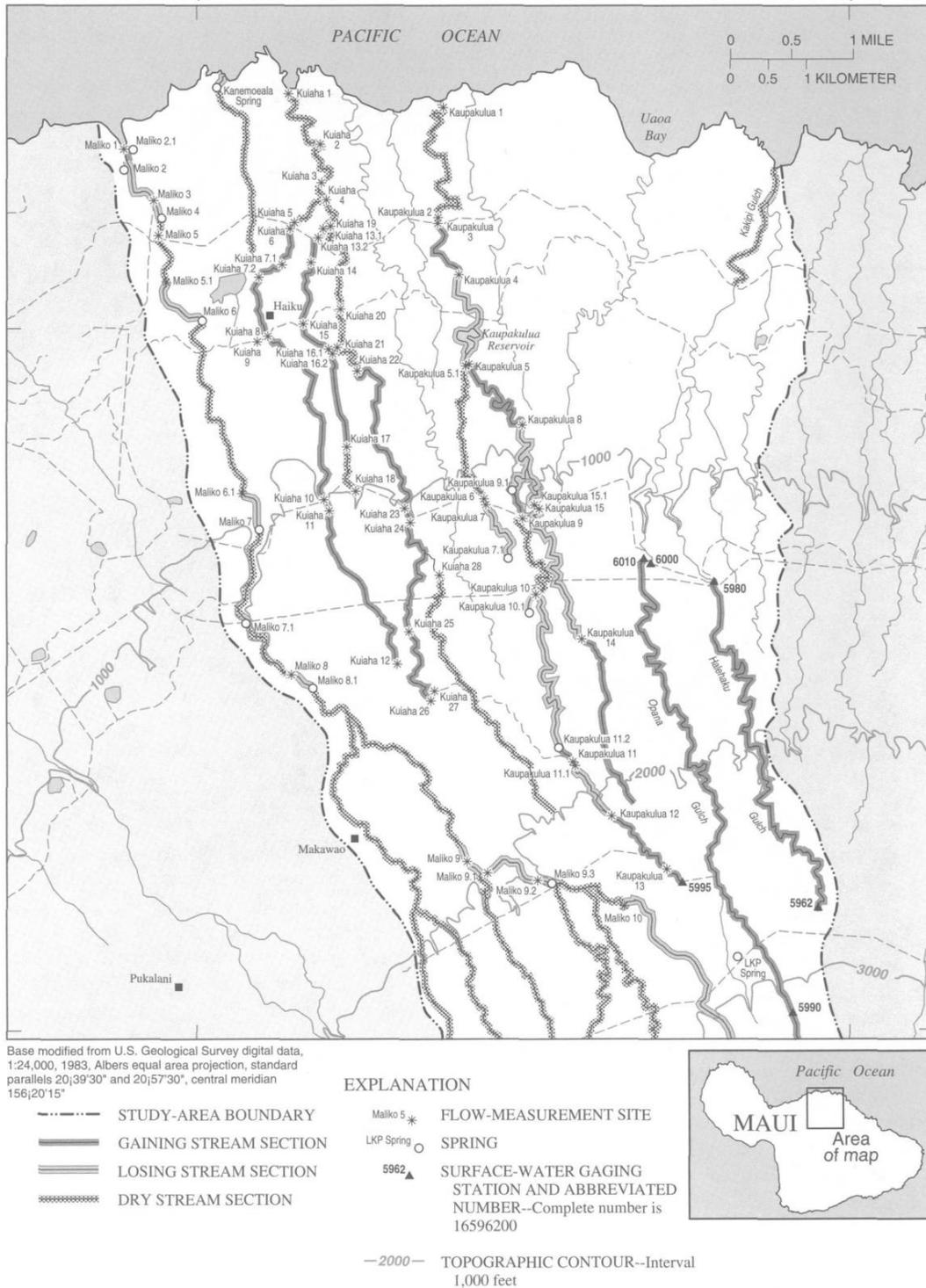


Figure 11. Surface water gaging stations, springs, and dry, losing and gaining sections of selected streams
Source: Gingerich, 1999

1.9 Surface Water Diversions and Irrigation System

Eight surface-water diversion systems carry water across the study area from east to west and all these systems either remove water from or add water to at least one stream in the study area. The USGS historically maintained a surface-water gaging station on an upper tributary of Kaupakulua Gulch to measure streamflow-diversion from Kakipi Gulch.

Table 3. Irrigation Systems and Stream Diversions

Diversion system	Approximate elevation of system (feet)	Estimated number of active diversions within study area ^a	Kakipi Gulch system ^b	Kaupakulua Gulch system ^b	Kuiaha Gulch system ^b	Māliko Gulch system ^b
Upper Kula Pipeline	4,200	5	Takes water	Does not cross	Does not cross	No effect
Lower Kula Pipeline	2,800	0	No effect	Does not cross	Does not cross	No effect
Opana Tunnel	2,200	4	Takes water	Takes water	Does not cross	No effect
Kaluanui Ditch	1,600	3	Does not cross	Takes water	Takes water	Abandoned
Wailoa Ditch	1,200	2	Takes water	No effect	No effect	No effect
Kauhikoa/New Hamakua Ditch	1,000	11	Takes water	Takes water	Takes water	No effect
Lowrie Ditch	600	12	Takes water	Takes water	Takes water	No effect
Ha'ikū Ditch	400	16	Takes water	Takes water	Takes water	No effect

Notes:

- a. *Estimated number of active diversions based on data provided by CWRM in July 2024. Diversion status needs to be verified by CWRM.*
- b. *Impact of irrigation system on Ha'ikū region streams and gulches as of 1999 USGS study (Gingerich, 1999).*

For broader context in the East Maui Region, many streams to the east of the study area have amended IIFS and are subject to a State of Hawai'i Board of Land and Natural Resources (BLNR) license for surface water use. The "License Area" is comprised of 33,000 acres of State-owned land which contains most of the EMI system and the streams diverted by the EMI system. The "Collection Area" 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. Some of the Collection Area falls within the Ha'ikū stream restoration program study area.

The EMI has gaging stations located in several ditch locations to monitor and manage East Maui ditch deliveries. These gages measure the flow in the ditches only, using a system that includes optical encoders with float tape and data loggers. Associated stream flows are not currently measured by EMI. EMI takes measurements at the boundary of each section of the License Area and at its gaging stations at Māliko Gulch.

Under low-flow conditions it has been observed that stream water from many Ha'ikū area streams does not enter the EMI ditch system. During high-flow conditions when there is substantial rainfall, some of the water from Ha'ikū area streams enters the EMI system. A quarterly report to the BLNR indicates that a monthly average of 1.55 mgd of surface water entered the EMI system between Honopou and Māliko Gulch in the first six months of 2024. Further data and analysis are needed to verify the amount of surface water entering and exiting the irrigation system from Ha'ikū area streams.

To assess the flow of surface water through the Ha'ikū study area, BC analyzed gage data for Ha'ikū Ditch, Lowrie Ditch, Kauhikoa Ditch, and Wailoa Ditch. Surface water users report monthly average water use data, which CWRM compiles in the Hawai'i State Water Use database and makes available upon request. The EMI ditch flows are measured at gages located at various points including Honopou Stream, just east of the study area, and again at Māliko Gulch, the closest point to where the water exits the study area as it flows from east to west.

Graphs were created from plotting "Date Submitted" and "mgd," referring to the time the data is sent out and the monthly average flow, measured in mgd. The graphs illustrate the amount of flow for each of the ditches over the period from 2011 to 2024. Across all four ditches, a noticeable decrease in flow occurred around 2017 when the Hawaiian Commercial & Sugar Company (HC&S) sugar plantation closed.

Next, the ditch flows at Māliko Gulch were subtracted from the ditch flows at Honopou Stream to analyze the change in ditch flow from east to west. While the analysis does not give a comprehensive quantity of surface water gained from Ha'ikū region streams, it does provide insights based on the most recent data available.

Figure 12 shows the irrigation system and ditch gages labeled by identification number.

1.9.1 Ha'ikū Ditch Flow Analysis

Figure 13 shows monthly average flow volumes in Ha'ikū Ditch at Honopou and Māliko. From 2011 through 2017, Ha'ikū Ditch flows averaged 4.55 mgd at Honopou and 9.56 mgd at Māliko. After 2017, very little water has been recorded in Ha'ikū Ditch.

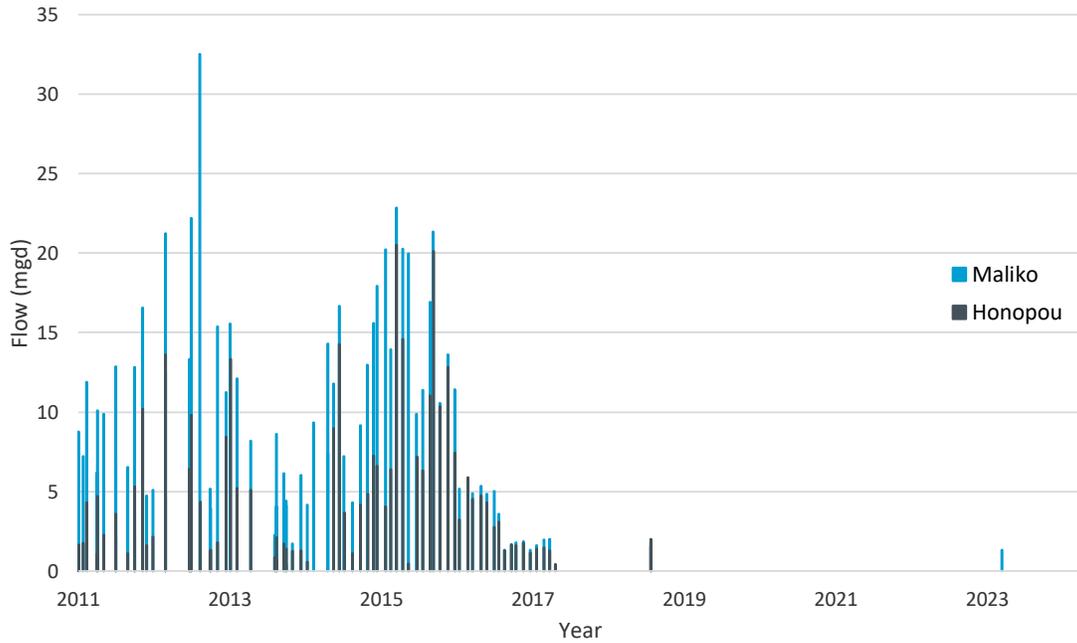


Figure 13. Ha'ikū Ditch Monthly Average Flow Volumes at Māliko and Honopou

Figure 14 shows the difference in Ha'ikū Ditch flow between Honopou and Māliko from 2011 to 2024. The difference in volume of Ha'ikū Ditch flow between the Honopou and Māliko gage locations is one indicator of how much water is being diverted from streams. From 2011 through 2017, the Ha'ikū Ditch gained an average of 4.7 mgd of surface water as it crossed the Ha'ikū region. From 2018 through the first half of 2024, Ha'ikū Ditch lost an average of 0.05 mgd as it crossed the Ha'ikū region. Notables are a 1.74 mgd monthly average loss in September 2018 and a monthly 1.34 mgd average gain in April 2023.

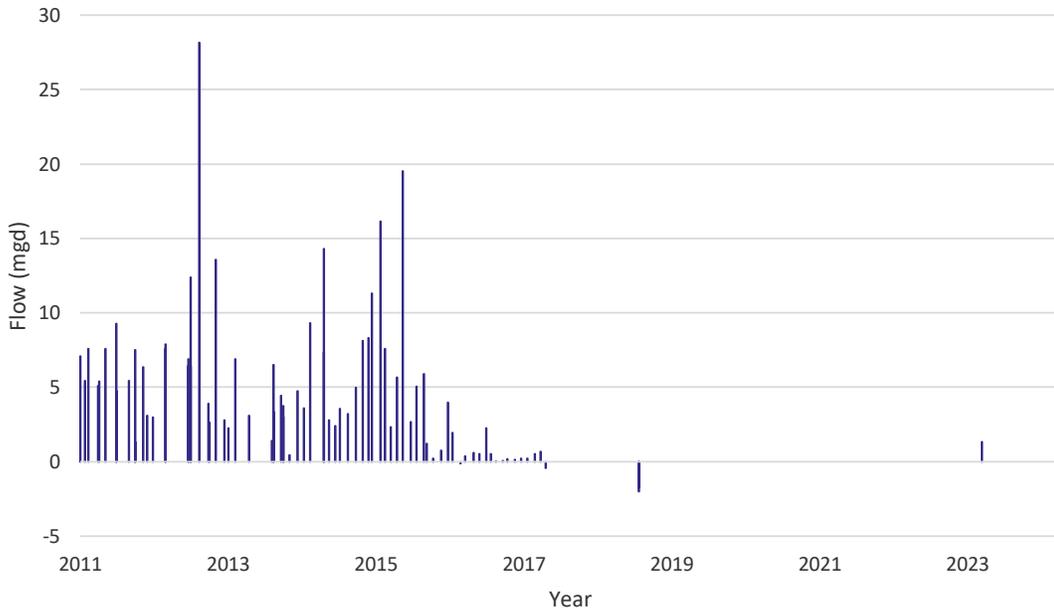


Figure 14. Difference in Ha'ikū Ditch flow from Honopou to Māliko

1.9.2 Lowrie Ditch Flow Analysis

Figure 15 shows Lowrie Ditch monthly average flow volumes at Honopou and Māliko from 2011 to 2024. From 2011 through 2017, an average of the monthly average volumes was 9.11 mgd at Honopou and 8.81 mgd at Māliko. From 2018 through the first half of 2024, average volumes were 1.26 at Honopou and 1.51 mgd at Māliko, representing a reduction in ditch flow of 82 to 86 percent as it crossed the Ha'ikū region. Water may be lost through seepage or overflow.

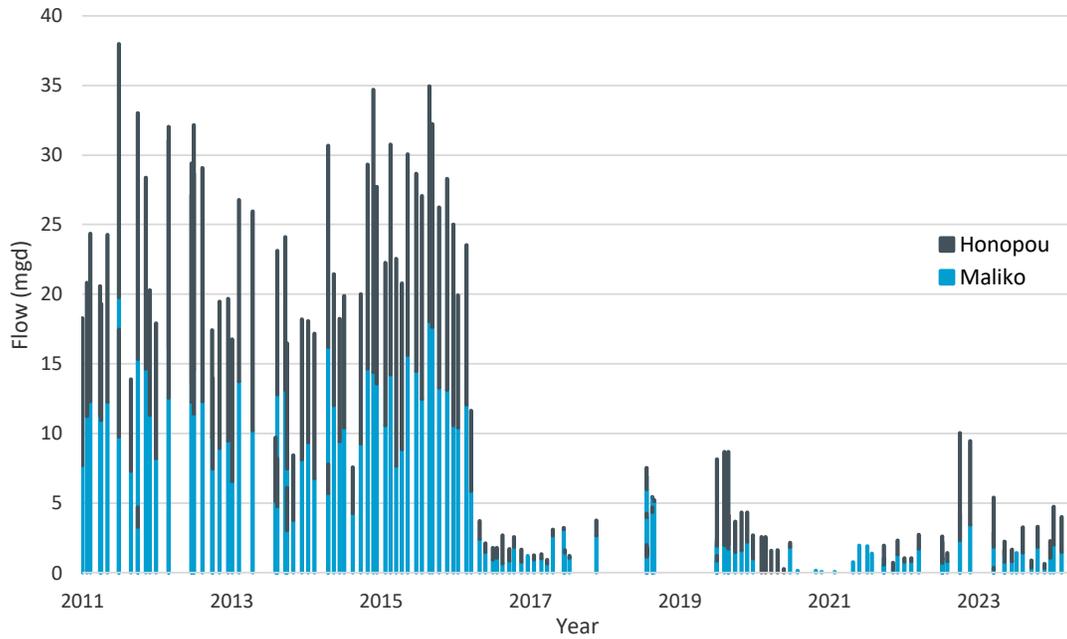


Figure 15. Lowrie Ditch Monthly Average Flow Volumes at Māliko and Honopou

Figure 16 shows the difference in monthly average Lowrie Ditch flow between Honopou and Māliko from 2011 to 2023, calculated by subtracting the ditch flow volume at Honopou from the volume at Māliko. From 2011 through 2017, Lowrie Ditch lost an average of 0.3 mgd as it crossed the Ha'ikū region. From 2018 through the first half of 2024, Lowrie Ditch gained an average of 0.25 mgd as it crossed the Ha'ikū region. Water may be gained through seepage or stream diversion.

