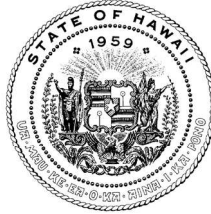


DAVID Y. IGE
GOVERNOR OF
HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 22, 2021

Ms. Mary Alice Evans, Director
State of Hawaii
Office of Planning and Sustainable Development
Environmental Review Program
235 S. Beretania Street, Room 702
Honolulu, HI 96813

SUBJECT: Final Environmental Assessment and Finding of No Significant Impacts for the Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation Project in the Hanalei District on the Island of Kaua'i

Dear Ms. Evans,

With this letter, the Department of Land and Natural Resources, Land Division hereby transmits the Final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation Project situated at Tax Map Keys (TMKs) (4) 5-4-003:999, 5-5-005: 999, 5-5-006: 999, 5-5-007: 999, 5-5-008: 999, 5-5-009: 999, 5-6-001: 999, 5-6-002: 999, and 5-6-004: 999 in the Hanalei District on the island of Kaua'i for publication in the next available edition of *The Environmental Notice*.

The Draft Environmental Assessment was published in the June 8, 2021 edition of *The Environmental Notice*. Comments received during the 30-day comment period and the Applicant's responses are included in the FEA-FONSI. We are providing this FEA-FONSI electronically via the "Submittal Form for HRS Chapter 343 Publications in the Periodic Bulletin."

If there are any questions, please contact Ian Hirokawa at (808) 587-0420.

Sincerely,

A handwritten signature in cursive script that reads "Suzanne D. Case".

Suzanne D. Case
Chairperson *RT*

c: A. U'ilani Tanigawa Lum
Kapua Sproat

From: webmaster@hawaii.gov
To: [DBEDT OPSD Environmental Review Program](#)
Subject: New online submission for The Environmental Notice
Date: Friday, October 1, 2021 11:55:55 AM

Action Name

Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation

Type of Document/Determination

Final environmental assessment and finding of no significant impact (FEA-FONSI)

HRS §343-5(a) Trigger(s)

- (2) Propose any use within any land classified as a conservation district

Judicial district

Hanalei, Kaua'i

Tax Map Key(s) (TMK(s))

(4) 5-4-003:999; (4) 5-5-005: 999; (4) 5-5-006: 999; (4) 5-5-007: 999; (4) 5-5-008: 999; (4) 5-5-009: 999; (4) 5-6-001: 999; (4) 5-6-002: 999; (4) 5-6-004: 999

Action type

Applicant

Other required permits and approvals

Right of Entry, Non-Exclusive Easement, Request for Water Lease, Watershed Management Plan, DHHL Reservation or Statement of No Reservation, Interim Instream Flow Standard

Discretionary consent required

Long-term water lease

Approving agency

Department of Land and Natural Resources

Agency contact name

Ian Hirokawa

Agency contact email (for info about the action)

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(808) 587-0400

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[Map It](#)

Applicant

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[Map It](#)

Was this submittal prepared by a consultant?

Yes

Consultant

Tridason LLC

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Consultant address

PO Box 1361
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[Map It](#)

Action summary

Wai'oli Valley Taro Hui, Inc. ("Hui") will be requesting a 65-year water lease from the Board of Land and Natural Resources ("BLNR") for the ongoing traditional and customary Native Hawaiian use of water from Wai'oli Stream for lo'i kalo cultivation, a cultural practice that has fed Wai'oli Valley and its neighboring ahupua'a and people for centuries.

Based on historic and existing use of this traditional irrigation system, and consistent with the Hawai'i Commission on Water Resource Management's 2021 numeric Interim Instream Flow Standard ("IIFS") for Wai'oli Stream of 4.0 million gallons per day ("mgd") the Hui is requesting all water in excess of the amended IIFS, up to 13.5 mgd, as needed to support lo'i kalo cultivation on private land outside the Conservation district.

Reasons supporting determination

See section 7.1 of the EA.

Attached documents (signed agency letter & EA/EIS)

- [Waioli_Final-EA_8.27.21.pdf](#)
- [Transmittal-Ltr-to-ERP-re-FEA-FONSI-for-the-Waioli-Taro-Hui.pdf](#)

Shapefile

- The location map for this Final EA is the same as the location map for the associated Draft EA.

Authorized individual

A. Uilani Tanigawa Lum

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

WAI'OLI VALLEY TARO HUI LONG-TERM WATER LEASE FOR TRADITIONAL LO'I KALO CULTIVATION

FINAL ENVIRONMENTAL ASSESSMENT
FINDING OF NO SIGNIFICANT IMPACT

Kaua'i Mokupuni, Halele'a Moku, Wai'oli Ahupua'a, Hanalei Kalana

Applicant:

Wai'oli Valley Taro Hui, Inc.