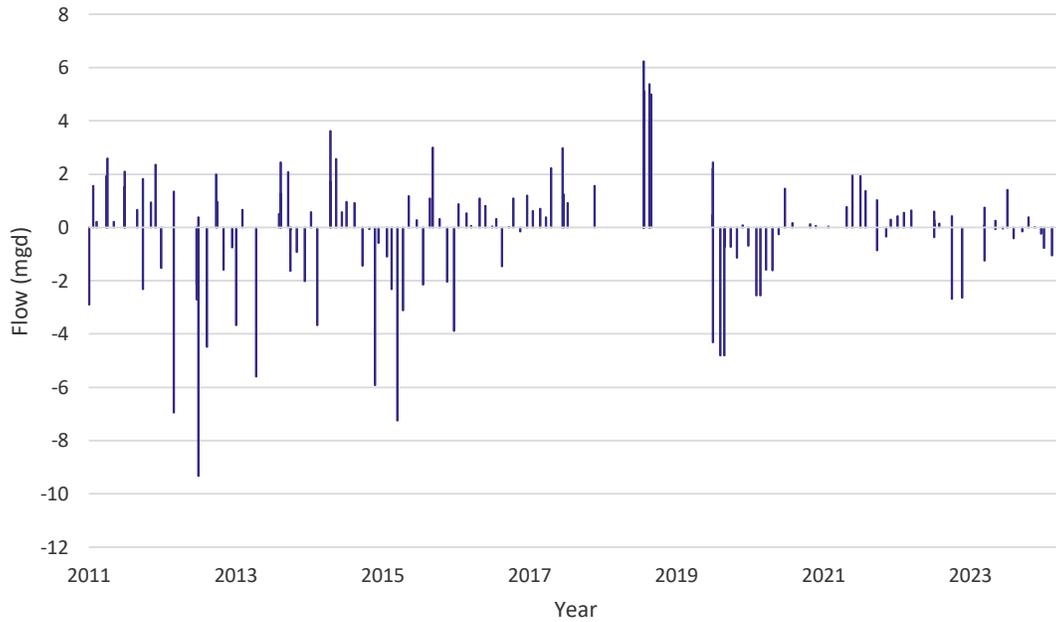


Figure 16. Difference in Lowrie Ditch Flow between Honopou and Māliko

1.9.3 Kauhikoa Ditch Flow Analysis

Figure 17 shows monthly average flow volumes in Kauhikoa Ditch at Māliko and Honopou. From 2011 through 2017, an average of the monthly average volumes were 10.82 mgd at Honopou and 11.96 mgd at Māliko. From 2018 through the first half of 2024, average volumes were 2.58 mgd at Honopou and 0.24 mgd at Māliko, representing a reduction of 76 to 98 percent, respectively.

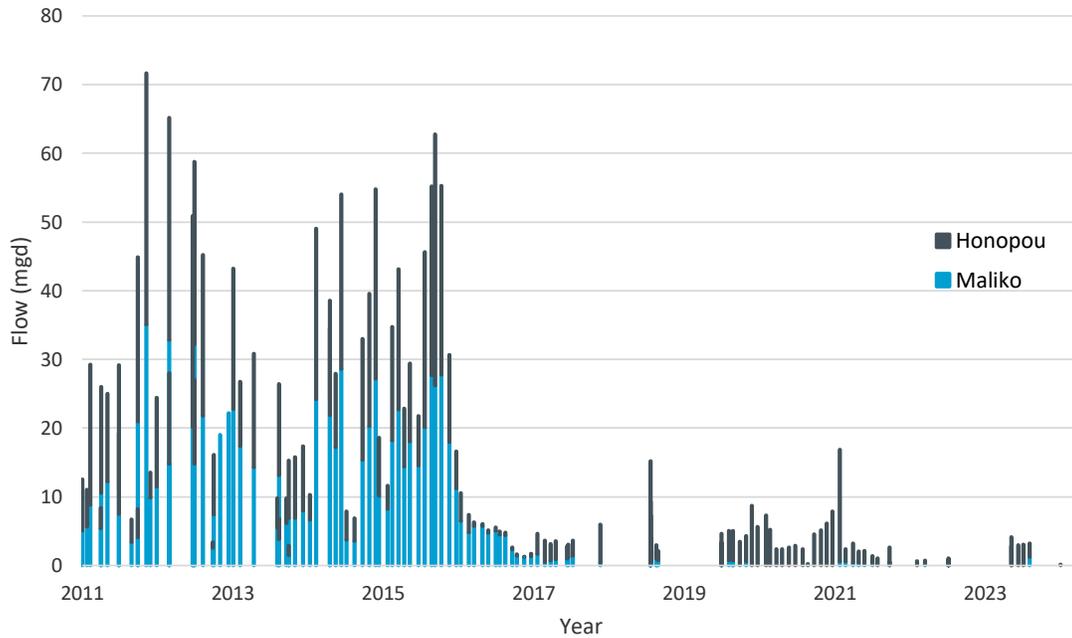


Figure 17. Kauhikoa Ditch Monthly Average Flow Volumes at Māliko and Honopou

Figure 18 shows the difference in monthly average Kauhikoa Ditch flow between Honopou and Māliiko from 2011 to 2023, calculated by subtracting the ditch flow volume at Honopou from the volume at Māliiko. From 2011 through 2017, Kauhikoa Ditch gained an average of 1.41 mgd as it crossed the Ha'ikū region. From 2018 through the first half of 2024, Kauhikoa Ditch lost an average of 2.33 mgd as it crossed the Ha'ikū region.

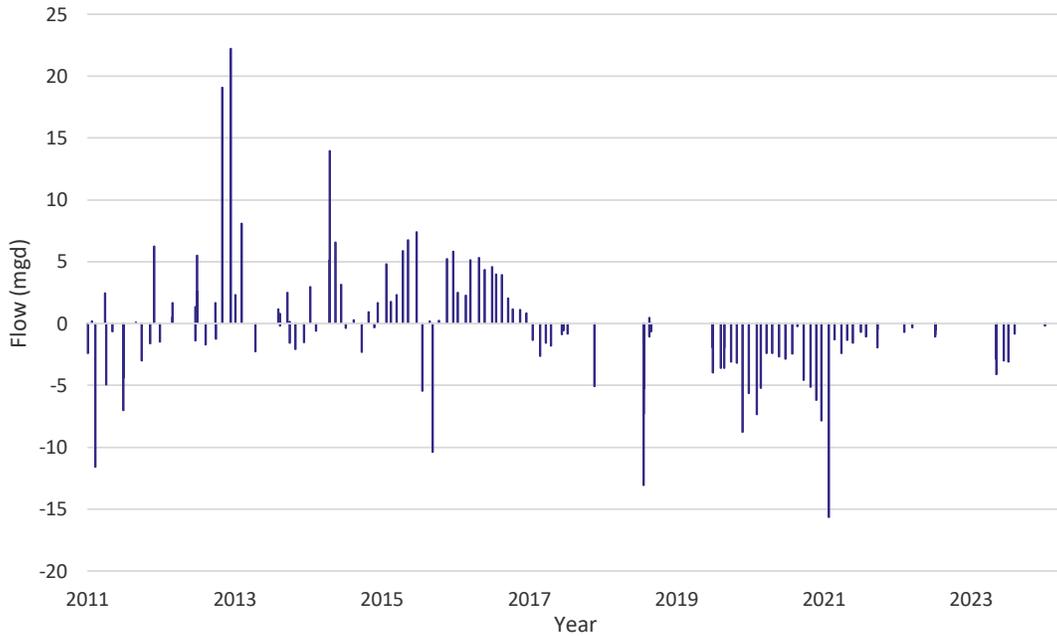


Figure 18. Difference in Kauhikoa Ditch Flow between Honopou and Māliiko

Average water usage from Wailoa Ditch at Kamole Weir varies considerably month to month according to seasonal demand. Figure 19 shows monthly average water use measured as quantity of water processed at Kamole Weir from 2015 to 2024.

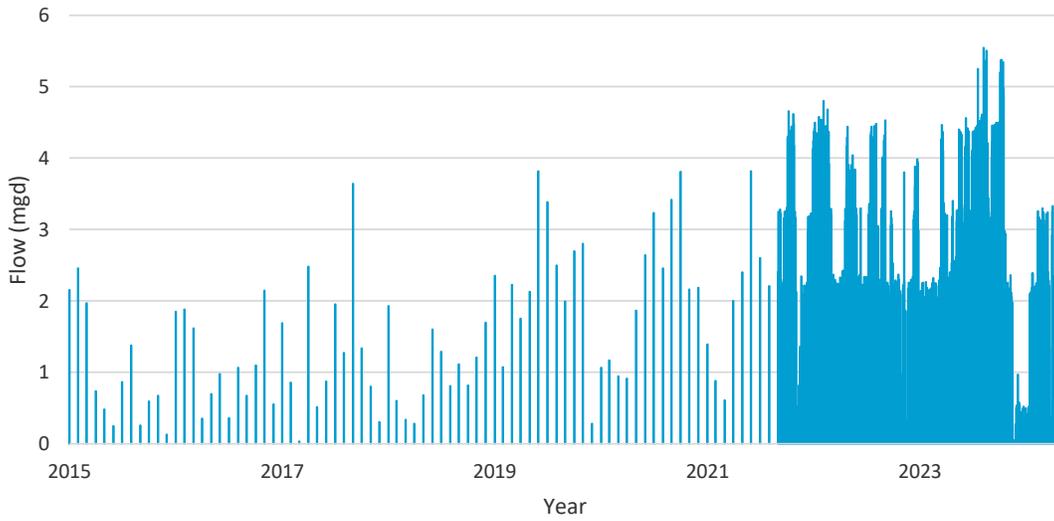


Figure 19. Monthly Surface Water Gaging Data: Kamole Weir

Source: CWRM, 2024

1.9.4 Regional Low-Flow Analysis

A 2022 CWRM report on Low-Flow Characteristics and Surface Water Availability in East Maui estimated flows for the Wailoa Ditch using mean daily flow at continuous-record ditch-flow gaging stations and subtracting out mean daily flow from streams with continuous-record gaging stations.

The total water available in the 1984-2013 climate at the Ko'olau/Spreckels/Wailoa Ditch elevation from Nahiku to Māliko gulch, estimated from record augmentation, modeling, and seepage gains prior to the 2018 Decision & Order (D&O), had a Q_{50} of approximately 109 mgd, a Q_{75} of approximately 55 mgd, and a Q_{90} of approximately 34 mgd. Following the implementation of the 2018 D&O, the total water available had a Q_{50} of approximately 69 mgd, a Q_{75} of approximately 31 mgd, and a Q_{90} of approximately 17 mgd (CWRM, 2022).

By comparison, measured flow in Wailoa Ditch at Honopou Gulch (i.e., without the contribution of streamflow between Honopou to Māliko Gulch) from 1987-2016, had a Q_{50} of approximately 60 mgd, a Q_{75} of approximately 36 mgd, and a Q_{90} of approximately 23 mgd. Measured flow in Lowrie Ditch at Honopou Gulch (i.e., without the contribution of streamflow between Honopou to Māliko Gulch) from 1987-2016, had a Q_{50} of approximately 8 mgd, a Q_{75} of approximately 4 mgd, and a Q_{90} of approximately 2 mgd (CWRM, 2022).

1.10 Agricultural and Municipal Surface Water Use

Pursuant to a contractual agreement with the County (EMI Water Delivery Agreement 2018), a minimum of approximately 7.175 mgd—reduced to 6 mgd by a BLNR permit in 2022—must be reliably made available to the County at Kamole Weir every day so that the County has flexibility regarding when to run its plant depending on weather conditions, demand, water available from its Pi'iholo plant, etc. Additionally, a minimum of approximately 1.5 mgd must be reliably made available to the County every day for the Kula Agricultural Park. Water that is not used by the County remains in the ditch system, is transported to Central Maui, and any excess is directed to reservoirs located on the farm (EMI, 2024).

The EMI allocation for Kamole Weir per agreements with amendments is as follows:

- The 1973 EMI Water Delivery Agreement permits County Department of Water Supply (MDWS) to withdraw 12 mgd and an additional 4 mgd upon one-year written notice by MDWS to EMI.
- The 5th amendment from 1998 states: "EMI will make available to MDWS up to 8.675 mgd per 24 hour period, with 7.175 mgd at Kamole Weir and up to 1.5 mgd per 24 hour period from Hamakua Ditch to the Kula Ag Park."
- The 6th - 8th amendments do not change the allocation. Therefore, the 5th amendment allocation of 7.175 mgd at Kamole with no option to increase applies (EMI Water Delivery Agreement 2018).

The monthly average surface water demand from the EMI system, specifically from Wailoa Ditch, for County DWS drinking water was 1.23 mgd for the first six months of 2024 (EMI, June 2024).

The monthly average surface water demand from the EMI system for the County's Kula Agricultural Park was 0.48 mgd for the first six months of 2024 (EMI, June 2024).



Figure 20. Central Maui Agricultural Fields in 2020

Credit: Berkowitz

Of the total monthly 7.5 mgd of surface water that must be provided to the County, a monthly average of 5.8 mgd “Diverted Reserve” remains in the ditch system, is transported to Central Maui, and any excess is directed to Mahi Pono farm reservoirs. The amount is unpredictable and unreliable, but EMI/Mahi Pono does make an effort to use the Diverted Reserve for crop irrigation when feasible. Figure 20 shows an aerial view of Central Maui fields irrigated with East Maui surface water.

1.11 Monitoring and Data Collection Programs

There are no active USGS gages measuring stream flows in the Ha'ikū region. The 1999 USGS report conducted seepage runs and identified groundwater elevations.

It is challenging to measure the amount of water diverted on a stream by stream, or stream section by stream section, basis. Prior efforts by CWRM to measure water diversions involved the installation of water gages in certain streams, but the gages were washed away during high stream flow events (CWRM, 2024).

In cooperation with CWRM and the University of Hawai'i Water Resources Research Center, the USGS developed a water resource monitoring program for rainfall, surface water, and groundwater data collection required to meet State needs for water resource management and protection in Hawai'i (Cheng, 2021). Current and anticipated issues related to water resource management and climate change effects guided the evaluation of data collection sites within the monitoring program. Data-collection sites being operated in Hawai'i as of 2018 were evaluated, and additional data collection sites were recommended based on their usefulness for understanding human effects on water resources or for representing natural conditions.

Surface-water priority areas include streams with major surface-water diversions, with established IIFS, in a surface water management area, that support water leases, and with uncertainties in hydrogeologic characteristics. Māliko Gulch is the only hydrologic unit within the Ha'ikū Stream Restoration Program area that is recommended for additional monitoring of surface water resources.

1.12 Planning, Regulatory and Legal Framework

1.12.1 Maui County Department of Water Supply

The mission of MDWS is to provide clean water efficiently. The MDWS provides water to approximately 36,400 services on Maui and Molokai, meeting all state and federal water quality standards. As part of a statewide water resource planning framework, MDWS developed the Maui Island Water Use and Development Plan (WUDP) adopted by the Maui County Council in 2022. The WUDP plans for the use, development, conservation, protection and management of the county's water resources through 2035. Its objective to allocate water to land use through the development of policies and strategies will guide the County in its planning, management, and development of water resources to meet projected demands.

1.12.2 'Aha Wai o Maui Hikina Regional Community Board

The 'Aha Wai o Maui Hikina Regional Community Board (a.k.a. East Maui Regional Community Board) water authority was established by public vote on a County charter amendment in November 2022. The Board is made up of eleven members appointed by the County Council and Mayor. It oversees efforts to manage East Maui's watersheds in the Nāhiku, Ke'anae, Honomanū, and Huelo license areas and grow water supply for future generations. A director was appointed by the regional community board with the approval of the County Council, whose powers and duties include but are not limited to:

- Acquire water systems and leases to be managed by the water authorities, including East Maui water licenses.
- Seek funding for water authority operation, maintenance, and capital improvements.
- Manage the distribution of water under the control of the water authorities, including providing water to the DWS (Maui County Charter 2023) (County of Maui, East Maui Community Regional Board website, 2024).

The Ha'ikū region streams are outside of the State license areas identified as the purview of the 'Aha Wai o Maui Hikina Regional Community Board. However, the management of streams and ditches to the east of Ha'ikū may impact stream restoration in the study area.

1.12.3 State of Hawai'i Commission on Water Resource Management

1.12.3.1 CWRM Stream Protection and Management Branch

CWRM's Stream Protection and Management (SPAM) Branch is responsible for protecting stream channels from alteration whenever possible and for managing the use of surface water resources. The SPAM Branch accomplishes these objectives through a regulatory permitting system.

A Stream Channel Alteration Permit (SCAP) is required for any temporary or permanent activity within the stream bed or banks that may (1) obstruct, diminish, destroy, modify, or relocate a stream channel, (2) change the direction of flow of water in a stream channel, (3) place any materials or structures in a stream channel, or (4) remove any material or structure from a stream channel.

A Stream Diversion Works Permit (SDWP) is required for the removal of water from a stream into a channel, ditch, tunnel, pipeline, or other conduit for off-stream purposes including, but not limited to, domestic, agricultural, and industrial uses. Construction of a new stream diversion structure or alteration of an existing structure require an SDWP.

1.12.3.2 Surface Water Management Areas

Surface Water Management Areas (SWMAs) are special areas designated by CWRM where users of surface water sources from streams, diversions and ditches are required to obtain surface water use permits (SWUPs) to withdraw and use surface water. The State Water Code authorizes CWRM to designate SWMAs where there are serious disputes occurring over the use of surface water. CWRM must consult with the Mayor, County Council, and MDWS and conduct a public hearing prior to designating a SWMA. The streams in the Consent Decree area are not currently within a SWMA.

1.12.3.3 Instream Flow Standards

Under the State Water Code, CWRM has the responsibility of establishing Instream Flow Standards (IFS) on a stream-by-stream basis to protect the public interest in the waters of the State. CWRM initially set IIFS at “status quo” levels. These IIFS were defined as the amount of water flowing in each stream with consideration for the natural variability in streamflow and conditions at the time the administrative rules governing them were adopted in 1988 (HAR §13-169-44 for East Maui, and HAR §13-169-48 for West Maui).

CWRM has adopted a process for establishing IFS and for modifying IIFS. Upon receiving or initiating a petition to modify an existing IIFS, CWRM staff will conduct a preliminary inventory of best available information. Staff then seek agency review and comments on the information compiled in an Instream Flow Standard Assessment Report (IFSAR) and issue a public notice for a public fact gathering meeting to be held in or near the hydrologic unit of interest. CWRM action to modify IIFS often becomes the subject of a contested case hearing, potentially leading to decades of public and/or legal proceedings. New or modified stream diversion permits cannot be granted until an IIFS is established.

Setting IFS is complex due to the individual components that comprise surface water hydrology, instream uses, non-instream uses, and their interrelationships. CWRM must weigh competing uses for a limited resource in a legal realm that is continuing to evolve. Figure 21 summarizes information that should be collected to conduct a comprehensive IFS assessment.



Figure 21. Data Needed for IIFS Amendment

Source: CWRM

Huelo region streams

In November 2022, CWRM approved a Petition to Amend Interim Instream Flow Standard for Huelo-Region Surface Water Hydrologic Units to Reserve a Portion of the Flow for the Department of Hawaiian Home Lands (DHHL) Reservation. The staff submittal included recommendations to protect instream uses for Surface Water Hydrologic Units of Ho'olawa (6035), Waipi'o (6036), Hoalua (6038), Hanawana (6039), Kailua (6040), Nailiilihaele (6041), Puehu (6042), 'O'opuola (6043), Ka'aiea (6044), Punalu'u (6045), and Kōlea (6046). CWRM approved staff recommendations for IIFS for the 15 streams in 11 hydrologic units but deferred a decision on the requested DHHL reservation of 1.33 mgd.

East Maui BLNR License Area

In June 2018, CWRM issued a Findings of Fact, Conclusions of Law, & Decision and Order to amend IIFS for Honopou, Hanehoi/Puolua, Waikamoi, Alo, Wahinepe'e, Puohokamoā, Ha'ipua'ena, Punalau/Kolea, Honomanu, Nua'ailua, Pi'ina'au, Palauhulu, 'Ohia (Waianu), Wai'okamilo, Kualani (Hamau), Wailuanui, Waikani, West Wailuaiki, East Wailuaiki, Kopiliula, Puaka'a, Waiohue, Pa'akea, Waia'aka, Kapaula, Hanawi, and Makapipi Streams (CWRM CCH-MA13-01, 2018). CWRM classified streams in four broad categories that represent different priorities and management strategies: kalo and community streams, habitat streams, public use streams, and other streams. Figure 22 shows the current (2024) IIFS status for streams in the vicinity of Ha'ikū.

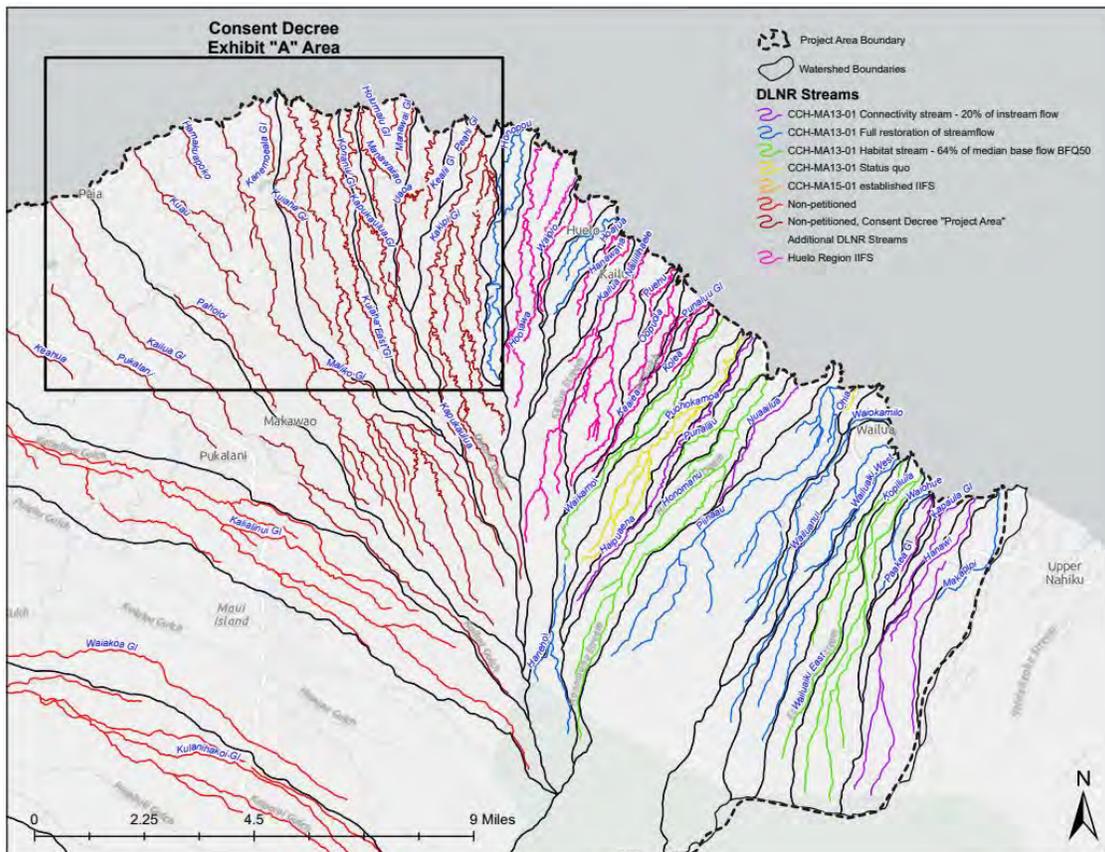


Figure 22. IIFS Status



The BLNR authorizes the amount of water that can be diverted into the EMI system. The ditch system diverts water from State lands in East Maui covered under prior water leases issued by the BLNR. The BLNR has issued a series of annual revocable permits for the continued use of water from the EMI system streams for diversified agriculture and public drinking water. The amount of water that can be diverted for off-stream use is governed by the IFS set by CWRM. These permits have been successfully challenged in court, leading to a further reduction in off-stream surface water use in East Maui.

The maximum amount of water that can be awarded through a water lease/revocable permit is what is available for diversion after implementation of the IIFS set in the 2018 and 2022 CWRM Orders. Actions taken since 2018 affecting the amount of water available from Wailoa Ditch include:

- October 2019, the BLNR limited EMI diversions to 45 mgd.
- July 2021, a First Circuit Court judge reduced EMI's permitted water diversions so as not to waste the balance of EMI's unused 45 mgd allocation.
- April 2022, the Environmental Court further lowered the amount to 20 mgd until the BLNR decides on a contested case over the 2021 and 2022 revocable permits.
- November 2022, Maui voters approved the formation of an East Maui Regional Community Board (aka 'Aha Wai o Maui Hikina Regional Community Board, aka East Maui Water Authority) to investigate, acquire, manage, and control water collection and delivery systems in the State license areas.
- November 2022, the BLNR approved one-year revocable permits allowing EMI to divert up to 41.5 mgd: (1) 27.91 mgd for Mahi Pono, (2) 6 mgd for the Maui County DWS, (3) 1.5 mgd for the County's Kula Agricultural Park, (4) 0.07 mgd for historic/industrial uses, (5) 2.2 mgd for other uses such as reservoirs, dust and fire, and (6) a cushion of 2.79 mgd.
- June 2023, the Environmental Court reduced EMI diversions to 31.5 mgd.
- December 2023, the BLNR issued a revocable permit with total cap amount to Alexander & Baldwin (A&B) and EMI of 38.25 mgd averaged annually, with 31.25 mgd granted to the permittee for agricultural use, 6 mgd to the County for Kamole Treatment Center, and 1 mgd to Kula Agricultural Park.
- April 2024, the Intermediate Court of Appeals overturned a lower court decision requiring the BLNR to hold a contested case hearing, challenging the continued use of revocable permits for water diversion.
- September 2024, a proposed 30-year EMI water license for 85 mgd was removed from consideration from the BLNR agenda.

The BLNR conditions for the A&B/EMI 2024 Revocable Water Permit require quarterly status reports on stream diversion removals/modifications to comply with the 2018 D&O, streamflow restoration, estimated losses from seepage and evaporation, debris removal from diverted streams, interim committee meetings, and the amount of water used on a monthly basis for the (1) County DWS and Kula Agricultural Park, (2) diversified agriculture, (3) industrial and non-agricultural uses, and (4) reservoir/fire protection/hydroelectric uses.

Ha'ikū region streams

The Interim (status quo) IFS for streams to the west of Huelo, between Kakipi Gulch and Kailua Gulch, have not been amended by CWRM. Streams in this area are outlined in Exhibit A of the 2003 Consent Decree and are the subject of this Phase 4 Stream Restoration Program.

1.12.4 State of Hawai'i Department of Land and Natural Resources

The DLNR aims to preserve and protect Hawai'i's mauka watersheds, above approximately 3,000 feet elevation, as a source of fresh water. The DLNR has identified "Priority Watershed Areas" which are areas of highest rainfall and resupply, based on climatic conditions that provide high recharge and fog capture. Additionally, many watershed management programs across the state are focused on public/private partnerships.

1.12.5 Other Actions Affecting Water Lease

The maximum amount of water that can be awarded through a water lease/revocable permit is what is available for diversion after implementation of the IIFS set in the 2018 and 2022 CWRM Orders. Actions taken since 2018 affecting the amount of water available from Wailoa Ditch include:

- October 2019, the BLNR limited EMI diversions to 45 mgd.
- July 2021, a First Circuit Court judge reduced EMI's permitted water diversions so as not to waste the balance of EMI's unused 45 mgd allocation.
- April 2022, the Environmental Court further lowered the amount to 20 mgd until the BLNR decides on a contested case over the 2021 and 2022 revocable permits.
- November 2023, Maui voters approved the formation of an East Maui Regional Community Board to investigate, acquire, manage, and control water collection and delivery systems in the State license areas.
- April 2024, the Intermediate Court of Appeals overturned a lower court decision requiring the BLNR to hold a contested case hearing challenging the continued use of revocable permits for water diversion.
- September 2024, Maui Mayor convinced the BLNR chair to remove from consideration a proposed 30-year EMI water license for 85 mgd from the BLNR agenda.

The amount of water that EMI is permitted to divert—from East Maui streams throughout the region—impacts ditch flows and may impact stream flows in Ha'ikū. Streams in the Ha'ikū region have been used as part of the EMI system to transfer water from one ditch to another. With changes to flows in Wailoa Ditch, some streams in Ha'ikū may see changes in flow that are not directly related to precipitation or water availability within that watershed.

1.12.6 State Historic Preservation Division

The State Historic Preservation Division (SHPD) reviews federal, state and local projects with potential impacts to historic properties under Hawaii Revised Statutes (HRS) 6E and Section 106 of the National Historic Preservation Act. Staff review projects for impacts to Hawai'i's historic places.

In the event a project will affect a significant historic property, certain mitigative actions are necessary to reduce the potential impacts. Under HRS 6E and its implementing administrative rules, the Archaeology Branch maintains mitigation plans and reports including archaeological monitoring plans and reports, data recovery plans and reports, and preservation plans.

For proposed stream restoration projects that include channel alteration to stabilize banks or improve habitat, it is recommended that consultation with SHPD occur to determine potential impacts to historic properties or archaeological sites.

1.12.7 U.S. Fish and Wildlife Service

Where applicable, stream channel modifications could be made to stabilize banks, reduce erosion, remove invasive vegetation, and plant native vegetation. If any federal funding is used to support this work, or if stream channel modifications are proposed that require any major federal permitting,

Section 7 of the Endangered Species Act (ESA) may be triggered. If Section 7 is not triggered, Section 10 will likely be required for an incidental take permit (ITP).

The USFWS has an online tool called Information for Planning and Consultation (IPaC) to help streamline the USFWS environmental review process. The IPaC report is an automatically generated list of species and trust resources under USFWS jurisdiction that are known or expected to be on or near a project area. The list may also include trust resources that occur outside of the project area, that could potentially be directly or indirectly affected by activities in the project area. The IPaC report on ESA-protected species lists 107 species in northeast Maui, so it is likely that some species will be considered potentially impacted from any proposed changes to the stream channels in the Ha'ikū region.

1.12.8 U.S. Army Corps of Engineers

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the Waters of the United States (WOTUS). There are several sections of the CWA, which pertain to regulating impacts to jurisdictional WOTUS. On August 29, 2023, the U.S. EPA and the U.S. Army Corps of Engineers (USACE) issued a final rule that amends the "Revised Definition of 'Waters of the United States.'" The new WOTUS definition decreases the extent of jurisdictional wetlands and waters, particularly wetlands and ephemeral and intermittent streams that are defined as WOTUS.

For proposed stream restoration projects that include channel alteration to stabilize banks or improve habitat, it is recommended that consultation with USACE occur to determine the jurisdictional status of streams proposed for restoration.

Section 2: Stakeholder Consultation

This section describes the outreach efforts to gather community input for developing a Stream Restoration Program. Participants engaged through diverse networks, provided feedback on activities and challenges in the Ha'ikū streams area and offered suggestions for developing the program during small group and community meetings.

2.1 Outreach Methods and Participants

In August 2024, stakeholder consultations were conducted to solicit community input to help develop guiding principles for a Stream Restoration Program. Every effort was made to engage with a cross-section of community members in inclusive networks. Initial prospective participants included those who provided input in a recent social impact assessment regarding a proposed long-term water lease for the Nāhiku, Ke'anae, Huelo, and Honomanū License Areas. The prospective participants list was expanded based on networking, media research, and general word-of-mouth. Four small group meetings and two general community meetings were convened, with a total of sixty-two people providing input.

At the beginning of each meeting, participants were provided a project description and map of the Ha'ikū streams within the study area. Participants were asked three questions, as follows:

1. What activities do you conduct and have observed in and around the Phase 4 streams and gulches?
2. What problems with current experiences and conditions do you feel should be addressed in coming up with a stream restoration program?
3. What suggestions do you have for us in developing a Ha'ikū stream restoration program?

After a review of project material, participants were provided various opportunities to comment via (1) Post-it and written notes on large maps, (2) comment sheets that could be submitted at the meeting or emailed, and (3) general email contact.

2.2 Stakeholder Input

The meetings were informal and allowed for spontaneous conversation among participants and with project team members. Discussions were free-flowing, and participants readily shared their ideas, experiences and suggestions. Many supplemented their comment sheets with follow up email or other communication.

2.2.1 Activities in and Around Ha'ikū Streams and Gulches

Key takeaways from participant responses regarding activities in and around the Phase 4 streams and gulches include:

- **Sense of place:** The primary appreciation for the streams is that they define a sense of place for long-term residents, including lineal descendants. Participants noted that a significant portion of Ha'ikū residents live adjacent to a stream and care deeply about the health of the streams, which are literally in their backyards.
- **Stream and ditch water is valued on many levels:** Participants reported using stream water to grow crops such as kalo, fruit trees and vegetables, as well as general irrigation. When flowing, the streams support recreational activities such as swimming and provide habitat for ducks and other water birds. A healthy stream flow supports traditional and cultural practices, as well. It supports kalo cultivation, the growth of traditional herbs used for healing, and habitats that support food gathering and recreation.

The value of stream and ditch water is also appreciated at a larger environmental level. Sufficient water flows support native flora and fauna, recharge the aquifer, and provide the right balance of fresh and sea water to sustain nearshore benthic species, such as 'opae, juvenile fish and limu.

- **From mauka to makai:** Participants tended to describe their activities as a continuum, from the land to the streams and ditches to the ocean. They talked about various types of farming and followed up with ocean activities, such as recreational swimming, picking 'opihi, catching Tahitian prawn, catching 'opae for bait, thrown net, shore, and boat fishing and diving.

2.2.2 Problems With Current Experiences and Conditions that Should be Addressed in a Stream Restoration Program

Problems and conditions identified by participants that should be addressed in and around the Phase 4 streams and gulches include:

- **Significant decrease or loss of agricultural irrigation and water for native plants:** The lack of water for agriculture threatens food security for those who grow their own food and raise animals, and for those who conduct commercial agriculture such as ranching and selling vegetables, fruit, and kalo. Participants reported that water needed for lo'i kalo, vegetable gardens and fruit trees is dwindling. Likewise, water supplies for cattle and horses are becoming scarce, and stream-related recreation is significantly dwindling or gone.
- **Increase in invasive species:** Participants cited several examples relating the lack of water to an increase in invasive species. They said that invasive flora is taking over habitat previously occupied by native species and believe that the roots of invasive flora are negatively affecting aquifer water recharge. Water scarcity is also related to feral pigs and boars destroying the environment. When streams are dry, these animals eat crops and dig for water, and hunters cannot keep the feral pig and boar population down.
- **Degradation of stream ecosystem and nearshore benthic environment:** It was noted that gathering 'opae in streams has been affected by climate change and decreasing water. Participants said they need to hike further mauka to gather. Along the shoreline, the decrease or lack of water flowing from streams and ditches has significantly impacted the nearshore benthic environment. Reefs, limu, fish and other benthic species that thrive in a mixture of fresh and sea water are not supported as in previous times, and participants noted a significant decrease in these resources.
- **Polluted and excess waters:** Participants reported that cars, appliances, and general waste are dumped into streams and ditches. This creates pollution and affects water quality both on land and in the streams. It was further noted that when the streams and ditches dry up and there are heavy rains, runoff into the ocean is muddy and silt settles on the ocean floor. The same occurs when excess ditch water is released into ditches.
- **Large corporations are not held accountable:** Participants expressed strong concern that for-profit agricultural corporations and developers are controlling the water supply. It was felt that corporations should not be deciding when and where to divert water, and when to release water.

2.2.3 Suggestions for Developing a Ha'ikū Stream Restoration Program

Suggestions from participants on what should be covered and addressed in a Ha'ikū Stream Restoration Program include:

- **Restore the stream water flow:** Based on concerns and problems previously identified, participants unanimously wanted to see full stream restoration. They suggested that the streams and ditches be inspected so that all waste that was previously dumped is removed prior to flow restoration and wanted to make sure that flow restoration is done in such a manner as to ensure that the watershed is managed and that rainforests are restored.
- **Keep restored water in the Ha'ikū region and within the source ahupua'a:** Participants wanted to make sure that water restored in Ha'ikū is distributed to residents in this region and not transported to resorts and private development.
- **100-percent transparency:** Participants suspected that EMI and Mahi Pono have not been forthright in reporting their use of water and management of the ditch system and that the County is allowing them to do whatever they want. They called for full transparency from these entities and suggested (1) easily accessible maps that show the entire ditch system, including diversion locations, and (2) installation of surveillance cameras at key diversion locations with 24-hour coverage—with live feed made available on a County-sponsored website.
- **Resource and information hub:** Participants wanted to see the County establish a resource and information hub that allowed the public to easily access information such as water studies, and data on water availability, diversion, and distribution.
- **Revise management and public policies:** Participants suggested that management of the ditch system be under the control of a non-profit agency whose major purpose is to ensure fair distribution of water, best management practices, and other mechanisms that promote optimal use of water resources. Further, there should be clear public policy that prioritizes water distribution for farmers, cultural practitioners and affordable housing. It was also suggested the County use eminent domain to establish public access to streams and the ditch system so that the community can observe conditions first-hand.
- **Increased communication:** Participants wanted to see more community meetings in which to share their mana'o. They recommended informing the community via mailed fliers in addition to emails and social media. Stakeholder input was considered in the development of the Stream Restoration Program in Section 3. A full summary of "Phase 4 Stakeholder Consultations" is available in Attachment A.

Section 3: Stream Restoration Program

Stream restoration in the Ha'ikū region will require restoring and maintaining healthy watersheds, as well as transparency around data and decision making to manage ditches and stream flows.

3.1 Restoration

Potential objectives of Ha'ikū stream restoration include (1) restoring stream flows, (2) improving management of ditch flows, (3) protecting a sense of place and connection to the health of streams, (4) enabling the cultivation of kalo and other traditional crops, (5) protecting stream and nearshore habitat and native species, (6) supporting traditional and customary (T&C) gathering of aquatic resources, (7) enabling recreation and swimming, (8) addressing the impacts of pollution and erosion on habitats, and (9) increasing communication and opportunities for stakeholder input.

Stakeholders consulted for this study supported stream restoration and amending IFS—noting that it is not just the surface levels of the streams that matter, but reforestation and restoration of groundwater as well. Restoring streams to their ecological potential before EMI systems and land use changes altered the streams is a goal that will require further study to ascertain what is possible for each respective stream in the Ha'ikū area.

The definition and objectives of stream restoration in Ha'ikū will continue to be shaped by stakeholder input, scientific studies, and collaboration between the government and community. Each stream is unique, and some may warrant physical modifications to stream banks and vegetation as part of the restoration efforts.

3.2 Proposed strategies

Strategies to restore streams in the Ha'ikū region were identified through review of available background information and consultation with stakeholders including Ha'ikū residents and CWRM staff. Figure 23 shows potential strategies in a Ha'ikū Stream Restoration Program.

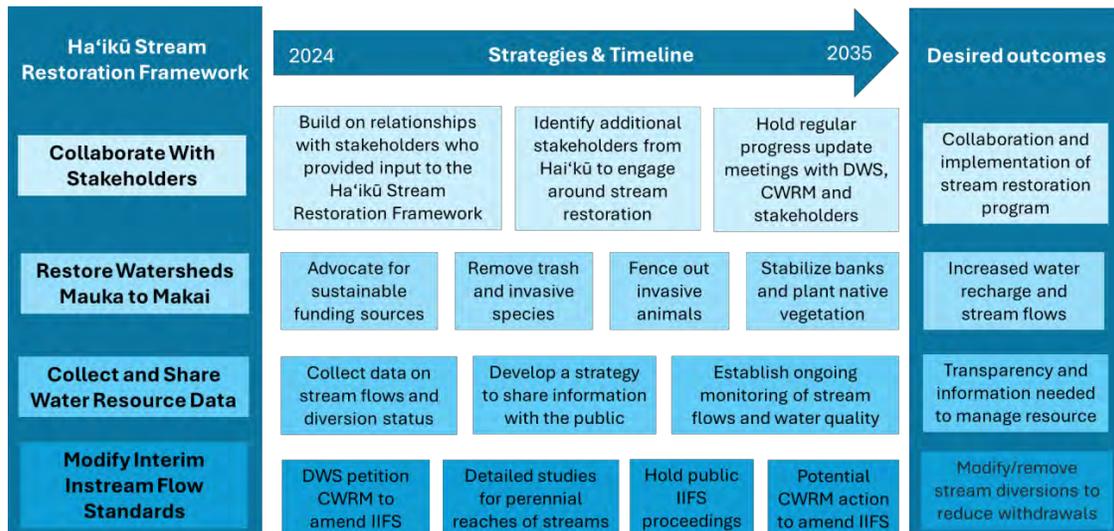


Figure 23. Ha'ikū Stream Restoration Program Strategies

Table 4 summarizes proposed strategies with potential lead agencies/organizations, funding sources, and timelines.

Table 4. Ha'ikū Stream Restoration Program Strategies				
Id no.	Strategy	Funding	Lead	Timeline
1	Continue work to restore Hāmākualoa Open Space in support of healthy makai watersheds and streams.	County, State, Federal, non-profit, private	Malama Hamakua	Ongoing
2	Continue work to protect mauka watersheds and control negative impacts of erosion on streams, water supplies, and nearshore environment.	County, State, Federal, non-profit, private	EMWP	Ongoing
3	Submit a petition for amended IIFS for applicable streams that had perennial reaches in 1999.	County	DWS	2024
4	Hold regular progress meetings to share information on ditch flows, stream diversions, and status updates on the stream restoration program.	County, State, non-profit, private	DWS, CWRM, HCA, Mahi Pono	2025
5	Monitor surface water quality and quantity.	State, Federal, County, non-profit	CWRM, DWS USGS, HCA	Ongoing
6	Collect preliminary data on stream diversion status and stream flows.	State	CWRM	2025
7	Conduct hydrological studies of applicable streams as potential candidates for amended IIFS.	County, State, Federal	DWS, CWRM, USGS	2026
8	Identify streams/reaches that are candidates for physical modifications to reduce erosion and improve aquatic species habitat, and develop permitting plans and designs for channel alterations in applicable locations.	County	DWS, HCA	2027
9	Conduct public IIFS proceedings to provide more opportunities for stakeholder involvement and collect more information about T&C uses of stream water.	State	CWRM	2028
10	Consider adoption of amended IIFS for applicable streams.	State	CWRM	2030
11	Modify or abandon stream diversions as necessary to comply with amended IIFS and provide status updates to CWRM and community.	Private	EMI	2035

Abbreviations: CWRM = Commission on Water Resource Management, DWS = Department of Water Supply, EMI = East Maui Irrigation, EMWP = East Maui Watershed Partnership, HCA= Ha'ikū Community Association, IIFS = Interim Instream Flow Standards, USGS = United States Geological Survey

The proposed strategies are further described below and grouped by topic.

3.2.1 Collaborate with Stakeholders

Ha'ikū residents shared valuable information and ideas that shaped the Ha'ikū Stream Restoration Program. The County and State may continue to consult with stakeholders regarding the implementation of a stream restoration program. The list of stakeholders consulted for this study could be expanded. Further outreach would yield more data and insights about the streams and the work that must be done to restore flows. Regular progress update meetings hosted by DWS could include CWRM and the public.

3.2.2 Restore Watersheds Mauka to Makai

Restoring native forest in watersheds that feed the Ha'ikū area streams is a critical component of improving streamflow. A healthy forest is key to a healthy water supply. Rain and condensation drip from plants and trees onto mosses and soils that act as sponges that hold and recharge groundwater. Hawaiian native forests have evolved over millions of years to become the best quality watershed areas. Controlling invasive species must have continued support.

In addition to the efforts of DLNR and EMWP, the County is taking action to support watershed restoration. Selected strategies from the 2022 WUDP Table 13-1 related to watershed management are:

- **Strategy 1.** Continue Maui County financial support for watershed management partnerships' fencing, alien plant control, and weed eradication efforts.
- **Strategy 2.** Promote increased distribution of funding for watershed protection and active reforestation to reflect multiple values and ecosystem services.
- **Strategy 3.** Expand watershed protection to lower elevations below 3,000 feet.
 - Note: Funding does not come from water rates as these are not critical watershed areas that supply domestic water. These protections are classified as other eco services and are funded from the County general fund, the State, and private organizations and landowners.
- **Strategy 4.** Expand watershed protection to incorporate the ahupua'a as a whole and incorporate ahupua'a resource management practices.

Watershed management to date has been largely focused on high-elevation forested areas. Management using a traditional mauka-makai approach is impeded by urbanization, agricultural lands, and fragmented ownership. Public-private partnerships and community-led organizations have an important role to play in stewardship of makai lands to support stream restoration in Ha'ikū.

In 2016, the County purchased 267 acres of former plantation land for \$9.49 million near Pe'ahi. The land, also referred to as the Ha'ikū Sugar East Subdivision, consists of four lots and includes a heiau and the access easement to the "Jaws" lookout. The purchase was called the Hāmākualoa Open Space Preserve, in recognition of the historic moku that encompasses the land and present-day Ha'ikū.

Malama Hāmākua is a non-profit, community-based organization created to help the County maintain and preserve the Hāmākualoa Open Space. Funding is through grants and a maintenance contract with the County. Much of the work is currently voluntary. Goals are to preserve the land and cultural sites, restore native plants, and establish a community garden. The public is invited to join monthly workdays to assist Malama Hāmākua with stewardship activities.

Additional funding for watershed restoration and management could come from a proposed visitor impact fee that would assess visitors a set amount per person to visit Hawai'i State Parks, with proceeds to support cultural and environmental protection. Proponents of stream restoration in the Ha'ikū area can advocate to the State legislature for passage of the visitor impact fee and request that some funds be directed to watershed restoration and management.

Continued cooperation and collaboration between government, private, and community organizations is necessary for the success of watershed restoration activities.

3.2.3 Collect and Share Water Resource Data

To improve transparency around water resources in Ha'ikū, DWS and CWRM should coordinate with stakeholders to develop a strategy to publicly share pertinent information about stream restoration. Information could include available data on ditch flows, stream diversions, and status updates on the stream restoration program. Section 3.3 identifies additional data that will be needed for a stream restoration program.

Ditch flow data at selected gaging stations is currently compiled by CWRM and available to the public upon request. Stream diversion data is limited to location, ownership, and status. CWRM should verify the status of existing diversions and consider making that information publicly available.

The Ha'ikū Community Association (HCA) recently entered a partnership with the University of Hawai'i (UH) on a research project in Ha'ikū. The goal of this research is to learn more about the hydrology of Ha'ikū, including both ground and surface water. A UH graduate student is working under the guidance of UH Sea Grant and Water Resources Research Center to analyze the hydrology of the Ha'ikū aquifer. The HCA will be working to train volunteers to help gather stream and well water samples, make some measurements, raise funds, and work with participating property owners who have water resources.

Government agencies should continue to support community efforts to collect data and should initiate further data collection. The Water Resource Management Monitoring Needs Report, State of Hawai'i (Cheng 2021) identifies Māliko Gulch as a priority for additional surface water monitoring, so this is a recommended next step.

3.2.4 Modify Interim Instream Flow Standards

The County may petition the CWRM to amend IIFS for the Ha'ikū region streams. This action may initiate additional data collection by CWRM, such as field verifications of existing stream diversions to ascertain their status. CWRM may consider installing monitors to indicate whether a stream is flowing at selected locations and to get a clearer picture of streamflow.

The Ha'ikū region streams are intermittent in most reaches, fed by shallow perched aquifers and rainfall. Amended IIFS could only be established for perennial reaches that may exist in some locations. Due to the intermittent nature of the Ha'ikū region streams and the limited capacity of CWRM staff to address surface water management across the State, amending IIFS for streams in the study area would not be considered a high priority from CWRM's perspective.

To amend IIFS, analyses noted in Figure 21 and in Section 3.3 would need to be initiated and completed by CWRM.

3.3 Data Needed to Amend IIFS

This section provides a summary of data needs and potential sources for Ha'ikū area streams. The categories match the outline of an IFSAR typically compiled by CWRM as part of the process to amend IFS.

The 1990 Hawai'i Stream Assessment (HSA) created an inventory of all streams in the state in four resource categories: (1) aquatic, (2) riparian, (3) cultural, and (4) recreational. Each stream received one of five ranks (outstanding, substantial, moderate, limited, and unknown). Based on the stream rankings, the HSA identified candidate streams for protection. The HSA did not recommend that any of the Ha'ikū region streams be listed as a candidate stream for protection based on their aquatic resources. The HSA is a valuable source of information as a starting place for data collection in the various categories of interest.

3.3.1 Surface Water Hydrologic Unit Characteristics

Data on surface water hydrologic unit characteristics may include the location of roads, streams, irrigation systems and diversions, geology, soils, rainfall, solar radiation, evaporation, land use, land cover, flooding and drought conditions. This information is publicly available and would need to be compiled in maps, tables, and narrative.

3.3.2 Hydrology

The 1999 USGS report on "Groundwater and Surface Water in the Ha'ikū Area, East Maui" includes information on hydrology for the study area. Per the 1999 study, continuous monitoring of selected springs and streamflow in the area is needed to measure baseline groundwater discharge.

Comparisons can then be made to determine if additional groundwater withdrawal would affect groundwater discharge at the high-level streams or springs. Next steps are to conduct stream flow monitoring, seepage runs, and modeling of surface water flow. Methodology like what used in the 2022 CWRM report on Low Flow Characteristics and Surface Water Availability in East Maui could be used.

Other information typically included in an IFSAR report are streamflow characteristics, watershed characteristics, and long-term trends in rainfall and streamflow.

3.3.3 Maintenance of Fish and Wildlife Habitat

The State of Hawai'i DAR published an "Atlas of Hawaiian Watersheds and Their Aquatic Resources" for each of five major islands in the state. Each atlas describes watershed and stream features, distribution and abundance of stream animals and insect species, and stream habitat use and availability. Based on these data, a watershed and biological rating is assigned to each stream to allow easy comparison with other streams on the same island and across the state.

3.3.4 Outdoor Recreational Activities

Streams are often utilized for water-based activities, such as boating, fishing, and swimming, while offering added value to land-based activities such as camping, hiking, and hunting. The HSA (p. 252) includes a recreational resource ranking based on number of available experiences, with "1" being "outstanding" and "4" being "limited." Māliko received a recreational resource ranking of 2, Kaupakulua and Kakipi received a 3, and Kuiaha, Manawai'iao, Uaoa received a 4.

3.3.5 Maintenance of Ecosystems

The HSA (p. 182) provides general data on riparian resources for streams in study area, including detrimental plants and animals, percent native forest, presence of recovering habitat, number of endangered birds, number of rare plants, presence of wetlands, and whether the stream is protected. The HSA did not identify any of the Ha'ikū region streams as candidates for protection based on riparian resources.

3.3.6 Aesthetic Values

There are certain elements within or near a stream that appeal to visual and auditory senses, such as waterfalls and plunge pools. Public access to scenic views including streams and watersheds could be considered as a data point.

3.3.7 Navigation

The Ha'ikū region streams, like most Hawai'i streams, are too short and steep to support navigable uses.

3.3.8 Instream Hydropower Generation

There is no known instream hydropower generation in the Ha'ikū region streams. The relatively short lengths and flashy nature of Hawai'i's streams often require water to be diverted to off-stream power generators.

3.3.9 Maintenance of Water Quality

The State of Hawai'i Department of Health (DOH) is responsible for water quality management duties statewide. The DOH Environmental Health Administration oversees the collection, assessment, and reporting of numerous water quality parameters including (1) possible presence of water-borne human pathogens, (2) long-term physical, chemical and biological components of inland, coastal, and oceanic waters, and (3) watershed use-attainment assessments, identification of sources of contamination, allocation of those contributing sources, and implementation of pollution control actions.

Volunteers with the HCA have collected and publicly posted several recent water quality measurements, including turbidity, nitrates, dissolved oxygen, conductivity, pH, and phosphate for streams to the east of the study area. Specific water quality data for the study area streams is not currently available.

3.3.10 Conveyance of Irrigation and Domestic Water Supplies

There is no comprehensive database of households whose domestic water supply is not part of a municipal system, who use stream or catchment water. Stream diversion data provided by CWRM in 2024 indicates approximately 40 private diversions that do not feed into the EMI system. Diversions need to be verified by site visit to confirm status. Stream restoration efforts may affect water availability to private diversions.

3.3.11 Protection of Traditional and Customary Native Hawaiian rights

The maintenance of instream flows is important to the protection T&C Native Hawaiian rights, as they relate to the maintenance of stream resources for gathering, recreation, and the cultivation of kalo. An appurtenant water right is a legally recognized right to a specific amount of stream water on the specific property. This right traces back to the use of water on a given parcel of land at the time of its original conversion into fee simple lands during the Great Mahele.

Stakeholders contacted for this study shared that the Ha'ikū streams are valued for sense of place, for cultivation of traditional crops, recreation, stream and nearshore habitat. A full summary of Phase 4 Stakeholder Consultations can be found in Attachment A. Additional stakeholder engagement can provide a more comprehensive understanding of T&C Native Hawaiian rights exercised in the study area.

3.3.12 Non-Instream Uses

Under the State Water Code, non-instream uses are defined as “water that is diverted or removed from its stream channel...and includes the use of stream water outside of the channel for domestic, agricultural, and industrial purposes (HRS 174).” Relevant information includes the volume of water leaving the streams in ditch systems, as well as agricultural and municipal demands.

General information about stream diversions, ditch flows, and off-stream demands are summarized in this TM. Data is not available for the quantities diverted by individual stream diversions in the Ha'ikū region.

3.4 Next Steps

Next steps include submittal of a petition to CWRM to amend IIFS for applicable streams, and establishment of a Ha'ikū stream restoration working group that will meet regularly to refine the objectives and review progress on the stream restoration program. Suggested members of the working group may include DWS, CWRM, Mahi Pono/EMI, Mālama Hāmākua, EMWP, 'Aha Moku o Maui, and HCA, among others identified through additional consultation with stakeholders.

3.5 Conclusion

This Stream Restoration Program TM is intended to provide a framework to guide the initiation of a stream restoration program for the Ha'ikū region streams. It summarizes available information about the streams, considers stakeholder input, and identifies potential strategies. Stream restoration will require a long-term cooperative effort by multiple stakeholders.

To improve transparency around water resources in Ha'ikū, DWS and CWRM should coordinate with stakeholders to develop a strategy to publicly share pertinent information about stream restoration. Information could include available data on ditch flows, stream diversions, and status updates on the stream restoration program. Government agencies should continue to support community efforts to collect data and should initiate further data collection such as surface water monitoring in Māliko Gulch.

The Ha'ikū region streams are intermittent in most reaches, fed by shallow perched aquifers and rainfall. Amended IIFS could only be established for perennial reaches that may exist in some locations. To amend IIFS, analyses noted in Section 3 of this study would need to be initiated and completed by CWRM.

Restoring native forest in watersheds that feed the Ha'ikū area streams is a critical component of improving streamflow. In addition to the efforts of the State and non-profit organizations, the County is continuing to provide financial support for watershed management partnerships' fencing, alien plant control, and weed eradication efforts. Public-private partnerships and community-led organizations have an important role to play in stewardship of makai lands to support stream restoration in Ha'ikū.

References

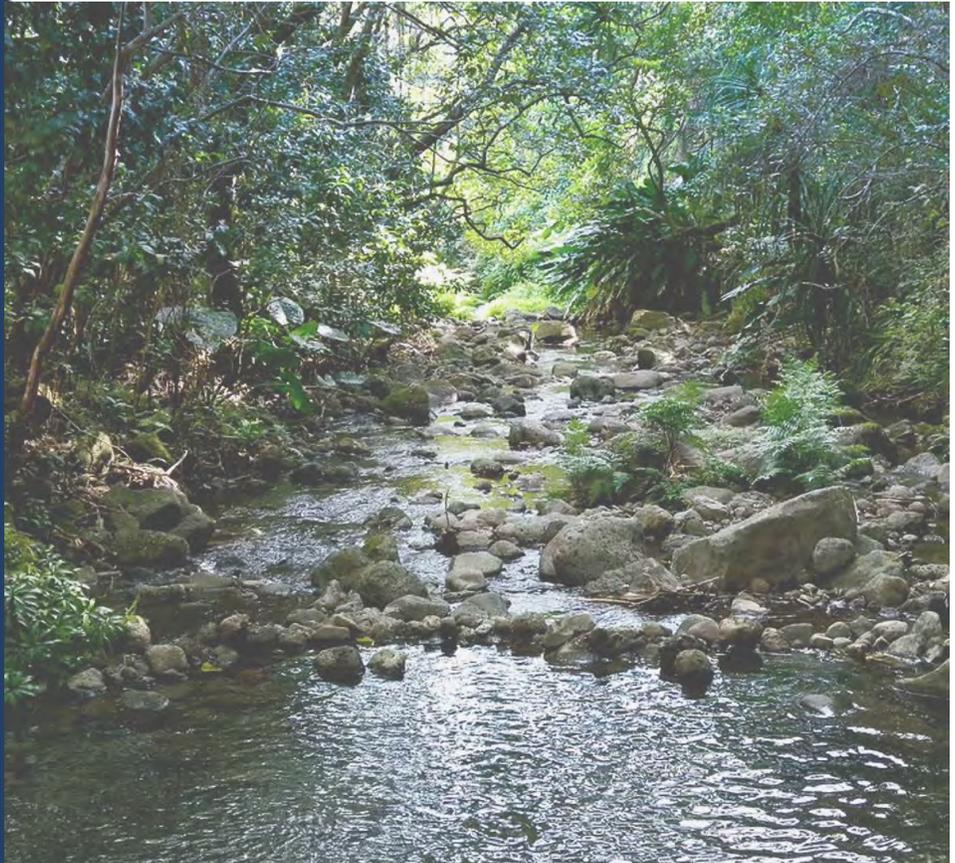
- Cheng, C.L., Izuka, S.K., Kennedy, J.J., Frazier, A.G., and Giambelluca, T.W., "Water-Resource Management Monitoring Needs," *State of Hawai'i: U.S. Geological Survey Scientific Investigations Report 2020-5115*, p. 114, 2021, <https://doi.org/10.3133/sir20205115>.
- Circuit Court of the Second Circuit (State of Hawaii), "Consent Decree Order: The Coalition to Protect East Maui Water Resources, et al. v. The Board of Water Supply, et al.," *Civil No. 03-1-0008(3)*, December 23, 2003.
- County of Maui Department of Water Supply, *Maui Island Water Use and Development Plan*, 2022.
- County of Maui, *East Maui Regional Community Board (Water Authority) | Maui County, HI – Official Website*. <https://www.mauicounty.gov/2741/East-Maui-Regional-Community-Board-Water> (accessed on August 12, 2024).
- East Maui Irrigation Company, LLC., "BLNR Conditions for Holdover of East Maui Water Permits, Status of Compliance as of June 30, 2024," 2024.
- East Maui Irrigation Company and County of Maui, "EMI Water Delivery Agreement," 2018.
- East Maui Watershed Partnership, *Home – East Maui Watershed*, 2024, www.eastmauiwatershed.org/.
- Federal Emergency Management Agency (FEMA), "Floodplain and Stream Restoration Fact Sheet," 2017, *Floodplain and Stream Restoration Fact Sheet*, https://www.fema.gov/sites/default/files/documents/fema_fsr_fact_sheet_feb2017.pdf (accessed on September 30, 2024).
- Gingerich, Stephen B., "Ground Water and Surface Water in the Ha'ikū Area, East Maui, Hawai'i," *USGS Water Resources Investigations Report 98-4142*, 1999, <https://pubs.usgs.gov/wri/1998/4142/report.pdf> (accessed on July 31, 2024).
- Gingerich, Stephen B., "Ground-Water Occurrence and Contribution to Streamflow, Northeast Maui, Hawai'i," *USGS Water Resource Investigations Report 99-4090*, 1999.
- Ha'ikū Community Association, "Ha'ikū Stream Data: In Situ Data," *Haiku Stream Data: In Situ Data – Ha'iku Community Association*, 2024, <https://www.haikumaui.org/haiku-stream-data/> (accessed on June 16, 2024).
- Hawai'i Statewide GIS Program, "Hawaii Streams from DLNR, Division of Aquatic Resources (DAR) as of 2008," *USGS Digital Line Graphs, v1983, CWRM Hawaii Stream Assessment database, v1993, DLNR Division of Aquatic Resources, v2004*, 2008.
- Hawai'i Statewide GIS Program, "Surface Water Hydrologic Unit Boundaries (Watersheds) for the 8 major Hawaiian Islands," *State of Hawaii Commission on Water Resource Management (CWRM)*, v2008, 2022.
- Knudson and Cantor, "Plantation Pasts, Plantation Futures: Resisting Zombie Water Infrastructures in Maui, Hawai'i," *Portland State University Geography Faculty Publications and Presentations*, 2023.
- Kumu Pono Associates. Maly, Kepā and Onaona, "Volume I Wai o Ke Ola: He Wahi Mo'olelo no Maui Hikina. A Collection of Native Traditions and Historical Accounts of the Lands of Hāmākua Poko, Hāmākua Loa and Ko 'olau, Maui Hikina (East Maui), Island of Maui," 2001.
- Malama Hāmākua Maui, *Malama Hamakua Maui – Hamakualoa Open Space Preserve*, <https://malamahamakuamaui.com/> (accessed on August 26, 2024).
- Oki, D.S. and Bassiouni, M., "Trends and shifts in streamflow in Hawai'i, 1913-2008: U.S. Geological Survey Hydrological Processes Series," *Pacific Islands Water Science Center*, 2012.
- Society for Ecological Restoration Science and Policy Working Group. "The SER primer on ecological restoration," 2002, <http://www.ser.org/Primer.pdf> (accessed on September 30, 2024).
- State of Hawai'i Commission on Water Resource Management and the National Park Service, "Hawai'i Stream Assessment: A Preliminary Appraisal of Hawai'i's Stream Resources," 1990.

- State of Hawai'i Commission on Water Resource Management, "Hawai'i State Water Use database: Data on monthly average EMI ditch flows 2011 - 2024 and general data on stream diversion location and ownership," Provided via email on June 25, 2024.
- Strauch, A. M. and State of Hawai'i Commission on Water Resource Management, "Low Flow Characteristics and Surface Water Availability in East Maui, Hawai'i," *PR-2022-01*, 2022.
- State of Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources, "Atlas of Hawaiian Watersheds & Their Aquatic Resources," *Makawao Watersheds*, https://Hawai'iwatershedatlas.com/maui_makawao.html (accessed on September 18, 2024).
- State of Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources, "Hawai'i Streams from DLNR, Division of Aquatic Resources (DAR) as of 2008," *Streams | Hawaii Statewide GIS Program*, 2008, <https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/explore> (accessed on June 15, 2024)
- State of Hawai'i Department of Land and Natural Resources, "Kahana Stream Restoration Project," *USFWS_Kahana.pdf*, 2017, https://files.hawaii.gov/dlnr/cwrm/publishedreports/USFWS_Kahana.pdf.
- U.S. Environmental Protection Agency, "Invasive Non-Native Species," *Invasive Non-Native Species | US EPA*, 2024, <https://www.epa.gov/watershedacademy/invasive-non-native-species> (accessed on September 26, 2024).
- U.S. Environmental Protection Agency, "Principles for the Ecological Restoration of Aquatic Resources," *Rep. No. EPA841-F00-003*, March 2000, <http://www.epa.gov/owow/wetlands/restore/> (accessed on September 30, 2024).
- Woessner, William W., "Groundwater-Surface Water Exchange," *2.5 Perennial, Intermittent and Ephemeral Streams – Groundwater-Surface Water Exchange*, 2020, <https://books.gw-project.org/groundwater-surface-water-exchange/chapter/perennial-intermittent-and-ephemeral-streams/> (accessed on September 26, 2024).

Attachment A: Stakeholder Consultation

FEASIBILITY STUDY FOR EAST MAUI WATER SOURCE DEVELOPMENT

PHASE 4 STAKEHOLDER CONSULTATIONS



Prepared for
Brown and Caldwell

Prepared by:
Oceanit.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

September 2024

This Page Intentionally Left Blank

TABLE OF CONTENTS

Table of Contents	1
Executive Summary	3
1 Introduction and purpose.....	7
1.1 Feasibility Study for East Maui Water Source	7
1.2 East Maui Stream Restoration Program	8
2 Participants and Meeting Approach.....	10
2.1 Participants.....	10
2.2 Meeting Approach	13
3 Activities in and Around Hai‘kū Streams	14
3.1 Sense of Place	14
3.2 Stream and Ditch Water is Valued at Many Levels.....	14
3.3 From Mauka to Makai	15
3.4 Presence of ‘Iwi, Heiau and Other Historic Resources	15
4 Problems With Current Conditions that Should be Addressed in a Stream Restoration Program	16
4.1 Significant Decrease or Loss of Agricultural Irrigation and Water for Native Plants ...	16
4.2 Increase in Invasive Species	16
4.3 Degradation of Stream Ecosystem and Nearshore Benthic Environment	17
4.4 Polluted and Excess Waters	17
4.5 Large Corporations are not Being Held Accountable	18
5 Suggestions for Developing a Ha‘ikū stream restoration Program.....	19
5.1 Complete Restoration of Stream Water Flow.....	19
5.2 Keep Restored Water in the Ha‘ikū Region and Within the Source Ahupua‘a.....	19
5.3 100% Transparency	19
5.4 Major Revisions to Management and Public Policies.....	20
5.5 Resource and Information Hub.....	20
5.6 Increased Communication Between Maui County and the Community	21

LIST OF FIGURES

Figure 1: 4-Phase Feasibility Study for East Maui Water Sources	7
Figure 2: Ha‘ikū Streams and Gulches	9

LIST OF TABLES

Table 1: Participants in Small Group Meetings10

Table 2: Participants in August 14, 2024, Meeting at Roots School11

Table 3: Participants in August 16, 2024, Meeting at “LaF’s Barn”12

Table 4: Participants Who Submitted Comments Only Via Email and Voicemail.....12

Attachment A: Project Description Provided in Emails and at the Meetings

Attachment B: Transcript of Audio Recordings Provided by Lucienne de Naie on August 19, 2024

EXECUTIVE SUMMARY

Stakeholder consultations were conducted in August 2024 to solicit community input that will help inform guiding principles in the development of a Stream Restoration Program. Community meetings included:

- 8/12 meeting with 2 ranchers who lease land in Ha‘ikū
- 8/14 meeting with 34 people at Roots School
- 8/16 meeting with 23 people at “Laf’s Barn”
- Individual meetings with State senator and representative, and Maui County Council representative for this region

Forty-six people participated in group meetings, 11 of whom came to both meetings in Ha‘ikū and offered different comments at each meeting. Many expressed appreciation to be able to meet and share their views. In addition, 8 people provided comments only via email and voicemail. In all, 62 people participated in providing input.

Most participants were long time residents and shared their observations over the decades. The younger participants learned from their kūpuna that stream conditions were much better in the past, and that they are left with the effects of long-time and increasingly low or no water in the streams. Without exception, all wanted to see stream flow restoration to the maximum extent possible. Several offered to help move this effort along, including cleaning gulches, collecting data, and testifying.

Three questions were posed:

1. What activities do you conduct and have observed in and around the Phase 4 streams and gulches?
2. What problems with current experiences and conditions do you feel should be addressed in coming up with a stream restoration program?
3. What suggestions do you have for us in developing a Ha‘ikū stream restoration program?

Activities in and around Phase 4 streams and gulches

- **Sense of place:** The primary appreciation for the streams is that they define a sense of place for long-term residents, including lineal descendants. Participants noted that a significant portion of Ha‘ikū residents live adjacent to a stream and care deeply about the health of the streams, which are literally in their backyards.

- **Stream and ditch water is valued on many levels:** Participants reported using stream water to grow crops such as kalo, fruit trees and vegetables, as well as general irrigation. When flowing, the streams support recreational activities such as swimming and provide habitat for ducks and other water birds. A healthy stream flow supports traditional and cultural practices, as well. It supports kalo cultivation, the growth of traditional herbs used for healing, and habitats that support food gathering and recreation. The value of stream and ditch water is also appreciated at a larger environmental level. Sufficient water flows support native flora and fauna, recharge the aquifer and provide the right balance of fresh and sea water to sustain nearshore benthic species, such as ‘opae, juvenile fish and limu.
- **From mauka to makai:** Participants tended to describe their activities as a continuum, from the land to the streams and ditches to the ocean. They talked about various types of farming and followed up with ocean activities, such as recreational swimming, picking ‘opihi, catching Tahitian prawn, catching ‘opae for bait, thrownet, shore and boat fishing and diving.

Problems With Current Experiences and Conditions that Should be Addressed in a Stream Restoration Program

- **Significant decrease or loss of agricultural irrigation and water for native plants:** The lack of water for agriculture threatens food security for those who grow their own food and raise animals, and for those who conduct commercial agriculture such as ranching and selling vegetables, fruit and kalo. Participants reported that water needed for lo‘i kalo, vegetable gardens and fruit trees is dwindling. Likewise, water supplies for cattle and horses are becoming scarce, and stream-related recreation is significantly dwindling or gone.
- **Increase in invasive species:** Participants cited several examples relating the lack of water to an increase in invasive species. They said that invasive flora is taking over habitat previously occupied by native species and believe that the roots of invasive flora are negatively affecting aquifer water recharge. Water scarcity is also related to feral pigs and boars destroying the environment. When streams are dry, these animals eat crops and dig for water, and hunters cannot keep the feral pig and boar population down.
- **Degradation of stream ecosystem and nearshore benthic environment:** It was noted that gathering ‘opae in streams has been affected by climate change and decreasing water. Participants said they need to hike further mauka to gather. Along the shoreline, the decrease or lack of water flowing from streams and ditches has significantly impacted the nearshore benthic environment. Reefs, limu, fish and other benthic species that thrive in a mixture of fresh and sea water are not supported as in previous times, and participants noted a significant decrease in these resources.

- **Polluted and excess waters:** Participants reported that cars, appliances and general waste are dumped into streams and ditches. This creates pollution and affects water quality both on land and in the streams. It was further noted that when the streams and ditches dry up and there are heavy rains, runoff into the ocean is muddy and silt settles on the ocean floor. The same occurs when excess ditch water is released into ditches.
- **Large corporations are not held accountable:** Participants expressed strong concern that for-profit agricultural corporations and developers are controlling the water supply. It was felt that corporations should not be deciding when and where to divert water, and when to release water.

Suggestions for Developing a Ha‘ikū Stream Restoration Program

- **Restore the stream water flow:** Based on concerns and problems previously identified, participants unanimously wanted to see full stream restoration. They suggested that the streams and ditches be inspected so that all waste that was previously dumped is removed prior to flow restoration, and wanted to make sure that flow restoration is done in such a manner as to ensure that the watershed is managed and that rain forests are restored.
- **Keep restored water in the Ha‘ikū region and within the source ahupua‘a:** Participants wanted to make sure that water restored in Ha‘ikū is distributed to residents in this region and not transported to resorts and private development.
- **100% transparency:** Participants suspected that East Maui Irrigation (EMI) and Mahi Pono have not been forthright in reporting their use of water and management of the ditch system and that Maui County is allowing them to do whatever they want. They called for full transparency from these entities and suggested easily accessible maps that show the entire ditch system, including diversion locations, and the installation of surveillance cameras at key diversion locations with 24-hour coverage and whose videos are available live on a County-sponsored website.
- **Resource and information hub:** Participants wanted to see the County establish a resource and information hub that allowed the public to easily access to information such as water studies, and data on water availability, diversion and distribution.
- **Revise management and public policies:** Participants suggested that management of the ditch system be under the control of a non-profit agency whose major purpose is to ensure fair distribution of water, best management practices and other mechanisms that promote optimal use of water resources. Further, there should be clear public policy that prioritizes water distribution for farmers, cultural practitioners and affordable housing. It was also suggested the County use eminent domain to establish public access to streams and the ditch system so that the community can observe conditions first-hand.

- **Increased communication:** Participants wanted to see more community meetings in which to share their mana‘o. They recommended informing the community via mailed fliers in addition to emails and social media.

1 INTRODUCTION AND PURPOSE

1.1 Feasibility Study for East Maui Water Source

The Maui County Department of Water Supply (DWS) is conducting a Feasibility Study to explore new water sources and related water infrastructure to meet drinking water needs identified in the Maui Island Plan. Studies are being conducted in four phases as shown in Figure 1.

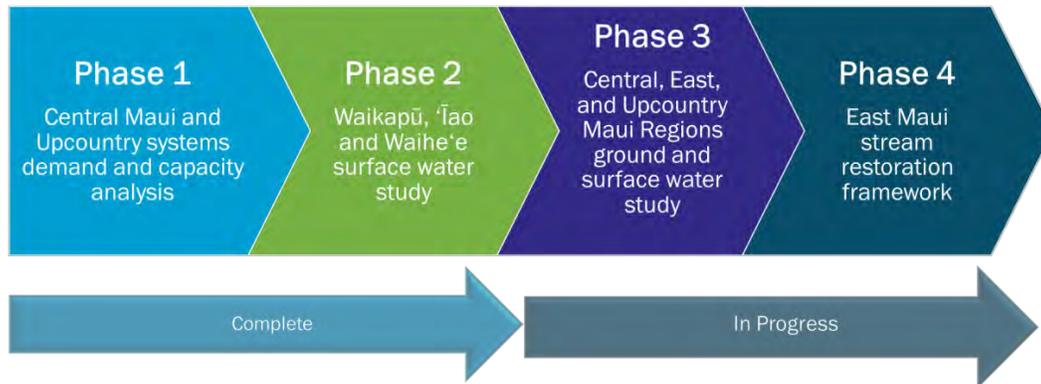


Figure 1: 4-Phase Feasibility Study for East Maui Water Sources

Phase 1 was an analysis of water system demand and capacity in the Central Maui and Upcountry systems. This phase has been completed.

Phase 2 was a study of the availability of surface water and a cost/benefit study for possible surface water sources from Waikapū Stream, Wailuku River and Waiheʻe River. An addendum to the initial study included the Pōhākea, Waipili, Waiōlaʻi, Makamakaʻole and Waiehu streams. The amount available to divert from a stream is legally limited by established Interim Instream Flow Standards (IIFS): “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.” Phase 2, which included a Ka Paʻakai Analysis, has been completed.

Phase 3 is a rigorous cost/benefit study of surface and groundwater resources available in the Central Maui region, the Upcountry region and the East Maui region. This study includes an evaluation of economic and water transmission options. This evaluation would help in understanding if these water sources would be feasible and how the water would be transmitted to meet potable water needs. A Phase 3 Ka Paʻakai Analysis is currently being conducted.

Phase 4 involves an East Maui Stream Restoration Program that will identify steps, timeline and potential implementing partners to restore streams in the Haʻikū area. This report summarizes findings from Phase 4 stakeholder consultations that focus on East Maui stream restoration in Haʻikū.

1.2 East Maui Stream Restoration Program

The Consent Decree in *The Coalition to Protect East Maui Resources v The Board of Water Supply, County of Maui* (2003) sets forth requirements that the DWS must meet before initiating development of water resources in the agreed upon portion of the East Maui Region. The 2003 Consent Decree stipulated that any effort to develop groundwater resources in East Maui will be treated as a new project. Further, before any new project is planned, DWS will undertake a rigorous Cost/Benefit Study of the surface and groundwater resources in the Central Maui Region, Upcountry Maui Region and East Maui Region.

The Consent Decree states “The County agrees that as long-term agricultural water needs are reduced, a stream restoration program will be studied, developed and initiated by the County. As such, the County agrees that one component of any plan or program to develop further water resources in the agreed-upon portion of the East Maui Region must include the study, development and initiation, as may be applicable, of a stream restoration program in the agreed-upon portion of the East Maui Region.”

The Phase 4 agreed upon portion of East Maui is Ha‘ikū. The eleven streams in the Study Area are as follows:

Kailua	East Kuiaha
Kaupakulua	West Kuiaha
Māliko	Kākipi
Manawaiāo	Keali‘i
Kanemoeala	Konanui
Uaoa	

Figure 2 depicts the agreed upon portion of the East Maui region that is being studied.

2 PARTICIPANTS AND MEETING APPROACH

2.1 Participants

Effort was made to engage with a cross-section of community members in inclusive networks. Initial prospective participants included those who provided input in a recent social impact assessment regarding a proposed long-term water lease for the Nāhiku, Ke‘anae, Huelo, and Honomanū License Areas.¹ The prospective participants list was significantly expanded based on networking, media research, and general word of mouth.

Four small group meetings and two general community meetings were convened. Forty-six people participated in community group meetings, 11 of whom came to meetings in both Roots School in Ha‘ikū and “Laʻs Barn. They provided different comments at each meeting. In addition, 8 people provided comments only via email and voicemail. In all, 62 people participated in providing input. Table 1 lists participants in small group meetings.

Table 1: Participants in Small Group Meetings

Name	Meeting date
Brendon Balthazar, Rancher	August 12, 2024
William Jacintho, Rancher	
Council Member Shane Sinenci	August 12, 2024
Gina Young, Executive Assistant, Council Member Sinenci office	
Dawn Lono Executive Assistant, Council Member Sinenci office	
Senator Lynn DeCoite	August 14, 2024
Representative Mahina Poepoe	August 21, 2024
Charlotte Farmer, Office Manager, Representative Poepoe Manager	

¹ *Earthplan, A&B Proposed Water Lease for the Nāhiku, Ke‘anae, Huelo, and Honomanū License Area Social Impact Assessment (2020), Section 4, Preliminary Community Issues.*

Table 2 lists the 34 people who participated in a community held at Roots School on August 14, 2024.

Table 2: Participants in August 14, 2024, Meeting at Roots School

Lauren Armstrong (Brown and Caldwell)	Caroline Kempt
Eva Blumenstein (Maui DWS)	Ellen Kraftsow (Maui DWS)
Joe Burett	Mickey Lavarre
Jocelyn Cruz	Pam Lavarre
Lilia Davis	Tiffany Lindsay
Maile Davis	Phil Lowenthal
Lucienne de Naie	Ryan Luskin
Margaret Elliott	Craig Mathison
Pato Gilbrator	Paulo Mendes
Bob Grossman	Shera Mielbrecht
Pam Grossman	Niaso
Zach Grossman	Kaleo Ollech
Catherine Hanna (Oceanit)	Berna Senelly (Oceanit)
Nāpua Hū'en	Chuck Spense
Kendra Hunter	Jordan Tabura
Mō'i Kawa'akoa	Summer Wong
'Okalii Kawa'akoa	Laf Young

Table 3 lists the 23 people who participated in an August 16, 2024, Meeting at “Laf’s Barn”

Table 3: Participants in August 16, 2024, Meeting at “Laf’s Barn”

Lauren Armstrong (Brown and Caldwell)	Ka‘aina
Frank Bernard	Richard Kekiwi
Lucienne de Naie	Tiffany Lindsey
Anna Ezzy	Phil Lowenthal
Laura Ezzy	Lurlyn Scott
Patrick Fondren	Berna Senelly (Oceanit)
Nicolas Garvin	Jordan Tabura
Dan Grantham	Susan Veno
Bob Grossman	Kanealii William
Pam Grossman	Beverly Young
Catherine Hanna (Oceanit)	Laf Young
Kendra Hunter	

In addition to meeting attendance, several people submitted emails to provide comments, including some who attended the meetings. Table 4 lists participants who submitted comments only via emails or voicemails.

Table 4: Participants Who Submitted Comments Only Via Email and Voicemail

Anna Enomoto	Henry Lauren
Heather Grossman-Benton	Christopher Shuler
Lauren Lipcon	Kaleihwahiwa Thielk
Danielle Kiersx	Hau‘oli Thielk

2.2 Meeting Approach

Participants were provided a project description, a copy of which is included in Attachment A, via prior emails and at the meetings. In meetings, they were asked three questions, as follows:

1. What activities do you conduct and have observed in and around the Phase 4 streams and gulches?
2. What problems with current experiences and conditions do you feel should be addressed in coming up with a stream restoration program?
3. What suggestions do you have for us in developing a Ha‘ikū stream restoration program?

After a review of project material, participants were provided various opportunities to comment, that included:

- Post-it and written notes on 24-inch X 36-inch maps
- Comment sheets that could be submitted at the meeting or emailed
- General email to mauiwater@oceanit.com

The meetings were informal and allowed for spontaneous conversation among participants and with project team members. Discussions were free-flowing, and participants readily shared their ideas, experiences and suggestions. Many supplemented their comment sheets with follow up email. One person generously shared her experiences and knowledge about streams in the Study Area. A transcript of her audio files is contained in Attachment B: Transcript of Audio Files Provided by Lucienne de Naie on August 29, 2024.

3 ACTIVITIES IN AND AROUND HAI‘KŪ STREAMS

This section summarizes responses regarding activities in and around the Phase 4 streams and gulches.

3.1 Sense of Place

Regardless of how long participants have lived in the area, or have conducted activities in this area, there was a common and strongly felt social connection with the physical attributes of Ha‘ikū. Part of the foundation of this connection, often described as spiritual, was the network of streams that run throughout the region. Participants pointed out, in various ways, that a significant portion of Ha‘ikū residents live near streams. Their relationship with the streams has become part of their way of life, as has caring for the streams. The reduction or cessation of stream water flow is difficult and painful for them because it diminishes the mana, or life force, of the area.

For lineal descendants, the presence of streams signified the birthright of Kānaka Maoli, thereby constituting a significant cultural sense of place.

3.2 Stream and Ditch Water is Valued at Many Levels

Participants reported using stream water to grow crops such as kalo, fruit trees and vegetables, as well as general irrigation. Lo‘i kalo were maintained by several participants, and many grew fruit trees, including banana, citrus and mango. Growing vegetables was also common among participants. Agricultural activities were undertaken on stream banks as well. These agricultural activities were conducted for personal use, as well as part of business enterprises.

A healthy stream flow supports traditional and cultural practices, as well. It supports kalo cultivation, the growth of traditional herbs used for healing, and shoreline habitats that support food gathering.

When flowing, the streams support recreational activities such as swimming and provide a place for ducks and other water birds. Participants also reported collecting and filtering stream water for potable use, although this practice has been greatly reduced with the reduction in stream flow. The source of stream water varies. Ranchers have built a water reservoir that is connected by pipe to a water tank. Water is released into the water tank as needed. Farmers and other residents also use water catchment systems dependent on rainfall.

The value of stream and ditch water is also appreciated at a larger environmental level. Participants noted that sufficient water flow supports native flora and fauna, recharges the aquifer and provides the right balance of fresh and sea water to support nearshore benthic species, such as ‘opae, juvenile fish and limu.

3.3 From Mauka to Makai

For participants, streams and ditches are not static land-based features. Streams and ditches are integral to land-based and shoreline environments, and when asked about stream-related activities, participants discussed a full spectrum of land and shoreline activities.

Participants tended to describe their activities as a continuum, from the land to the streams and ditches to the ocean. They would start describing their various farming activities, such as kalo cultivation, growing casava and ulu, maintaining vegetable gardens and permaculture, and growing trees, such as citrus and bananas. Several indicated they also raise animals, including cows, pigs and horses. Participants also swam in streams when there is adequate water flow.

Ocean-related activities were equally important. In addition to providing venues for recreational activities such as swimming and snorkeling, the nearshore environment supported various edible species. Participants picked 'opihi and other shells, laid throw nets, caught Tahitian prawns, picked limu, and caught 'opae for bait. It was noted that the mouth of Kanemoeala Stream has a healthy population of native limu species, some very uncommon and there is a kalo terrace nearby. Participants also mentioned going boat fishing and diving for fish.

3.4 Presence of 'Iwi, Heiau and Other Historic Resources

The following is a sampling of areas that were identified that contain Kānaka Maoli and other historic resources. The transcript contained in Attachment B has additional information on streams and gulches.

- Keone Po'ō Beach where Ka'iwa Stream comes out is a traditional burial ground in sand dunes.
- Ka'iwa Stream has a heiau near its east (Pā'ia side) bank. Remains are reportedly still located there. Kailua Stream is a moku boundary.
- Ka'iwa Stream used to have a natural pool not far from Hana Highway in 1940s. Ka'iwa Stream had many special place names like "olo pua" (native plant). Old maps show these old place names.
- There was a stream and wetlands that came out where Mama's Fish House is now. The area was a vineyard in the 1940s.
- A stream ran just Ha'ikū side of Baldwin Avenue. There is a deep gulch for that stream mauka near the old Pā'ia gym. There are petroglyphs in gulch.
- A Kailua heiau can still be found on the Pā'ia side of the stream.

4 PROBLEMS WITH CURRENT CONDITIONS THAT SHOULD BE ADDRESSED IN A STREAM RESTORATION PROGRAM

This section summarizes responses regarding problems and conditions that should be addressed in and around the Phase 4 streams and gulches.

4.1 Significant Decrease or Loss of Agricultural Irrigation and Water for Native Plants

Participants shared a common concern about the significant decrease in water flows in streams and ditches. They shared first-hand experiences of having less water for lo‘i kalo, vegetable gardens and fruit trees. Likewise, water supplies for cattle, pigs and horses are becoming scarce, and stream-related recreation is significantly dwindling or gone. In the big picture, it was stressed that the lack of water for agriculture threatens food security for those who grow their own food and raise animals, and for those who conduct commercial agriculture such as ranching and selling vegetables, fruit and kalo. Some areas that were identified with significant decrease or loss of water include Uaoa, Māliko, Pe‘ahi, Kauhikoa, Pauwela, and Kaupakulua.

It was noted that there was a natural pond at the mouth of Kailua Stream, not far from Hāna Highway. Keiki used to swim there. However, this pond started gradually disappearing after the Spreckelsville Golf Course was established in the mid-1920s and an irrigation well was built at the pond.

Kailua Stream also served as a moku boundary between the moku of Wailuku and Hāmākuapoko. As it makes its way through Makawao Town, Kailua Stream becomes a deep gorge west of Olinda Road that includes an area known as Waihou Springs, a natural spring that fed into Kailua Stream. At one point, Waihou Springs produced enough water to support the village of Makawao. After the native ‘ōhi‘a and koa tree forests surrounding Kailua gulch were cleared to create cattle grazing pastures, the output of the stream is said to have gradually diminished. In 1909, the Territory of Hawai‘i replanted some of the area around Waihou Springs and Kailua Gulch with non-native species but the robust spring flows did not return.

4.2 Increase in Invasive Species

Participants cited several examples relating the reduction of stream and ditch water to a significant increase in invasive species. They said that invasive flora is taking over habitat previously occupied by native species and believe that the roots of invasive flora are negatively affecting aquifer water recharge. Habitats that previously supported native Hawaiian plants used for medicinal and cultural purposes have been said to be overtaken by invasive grasses and vines.

Water scarcity is also related to environmental destruction caused by feral pigs and boars. Participants explained that when streams are flowing well, wild pigs and boars come, drink and move on to the forest following their usual trails. When streams are dry, these feral animals are in distress and go into people's yards and gardens to find water and tear up everything in their paths. They eat crops and dig for water, and hunters cannot keep the feral pig and boar population down. This pattern of adapting to water scarcity is similar to those of deer and wild goats.

Participants often noted that stagnant pools in ditches and streams are breeding grounds for mosquitoes. It was also said that "rubbish limu" has been replacing edible limu.

Further, there has been a noticeable increase in coqui frogs that are considered invasive, and the area around Kuiaha Stream is especially infested. Coqui frogs eat large quantities of insects, thereby removing insects from forest floor to treetops and resulting in the loss of insect services, such as pollination. Coqui frogs also disrupt the balance of vulnerable native ecosystems and have been known to change the chemical composition of the forest floor. Participants also noted that the sounds created by coqui frogs is noisy, loud and irritating.

4.3 Degradation of Stream Ecosystem and Nearshore Benthic Environment

There were several comments regarding the degradation of the stream ecosystem. One person noted that the muliwai (estuary) behind his house has a greenish orange color, does not support any life, and smells bad. He further noticed that, when there are big rains, a flash flood of brown water would flow into the ocean. This can be a positive aspect, because hapawai (shells), prawns and 'opae start to come back, and the muliwai thrives with fish that need fresh water to multiply.

Other instances of ecosystem degradation along the shoreline due to the decrease or lack of water flowing from streams and ditches were commonly cited. Participants noted that reefs, limu, fish and other benthic species that thrive in a mixture of fresh and sea water are not supported as in previous times, and participants noted a significant decrease in these resources. It was reported that turtles are dying at the waterfall in a cove that receives water from Uaoa Stream. When the water is low or non-existent, they cannot swim out of the cove due to a rocky bottom and many die as evidenced by white carcasses lining the cove.

Participants mentioned that gathering 'opae in streams has been affected by climate change and decreasing water. They said they need to hike further mauka to gather 'opae.

4.4 Polluted and Excess Waters

Participants reported that cars, appliances and general waste are dumped into streams and ditches. Green waste, such as grass and plant cuttings, are also thrown into the streams and ditches. In addition to hindering water flow, dumping creates pollution and affects water quality both on land and in the streams. Further, these polluted waters flow into the ocean, thereby negatively impacting the nearshore water quality and benthic habitats. This requires that such waste is removed prior to restoring stream flow.

It was further noted that when the streams and ditches dry up and there are heavy rains, runoff into the ocean is muddy and silt settles on the ocean floor. One area with high water pollution is Māliko Bay, whose waters have been tested by the Surfrider Organization.

Participants were concerned that water flow is not being managed well in that there does not seem to be any management of water flow from the ditches. Excess waters released from the ditches flood the area and negatively impacts nearshore water quality, and adds silt to the ocean floor, thereby “smothering” healthy reefs and the bottom of the ocean.

4.5 Large Corporations are not Being Held Accountable

Participants expressed strong concern that for-profit agricultural corporations and developers are controlling the water supply. It was felt that private companies and corporations should not be deciding when and where to divert water, and when to release water. Further, it was felt that information was not forthcoming, and people knew about Mahi Pono operations mostly through two community members that attend quarterly Mahi Pono meetings.

It was reported that in at least one instance at Keali‘i, EMI retains exclusive easement to the water even after the land was sold and the lessee does not understand the reason for restricting water rights.

Participants further noted that the exploitation of rural Hawai‘i led to resource theft, leaving rural areas resource poor and environmentally degraded. Kānaka Maoli and long-time residents have had to adjust their operations and lifestyle to deal with “stolen” water. It was iterated that water is a Public Trust, and private control of this Trust was described as criminally negligent.

5 SUGGESTIONS FOR DEVELOPING A HA'IKŪ STREAM RESTORATION PROGRAM

This section summarizes suggestions from meeting participants on what should be covered and addressed in a Ha'ikū Stream Restoration Program.

5.1 Complete Restoration of Stream Water Flow

Section 4 covered various problems and conditions that participants identified related to Ha'ikū streams and ditches. Based on these comments, meeting participants unanimously wanted to see full stream water flow restored as much as possible.

They suggested that prior to restoring water flow, a full inspection is needed to inventory dumped and trash material in the streams and ditches. This inventory would be the basis for a stream and ditch cleanup program that should occur prior to releasing water flow.

Participants also urged the County to make sure that flow restoration is accomplished in such a manner to ensure continuous watershed management and restoration of mauka rain forests. Further, monitoring of the aquifers was strongly recommended to ensure that stream and ditch water flow restoration does not deplete or negatively impact underground aquifers.

5.2 Keep Restored Water in the Ha'ikū Region and Within the Source Ahupua'a

Participants wanted to make sure that water restored for Ha'ikū is distributed to residents and farmers in this region. They did not want to see restored waters transported to other regions, particularly West Maui resorts and Mahi Pono agricultural fields. Ideally, water from one ahupua'a should be prioritized for uses within that ahupua'a. It is noted that variations of this comment were expressed in small group and community meetings.

5.3 100% Transparency

Participants suspected that EMI and Mahi Pono have not been forthright in reporting their use of water and management of the ditch system. They further believed that the State of Hawai'i and Maui County were allowing these private companies to do whatever they want. Participants called for full transparency from these entities and suggested easily accessible maps that show the entire ditch system, including diversion locations and timing, diversion quantities. Further, it was suggested that surveillance cameras be installed in key diversion locations to record 24-hour coverage. Those videos, they said, should be available live and in real time on a County-sponsored website.

It was noted that Kailua gulch has been transformed in sections by plantation agriculture and residential development, and strongly suggested that its hydrology be fully studied as part of this Phase 4 effort. Of particular interest would be the effect of the pumping of various former Hawaiian Commercial and Sugar Company (HC&S) wells in the Pā‘ia aquifer, now managed by Mahi Pono. Wells in the vicinity of Kailua gulch include State wells 6-5423-001, 6-5422-001 and 6-5323-001. Pumping records and chloride levels for those wells and any others in the general area of Kailua gulch should be considered in developing the program for stream restoration in terms of any effect groundwater pumping from shallow “skimming” site wells could have on flows in Kailua Stream. During heavy rainfall, Kailua gulch regularly floods Baldwin Beach Park where it enters the ocean in what appears to be a narrowly engineered channel.

5.4 Major Revisions to Management and Public Policies

Participants suggested that management of the ditch system be under the full control of a non-profit agency whose major purpose is to ensure fair distribution of water, best management practices and other mechanisms that promote optimal use of water resources. This non-profit agency would set reporting criteria and requirements. Private companies, such as Mahi Pono and EMI, would need to report to this non-profit management agency.

Additionally, participants urged lawmakers and agencies to prioritize water distribution for farmers, cultural practitioners and affordable housing. Private market housing and resort development should not be on the priority list.

It was suggested the County use eminent domain to establish public access to streams and the ditch system so that the community can observe conditions first-hand on said lands.

In terms of water infrastructure, participants felt that any flow restoration program should include reservoirs and catchment systems to store water when flow is sufficient. Water can then be released through a county transmission system when additional flow is needed.

5.5 Resource and Information Hub

Except for a few individuals, participants felt they have little or no access to information regarding stream and ditch flow and maintenance. Various suggestions for information in a centralized and County-run web site included:

- Previous and current water feasibility studies
- Links to the State Water Code and other legislation
- Solid data that shows how much water is available, and how diversion affects each stream, such as diverted flow and frequency
- How the County is distributing water

- How to identify and reduce invasive species in the watershed and along ditches and streams
- How to document and report problems related to water flow and diversion
- Opportunities for community volunteers in monitoring, trash collection, data gathering, etc.

5.6 Increased Communication Between Maui County and the Community

While participants welcomed being consulted as stakeholders in these Phase 4 efforts, they strongly urged the County and elected officials to continue community conversations about a stream restoration plan for Ha'ikū streams and ditches. They suggested that consultations be ongoing and proactive, and prior to any plans being adopted. Invitations should also be mailed and widely disseminated beyond emails and social media.

ATTACHMENT A
OUTREACH COMMUNICATIONS TO SOLICIT
PARTICIPATION

FEASIBILITY STUDY FOR EAST MAUI WATER SOURCE DEVELOPMENT

PHASE 4 STAKEHOLDER CONSULTATIONS

AUGUST 2024

THE 4-PHASE FEASIBILITY STUDY FOR EAST MAUI WATER SOURCES

The Maui County Department of Water Supply (DWS) is conducting a Feasibility Study to explore new water sources and related water infrastructure to meet drinking water needs identified in the Maui Island Plan. Studies are being conducted in four phases as shown in Figure 1.

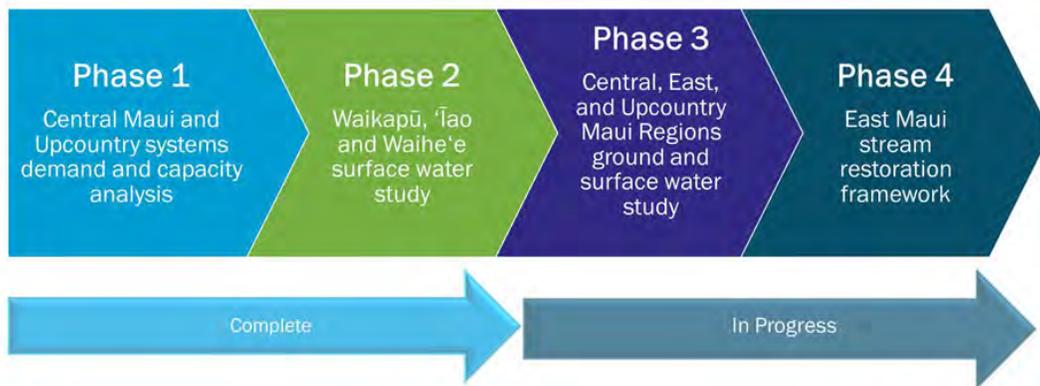


Figure 1: 4-Phase Feasibility Study for East Maui Water Sources

Phase 1 was an analysis of water systems demand and capacity in the Central Maui and Upcountry system. This phase has been completed.

Phase 2 was a study of the availability of surface water and a cost/benefit study for possible surface water sources from Waikapū Stream, Wailuku River and Waihe'e River. The amount

available to divert from a stream is legally limited by established Interim Instream Flow Standards (IIFS): “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.” A Ka Pa’akai Analysis was completed for Phase 2.

Phase 3 is a rigorous cost / benefit study of surface and groundwater resources available in the Central Maui Region, the Upcountry region and the East Maui region. This study includes an evaluation of economic and environmental factors that would help in understanding if these water sources would be feasible and how the water would be transmitted to meet potable water needs. A Phase 3 Ka Pa’akai Analysis is currently being conducted.

Phase 4 is the current phase and involves an East Maui Stream Restoration Framework that will identify steps, timeline and potential implementing partners to restore flow to streams in the Ha’ikū area.

PHASE 4: EAST MAUI STREAM RESTORATION FRAMEWORK

The Consent Decree in *The Coalition to Protect East Maui Resources v The Board of Water Supply, County of Maui (2003)* set forth requirements that the (DWS) must meet before initiating development of water resources in the agreed upon portion of the East Maui Region. The 2003 Consent Decree stipulated that any effort to develop groundwater resources in East Maui will be treated as a new project. Further, before any new project is planned, DWS will undertake a rigorous Cost/Benefit Study of the surface and groundwater resources in the Central Maui Region, Upcountry Maui Region and East Maui region.

The Consent Decree states: “The County agrees that as long-term agricultural water needs are reduced, a stream restoration program will be studied, developed and initiated by the County. As such, the County agrees that one component of any plan or program to develop further water resources in the agreed-upon portion of the East Maui Region must include the study, development and initiation, as may be applicable, of a stream restoration program in the agreed-upon portion of the East Maui region.”

The Phase 4 agreed upon portion of East Maui is Hā’iku, as depicted in Figure 2. The eleven streams in the Study Area are as follows:

Kailua	Kaupakulua
Māliko	Manawai’iao
Kanemoe’ala	Uaoa
East Kuiaha	Keali’i
West Kuiaha	Kakipi
Konanui	

OVERALL FRAMEWORK FOR THE PHASE 4 STREAM RESTORATION PROGRAM

The Phase 4 Stream Restoration Program will encompass components identified in Figure 3.

Figure 3: Phase 4 Stream Restoration Components



PHASE 4 STAKEHOLDER CONSULTATIONS – AUGUST 2024

Phase 4 Stakeholder Consultations are very early in the planning and development of the Stream Restoration Program.

The purpose of Phase 4 stakeholder consultation is to help **develop criteria** that will help guide and shape the Stream Restoration Program. We are soliciting your input regarding:

- 1. What activities do you conduct and have observed in and around the Phase 4 streams and gulches?***
- 2. What problems with current experiences and conditions do you feel should be addressed in coming up with a stream restoration program?***
- 3. What suggestions do you have for us in developing a Hā'iku stream restoration program?***

Your input will help shape **guiding principles** as we proceed in developing the Phase 4 Stream Restoration Framework. We respectfully ask for your input and will be contacting you to establish an optimal time to meet. If you have questions, please email Berna Senelly at mauiwaterstudy@oceanit.com. She may also be reached by phone at 817.422.1372.

**ATTACHMENT B: WRITTEN TRANSCRIPT OF
AUDIO FILES PROVIDED BY LUCIENNE DE NAIE
ON AUGUST 29, 2024**

Written Transcript of Audio Files Provided by Lucienne deNaie on August 19, 2024

Part 1

Aloha, this is Lucienne deNaie and I am giving some comments to the phase four stakeholder consultations on the haiku streams to Oceanit. I am a resident of Huelo for forty years and I currently serve as President of the Community Association in Haiku as well as the chairperson of the Sierra Club, Maui Group.

As for the first question, what activities do you conduct or have observed in and around the phase four streams and gulches? I have a lot of things to contribute in this category. I am familiar with most of the streams having hiked to the ocean portions of the stream between the Hana Highway and the ocean, and in some cases also hiking the streams above the Hana Highway.

What I have observed in general is that many, many people use this coastline where the streams discharge. I have seen folks fishing gathering, you know, picking opihi, gathering limu. I have seen folks just recreating with their families, you know, just going in the ocean and playing in the estuaries where a few of the streams where they come down actually create like little shallow bays and you know, kids come down and play in them. So there, there's a lot that goes on in these streams. Also, mauka a number of people depend upon the streams when they can for water for their farms. There's lots of agricultural land in Haiku and lots of people are very sincere about wanting to have fruit trees and/or even row crops on their lands and that takes water. Not everyone in Haiku can get access to county water. In fact, if you didn't get access to county water about twenty years ago, you're still waiting probably if you're on that upcountry water meter list. So the streams and the water supply that they could offer is extremely important to many families on different streams.

One of the streams that has a lot of different farming families is East Kuiaha, and that stream also discharges into a county wilderness preserve. It's called the Hāmākualoa open space preserve. It's a three hundred acre preserve and along two lots of it, the Haiku area there East Kuiaha Stream, that kind of wiggles its way along the boundary of the what's called Lot Four and Lot One and Lot Five of the Hāmākualoa Preserve. East Kuiaha Stream has traditional fishing access and also there is terrific evidence in the Gulch. I've hiked that Gulch all the way from Hana Highway all the way to the ocean. And there are so many beautiful, large, beautifully constructed low E that were used to grow.

Kalo or other crops that are on both sides of the stream bed. There's also the Waikikena heiau that overlooks the stream. There are a number of house sites and other Hawaiian remains. There will be a in depth archaeological survey conducted as part of the Park Master plan. There was kind of a cursory survey done when the lands were put up for Sale by A and B, but there's really a lot going on along East Kuiaha Stream and mauka of the highway on East Kuiaha is farm after farm, where folks really when they have flows use the flows to irrigate their farms. So that's the stream that really needs a lot of attention in terms of restoration potential.

West Kuiaha is much the same West Kuiaha Stream, where it comes into the ocean is not on the counties Hāmākualoa Preserve, but it is part of a large preserve area that has been purchased last year by Kamehameha Schools and Kamehameha Schools is very committed to utilizing the land for conservation and to some extent some traditional agriculture and possibly other agriculture. But they really see places like Kuiaha Bay, which is also called Puniawa Bay. They see these as places that students from their schools and other schools can come and see first hand how Hawaiian culture worked.

The Bay where West Kuiaha Stream comes down is a beautiful, sheltered landing. It's a legendary fishing area. There are tide pools there that are utilized recreationally for swimming, they're colloquially called the birthing pools, although there's no evidence I've ever seen that they were used for birthing activities, but they might have been, but they're safe to access and they're right along the coast there where the Kuiaha Stream comes out into the ocean. There's also a famous fishing area in West Kuiaha Stream Bay, called Sharks Pit and sharks were known to come into this area and local fishermen would rig up hooks above the ocean with baited carcasses of dogs or even cows sometimes, and lure the sharks to go for the bait and then spear the sharks and haul them in. There are many fishing caves that are along the side of the bluff where the stream enters the ocean. It's a very important cultural area.

There's an estuary area along the I would say the Haiku side of the bay and that estuary. Unfortunately, the stream flows have been so limited in recent times. It's sometimes just a little trickle or dried up, but this whole area of West Kuiaha, the valley and the stream that meanders through it, have countless archaeological remains. Lots of evidence of past agriculture.

And I am aware, and others are aware, that about twenty to twenty five years ago, Alex Bode who is a, was a master farmer and source of cultural knowledge, Hawaiian cultural knowledge. He conducted a kids program empowerment program in that valley and he had the students work with him to plant all kinds of useful food trees. So there's groves of avocado trees, ulu trees, citrus trees, banana trees, manioc, all kinds of things growing in that valley along the stream. This is now owned by Kamehameha Schools and my understanding is that they want to enhance and care for this food farm. Basically, that exists along Kuiaha Stream West Kuiaha Stream. However, the stream does not flow regularly now. It used to years ago. I remember it well. This is also a favorite surfing spot of many of our community. It's called K-Bay or Kuiaha Bay. And if you look it up, you'll see references to people surfing K Bay on an eastern swell. I myself surfed there many years ago, when I was younger and out in the waves a lot. And it's just a beautiful Bay. And you really saw people down there, fishing, gathering, throwing net - very, very used by our community and very, very appreciated by our community.

And the streams at that time I'm talking like the nineteen eighties actually had flow at least some of the year. Now it's fairly rare when there is flow. I believe that Surfrider Foundation does do some water quality sampling at Kuiaha Bay, and it would be good to grab data that they have been collecting for the past four or five years at that location. Just to see you know how the presence of the stream water and you know how it is in the ocean, but I can't emphasize enough that both West and East Kuiaha Bays should really have fully restored streams and the streams that flow into both of them have various tributaries like the West Kuiaha has the Waikina tributary that meanders through Haiku. In some places it's labeled as Lilikoi Stream, but it too is an important water source, and there are farms that depend on the tributaries of West Kuiaha.

There's also farms that depend on tributaries of East Kuiaha. There's a few small tributaries. I do have access to old maps that have the old place names for the tributaries. I don't know if you folks do, but if you get serious about this, those maps could be provided.

There are other streams that I didn't note that Kanemoeala Stream, which is the first stream past Māliko Gulch and is a very culturally important area as well. I wrote a lot on the map about it. It is not on your folk's map. Now it may not be on your map because maybe East Maui irrigation says, oh, we don't divert that stream. You know it starts below our diversions, it's spring fed, it's this, it's that. Well, it really should be in the discussion because it does appear that there's an intake off of one of the branch of Māliko stream near where it intersects with the stream system that goes down to the ocean at Kanemoeala.

Kanemoeala is colloquially known as the Watercress Farm here in Haiku because there is a long standing use down at the ocean part of the stream watercress is growing there in abundance, and I think the Arakaki family actually grew watercress there commercially.

The county of Maui recently purchased a parcel of land that's eighty-two acres between the Pa'wela Lighthouse and Kanemoeala stream that they have basically, I think they own the pali that drops down to the Haiku side or Hana side of the stream. But when you go down to that stream, it's just remarkable. There's so much fresh water bubbling up there, so there is a natural spring there as well. I think even Stearns and McDonald back in the Forties noted that there was spring activity there. But there is so much abundance of limu. You see limu kinds like limu kala that you hardly see along our coast anymore. Only a few places, but it grows in abundance there. I believe. There I went there with Angela Kepler, Doctor Kepler who's a noted naturalist. I think she counted in just the short time we were there seven species. That is an area where people go to fish. Obviously if you have that abundant limu and that freshwater coming down, you have fish coming in to eat the limu. And so it is a favorite fishing spot. Several of the people who came and gave their mana'o at our public meetings in Haiku mentioned that that was a spot where they go fishing at Kanemoeala. It was also mentioned that the endangered Native Hawaiian bees use that area for habitat.

So it's a very, very special place and we must do everything we can to make sure if those waters are not diverted, fine. But we don't want anything to happen that could possibly upset the groundwater balance and with result in those underground flows being disrupted in any way, it may be that this is a stream that runs more underground than above ground. And so folks don't see it. And so they don't know it's there, but there is certainly an abundance of water coming into the ocean at that spot.

Moving over in the HANA direction, so you have Kanemoeala, you have Māliki Gulch going back in the Paia direction. Many people are concerned about Māliki Gulch. Obviously, it comes out to the ocean. And there's an area there that was an estuary for years and years.

I've been here off and on since nineteen seventy-two and that functioned as an estuary for most of the early days of my awareness. Lots of people come there to fish. People launch their boats there to go fishing. People launch there to go surfing. People launch their to go kayaking around the east side of Maui. It's really a very, very used area.

Māliki itself has a lot of cultural importance. If you just go a little bit mauka, there's all these remains of amazing large low east systems, ponds, you name it, rich, rich soil, the trees. Tracy Stice had a farm there for years that I think he's now deeded over to the Kimokea Foundation, but every fruit tree on that farm was giving fruit twice the size of other fruit trees that the soil is so good there.

So folks who farm upstream more by Kaluanui, there's a whole cluster of small farms up there. The Sacred Garden, Sidney Smith 's place with her husband, Lauren Lipcon, and all of these folks really have not seen much in the way of flows in Māliki, even though A and B and Mahi Pono swear that it's not diverted.

So we really need to look into deeply whether there are tunnels that may not be considered dam diversions but are actually extracting waters that would be flowing in Māliki. The maps, the Old Stearns and McDonald's maps, show a variety of springs and tunnels in the sides of the of the Gulch of Māliki Gulch are those still operant? Is any water being extracted from them? It's really something we should know.

Written Transcript of Audio Files Provided by Lucienne deNaie on August 19, 2024

Part 2

This is part two of the consultation on phase four haiku streams. This is Lucian Dinay continuing part two. I'm making them into files that hopefully can be successfully emailed.

Let me continue with Māliko stream and Māliko Gulch. It's important to understand that Māliko stream has tributaries that go way up. You know, past Makawao town. And I have hiked and visited. There are some pools up there on one of the tributaries above Makawao and those are very valued for recreation purposes. I'm not sure what the state of those pools are. I haven't been there in a number of years, but that used to be kind of a neighborhood place to go and hike down to. Also Māliko Gulch not far above Hana Highway. So we're going downhill again, makai again has a tributary branch that juts off that has a remains of a of a heiau, probably agricultural. And as I mentioned before, lots of prominent lo'i or kalo growing areas and that area was at one time kind of restored by Brian McCafferty and his youth program teams. He got some sort of a grant to replant these with kalo and I guess they had enough water from the stream to water the kalo. I don't know if it was dry land or wetland. Probably dry land kalo. But anyway the kalo was then harvested by the Youth Teens on Call and sold as a luau leaf, very much in demand. People like fresh kalo leaves to, you know, wrap laulau in and, you know, use for various cooking purposes, like kalo coconut soup with luau leaf in it. They had quite a nice market for growing and harvesting those leaves and the area they utilized was a tributary of Māliko Stream. That was a little bit above where all a housing subdivision that's called Haiku Makai, is located. So this was a little bit mauka of Haiku. You just hiked up this valley. I got taken there a couple of times and was just impressed by how much kalo was growing there and how beautiful the restoration was. You could really see the lo'i systems there and what this tells you is Maliki 's, you know, stream had a lot of water. No one invests in a lot of structures to grow kalo. If there hasn't been a regular flow of water coming through that area.

So the people of old really leave us a very clear, I think blueprint, for how the waters ran at one time, how they once ran

Moving away from the west side of a Haiku and going more towards the central part, we have a series of streams that also go through the County's three-hundred-acre Hāmākualoa open space preserve. One of them is called Konanui and one of them is called Kaupakulua. And that's the West Kaupakulua. And then there is also the east branch of the stream and Manawai'iao now the county preserve has a Konanui and the west branch of Kaupakulua.

And beyond that, the other streams I mentioned are on land that was also purchased by Kamehameha School. It is also preserved land that the intent is to restore it as much as possible to a healthy ecosystem and to allow traditional use and also food production on the land because these are former pineapple fields.

They once did produce food in the upper slopes of the land the flat slopes and in the gulches. Hawaiians grew kalo, sweet potatoes, bananas. An abundance of food. Ulu, and there's remnants still there. So all of these streams that I just mentioned continued couple Konanui, Kaupakulua west and east branch, Manawai'iao all have the potential to feed people.

They all have various levels of recreational use. Konanui comes out at the ocean on a cliff, so it doesn't come out, you know, at the ocean floor level. But it's a very, very popular fishing spot. There's like a little

kind of spit of land down there and there's a trail that's called Step Ladders. It's a zigzaggy trail that starts out by going down some step ladders and folks go down that trail and go fishing and opihi picking and gathering down along the coastline that gives access to that part of the coastline.

The stream does not flow like it really should but the Gulch is beautiful and has many, many remains of Hawaiian cultural and agricultural activities. The Malama Hāmākua Maui, which is a nonprofit group that manages the preserve area there for the county is very interested in restoring farming, both traditional crops and also other useful crops like citrus etcetera to that area, but would need a regular supply of water. So that stream is intersected by the new Haiku ditch. Not sure if it's diverted or not. There is a diversion on Kaupakulua, but I've been told that it's open and the water is being taken at the new Haiku ditch. Not sure if that's always going to be true or if it was just the month that I asked Mahi Pono. So that's something that this study should really investigate.

Which one of these you know these streams that are present in public land? What's the diversion status? Either on the public land or in the Lowry ditch, or the Kalekoa ditch, or Wailua ditch above the public lands? What is really being diverted and is that something that is a permanent state or happens some of the time and then some of the time. the water just isn't diverted, isn't needed. We should really answer those questions.

Kaupakulua really has a lot of tributaries as well. There's a big reservoir that is mauka of the highway that was one of the casualties of the big storms of early twenty, twenty one and you know, because of that storm, the reservoir had to be decommissioned and was so after that but ' Ōpaepilau which is one of the tributary streams that runs into that that whole large gulch of Kaupakulua does have pools and waterfalls that people use recreationally. I myself have visited one or two just from, you know, people 's backyard trails. There's just a whole system of life there. Folks have farms along these streams.

Kolealea Stream is another tributary. Folks are farming along that stream as well. They were pretty hard hit by the floods as well, but these are very complex stream systems and they should be carefully mapped. And more interviews if needed, with folks who couldn't make it to these meetings so we understand who uses the tributaries because we have to keep in mind probably very few people have ever registered diversions, they just didn't know. You know what the process was and they didn't know that they could, you know, count on the stream being there all the time.

Other streams, if you keep going in the HANA direction past called Kaupakulua and Manawai'iao, you get to Uaoa Bay and Uaoa Stream is quite a quite a complex system it goes way up mauka of the highway. There's a number of farms and traditional users. There's one lo'i complex that I came across just in the old Mahele records and I happen to know the family that that owns it now. It's an old Land Commission award parcel. It was registered as having dozens of lo'i right there along that stream. So once again, that tells me that that stream had flows.

Uaoa comes down to the ocean in a very unique place it makes kind of a big turn and then it goes over the Cliff as a waterfall and a pool has formed underneath right at the ocean. One of the few places that you have a pool right at the ocean that has large boulders on the makai side on the ocean side, so it holds in the water of the pool and it's very well known. Well, not very well known, but it is known if folks have hiked in that area, which I personally have for twenty years or more as a place with a honu or the threatened green sea turtle swim in and like to bask around that pool. And in that pool and the pool is a combination of ocean water and fresh water from the stream. And one of the folks who came out to give their manao during the phase four meetings we just had in Haiku pointed out how sad it is that when that stream dries up, there's not enough water bridge to let the honu go back to the ocean. Normally, if the stream flows, the whole new can just swim over the rocks. There's enough stream water to fill up the pool

and allow the honu to swim among the rocks and over the rocks and back out to sea. But when the flows dry, they're trapped there and they just die and they area threatened species.

And we really should make sure that Uaoa is one of those streams and its tributaries. That is very, very carefully studied. There is also a very unique place that is a little bit between the Huna highway and the Whatever they call themselves, they're holio pilina subdivision or people call it the Holokai subdivision. But there's this special little island between two branches of Uaoa Stream, and it's been known as the name the Valley of the Mist. And of course, Uaoa kind of means like the misty rain in Hawaii and is one of the meanings in Hawaiian.

But this locale was lovingly restored by a gentleman who lived in Huelo that I knew and many others knew. If you lived here in the old days named Tim Shenk and he was, I think, a plumber by trade, but he just spent all of his free time. He bought this little piece of land from a Hawaiian family who were not interested at the descendants of this Hawaiian family were not interested in in farming it for kalo. They did. They did have some cattle there, but Tim told them that he, you know, wanted to restore it to grow color there and they sold it to him and he just lovingly rebuilt it. And it's just a magical place that has, like, a couple small structures on it and it is now owned by someone else because he sadly passed away at a young age.

But there are stories associated with the former owners, the wife of the couple, and this is around, you know, the early nineteen hundreds, the late eighteen nineties. A couple lived there and farmed there, and the wife of the couple was the Hawaiian couple was very much connected to the mono, the shark. It was the aumakua for her family and so she would go down when they were hungry. She would go down to Uaoa Bay and she would call in the Sharks and they would just herd fish to her and she would catch all the fish. They need and bring them back and they were, you know, always provided. One day, that particular mana who was her aumakua was supposedly captured by a fisherman who came from another place and came in and said, oh, you know, I'll go fishing in this Bay. Uaoa is probably the longest Bay along our coastline. It's a very, very large Bay. And so it's a place where fishers go in their boats and hang out and fish off the coast. So this person caught the aumakua shark and the legend says that you know, shortly after the woman who was so closely connected to this mano passed away and her husband followed her soon after. And I think it was their son that told the story or shared the story with Tim Schenk. And so these were I believe his parents. So he was an older man by the time Tim acquired the land of maybe the early seventies, you know, fifty years ago, but it, it remains that little island in the stream and it was a place that had lots of loi, so it must have had abundant water supply at one time or no one once again would have put the work in to create all those planting areas.

But I could go on and on about Uaoa. It's just such a beautiful valley and a beautiful stream. And it's heartbreaking to hear that the flows have been very, very intermittent in the past few years. It flowed almost all the time when I hiked there twenty years ago, twenty five years ago, in the nineties and the early two thousands, I hiked there regularly and I had friends that lived there and went down there all the time and there were always some flows, but evidently something has happened and a number of people that came to the public meetings do live in that area and they said what happened to our stream?

Moving over to the Hana direction of 'Awalau stream, also 'Awalau kind of flows into the whole rich valley of Uaoa as well, but 'Awalau stream and the neighborhood of 'Awalau off of Paupukaloa Road they they're just used to having their stream flow. It's considered one of the rainiest places in Haiku, but a number of the folks who came to the hearings reported that the stream was down to a trickle if, if not dry. I have heard the same thing I have recreated in that stream. I've had friends who lived up near the r Hanzawa 's store, where 'Awalau Road comes in to Kaupakulua Road and for years, you know, I visited

various friends in that area, went swimming in the stream. It's a place that's very, very popular and very much beloved because the neighborhood there is extensive. A number of rural flame families live there and farm there. So that stream also is an important stream to look into at one time, the county had a tunnel there, the 'Awalau tunnel that they shared with Maui Land and Pine, and they extracted water from that tunnel be part of the county water system.

I'm not even sure if that tunnel has enough water for the county to take any in recent years, but they did back in the nineteen seventies and maybe even into the nineteen eighties and nineteen nineties. So that should be a question that the county does a little research and see when they stop taking water from 'Awalau tunnel, or if they're still taking water from 'Awalau tunnel and where it goes and how it might be connected to the streams.

Also going a little bit further east, you have the whole complex of streams that come down to Halehaku. Halehaku Bay is the kind of the dividing line of the area for Phase four. It is a cultural treasure down there, there's a gigantic the Halehaku heiau. Gigantic stone structure with walls, you know, towering eight, ten feet high, built into the side of the hill. Other smaller structures, shrines, house sites, acres and acres of lo'i if you hike up the various, there's two main branches of the stream and if you go up either branch that they're both just surrounded by extensive lo'i for growing kalo. There's also some very rare plants up there. My kumu Ed Lindsey told me a lot about Halehaku Bay and said that there's a special underwater koa fishing there that attracts the fish that was built by one of the spiritual leaders of the area and blessed and, you know, duly consecrated. He also told me that that area has a very special variety of lauhala of the pandanas that grows there. It's the type that when it dries the leaves are red rather than just a more of a beige or tan color. And so it's very prized. He took me there and the late Renee Silva, but both of them have passed away now.

But we went hiking all over those valleys and all they had so much to say about them. That land too is now owned by Kamehameha Schools, and there's about three or four different tributaries. These that come and flow together into Halehaku stream, there's a big estuary there. Folks come down to go fishing all the time. People go fishing in the Bay all the time. They go spear fishing. People come in with their boats. It's very, very recreationally used. It's culturally used. It's a very, very important stream.

Well, I've just blended in both what I know about activities in these streams and the extent to which those resources and rights will be affected by, you know, the potential of restoration.

And so I've tried to answer question one and two in this narrative. The problems and experience this should be addressed as far as suggestions for developing the Haiku stream restoration program, my main advice is don't make this a rush job. We took years to dig out what was really going on with the streams in East Maui and because of it, when restoration did happen.

It was a more thorough process, so there is no need to rush on this. Let's get all the data we need. It's a mysterious system. There are four levels of diversions. There's portions of the old Spreckelsville Ditch still exist in haiku. We assume they're all disabled, but you know without somebody really checking it out, it's hard to say. We're finding that there's a ghost section of that old Spreckels ditch from eighteen eighty two that was not disabled up above whole lava stream outside this this study area, but it's now being disabled so we we really need to know what's going on. It's an area where water has been extracted for almost a hundred and fifty years since eighteen seventy eight with the old Hamakua ditch the A and B ditch and the eighteen eighty two for the Spreckels filled ditch.

So we really need to give it the time to get the information before any application for modifying in stream flow standards is filed because I will tell you the state does the best job they can, but they really depend

upon the community to provide the on the ground information. There's no way that a couple of state hard working hydrologists can go out and know what people have learned in lifetimes, so mahalo for this opportunity to comment and I look forward to being involved with this study.

East Maui Water 2003 Consent Decree Map

-  Area shown in hand drawn map
-  Projected area shown on hand drawn mp