Prepared by:

A. U'ilani Tanigawa Lum
Terina Fa'agau
Devin Kamealoha Forrest
Gloria Leilani Palma

with

The William S. Richardson School of Law's
Native Hawaiian and Environmental Law Clinics

In partnership with:

Tridason LLC

August 2021

WAI‘OLI VALLEY TARO HUI LONG-TERM WATER LEASE FOR TRADITIONAL LO‘I KALO CULTIVATION

FINAL ENVIRONMENTAL ASSESSMENT – FINDING OF NO SIGNIFICANT IMPACT



Kaua‘i Mokupuni, Halele‘a Moku, Wai‘oli Ahupua‘a, Hanalei Kalana

TMKs: (4) 5-4-003:999, (4) 5-5-005: 999, (4) 5-5-006: 999, (4) 5-5-007: 999, (4) 5-5-008: 999, (4) 5-5-009: 999, (4) 5-6-001: 999, (4) 5-6-002: 999, and (4) 5-6-004: 999

Approving Agency:

Department of Land and Natural Resources - Land Division
Kalanimoku Building
1151 Punchbowl St. Honolulu, Hawai‘i 96813

Prepared for:

Wai‘oli Valley Taro Hui, Inc.
PO Box 1289 Hanalei, Hawai‘i 96714

Prepared by:

A. U‘ilani Tanigawa Lum, Terina Fa‘agau, Devin Kamealoha Forrest, and Gloria Leilani Palma
with The William S. Richardson School of Law Native Hawaiian & Environmental Law
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In partnership with: Tridason LLC
PO Box 1361 Honolulu, Hawai‘i 96807
info@tridason.com

August 2021

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Appendices

- A. Summary of Pre-consultation Outreach for the Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation. (“Pre-Consultation”).
- B. May 18, 2021 Commission on Water Resource Management Staff Submittal: Amend Interim Instream Flow Standards for Wai‘oli Stream in the Surface Water Hydrologic Unit of Wai‘oli (2018), Wai‘oli Stream, Halele‘a, North Kaua‘i. (“CWRM May 2021 Submittal”).
- C. I Mano ka Wai‘oli: Sustaining the Joyous Waters, A Cultural Impact Assessment of the Wai‘oli Lo‘i Kalo Irrigation System in Kaua‘i Moku, Halele‘a Moku, Wai‘oli Ahupua‘a, Hanalei District. Prepared by Nohopapa Hawai‘i, October 2020. (“CIA: I Mano ka Wai‘oli”).
- D. Draft EA Public Comment Letters and Responses.

1. Introduction

1.1. Project Summary

Project Name:	Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation
Applicant:	Wai‘oli Valley Taro Hui, Inc. PO Box 1289 Hanalei, Hawai‘i 96714
Agent:	Tridason LLC PO Box 1361 Honolulu, Hawai‘i 96807 Contact: Tricia Dang, Principal Telephone: 808.542.9251 / Email: info@tridason.com A. U‘ilani Tanigawa Lum Email: anelatan@hawaii.edu
Approving Agency:	State of Hawai‘i Department of Land and Natural Resources – Land Division 1151 Punchbowl St. Honolulu, Hawai‘i 96813 Contact: Ian Hirokawa Telephone: 808.587.0400 / Email: ian.c.hirokawa@hawaii.gov
Recorded Fee Owners:	State of Hawai‘i Department of Land and Natural Resources – Land Division Kalanimoku Building 1151 Punchbowl St. Honolulu, Hawai‘i 96813
Chapter 343, HRS Trigger:	Use of water that originates on State land and flows through the State Conservation District
Project Location:	Wai‘oli, Kaua‘i (Figures 1 and 2) Hanalei Kalana
District:	Hanalei, Kaua‘i
Tax Map Key (“TMK”):	The TMKs represent the location of Wai‘oli Stream and the Wai‘oli Lo‘i Kalo Irrigation System, spanning nine (9) plat maps.

Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation
 Final Environmental Assessment, August 2021

	(4) 5-4-003:999, (4) 5-5-005: 999, (4) 5-5-006: 999, (4) 5-5-007: 999, (4) 5-5-008: 999, (4) 5-5-009: 999, (4) 5-6-001: 999, (4) 5-6-002: 999, and (4) 5-6-004: 999
Existing Use:	Native Hawaiian lo‘i kalo (wetland taro) cultivation
Proposed Action:	<p>Wai‘oli Valley Taro Hui, Inc. (“Hui”) will be requesting a 65-year water lease from the Board of Land and Natural Resources (“BLNR”) for the ongoing traditional and customary Native Hawaiian use of water from Wai‘oli Stream for lo‘i kalo cultivation, a cultural practice that has fed Wai‘oli Valley and its neighboring ahupua‘a and people for centuries.</p> <p>Based on historic and existing use of this traditional irrigation system, and consistent with the Hawai‘i Commission on Water Resource Management’s 2021 numeric Interim Instream Flow Standard (“IIFS”) for Wai‘oli Stream of 4.0 million gallons per day (“mgd”) the Hui is requesting all water in excess of the amended IIFS, up to 13.5 mgd, as needed to support lo‘i kalo cultivation on private land outside the Conservation district.</p>
Project Area:	Wai‘oli is a perennial stream with a length of 5.4 miles and an additional 6.16 miles of actively maintained traditional lo‘i kalo.
State Land Use Districts:	Conservation, Agricultural, and Urban (Figure 35)
Kaua‘i County Zoning:	Open Lands (“OP”) and Agricultural (“AG”)
Flood Zone:	Zones X, A, AE, and AE Floodway (Figure 31)
Anticipated Determination:	Finding of No Significant Impact (“FONSI”)

1.2. Abbreviations and Glossary of Hawaiian Terms

Abbreviations

above mean sea level	amsl
Board of Land and Natural Resources	BLNR
Census County Division	CCD
Census Designated Place	CDP
cubic feet per second	cfs
Cultural Impact Assessment	CIA
Department of Agriculture	DOA
Department of Hawaiian Home Lands	DHHL
Department of Health	DOH
Department of Land and Natural Resources	DLNR
DLNR Commission on Water Resource Management	CWRM
DLNR Department of Fish and Wildlife	DOFAW
DLNR Division of Aquatic Resources	DAR
DLNR Office of Conservation and Coastal Lands	OCCL
Environmental Assessment	EA
Fahrenheit	°F
Flood Insurance Rate Map	FIRM
gallons per acre per day	gad
Hanalei Bay Watershed Management Plan	HBWMP
Hawai‘i Administrative Rules	HAR
Hawai‘i Revised Statutes	HRS
Hawai‘i Stream Assessment	HSA
Instream Flow Standard	IFS
Instream Flow Standard Assessment Report	IFSAR
Interim Instream Flow Standard	IIFS
Integrated Report (Water Quality Monitoring and Assessment Report)	IR
mean sea level	msl
million gallons per day	mgd
National Climatic Extremes Committee	NCEC
National Wildlife Refuge	NWR

Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation
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Office of Hawaiian Affairs	OHA
State Water Projects Plan	SWPP
Tax Map Key	TMK
Total Maximum Daily Loads	TMDL
U.S. Department of Agriculture	USDA
U.S. Fish and Wildlife Service	USFWS
U.S. Geological Survey	USGS
University of Hawai‘i	UH
Wai‘oli Valley Taro Hui, Inc.	Hui
Draft Wai‘oli Valley Taro Hui Watershed Management Plan	Draft Hui Watershed Management Plan
Water Quality Plan	WQP
Water Quality Standards	WQS
Water Resources Protection Plan	WRPP

A note about language:

This EA relies upon and incorporates ‘ōlelo Hawai‘i¹ words and concepts fundamental to the Proposed Action and Kānaka Maoli² practices and worldviews. Often, when translating from ‘ōlelo Hawai‘i to English, or vice versa, a word does not have a direct translation, but rather there may be several interpretations that differ slightly. Further, a word may include layers of meaning and nuances that this Environmental Assessment endeavors to explain to accurately encapsulate the worldview and promote a full understanding.

The report uses many commonly used Hawaiian words to support cultural and ‘āina-based education and context. As an official language of the State of Hawai‘i, we have chosen to use ‘ōlelo Hawai‘i in an effort to document and use Wai‘oli’s traditional words and understandings, while also acknowledging that other practitioners may use different words, phrases, and descriptions.

The following glossary provides various context and translations from ‘ōlelo Hawai‘i to English for words that are used more than once in this EA. The translation is also defined in a footnote when it is first used within the body of this document.

Glossary of Hawaiian Terms

‘ai pono	eating healthy foods
‘ai pa‘a / pa‘i ‘ai	cooked taro pounded into a hard mass not mixed with water
‘āina	land, that which feeds
ahupua‘a	land division
aloha ‘āina	caring/love for the land

¹ Hawaiian language.

² Native Hawaiian.

Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation
Final Environmental Assessment, August 2021

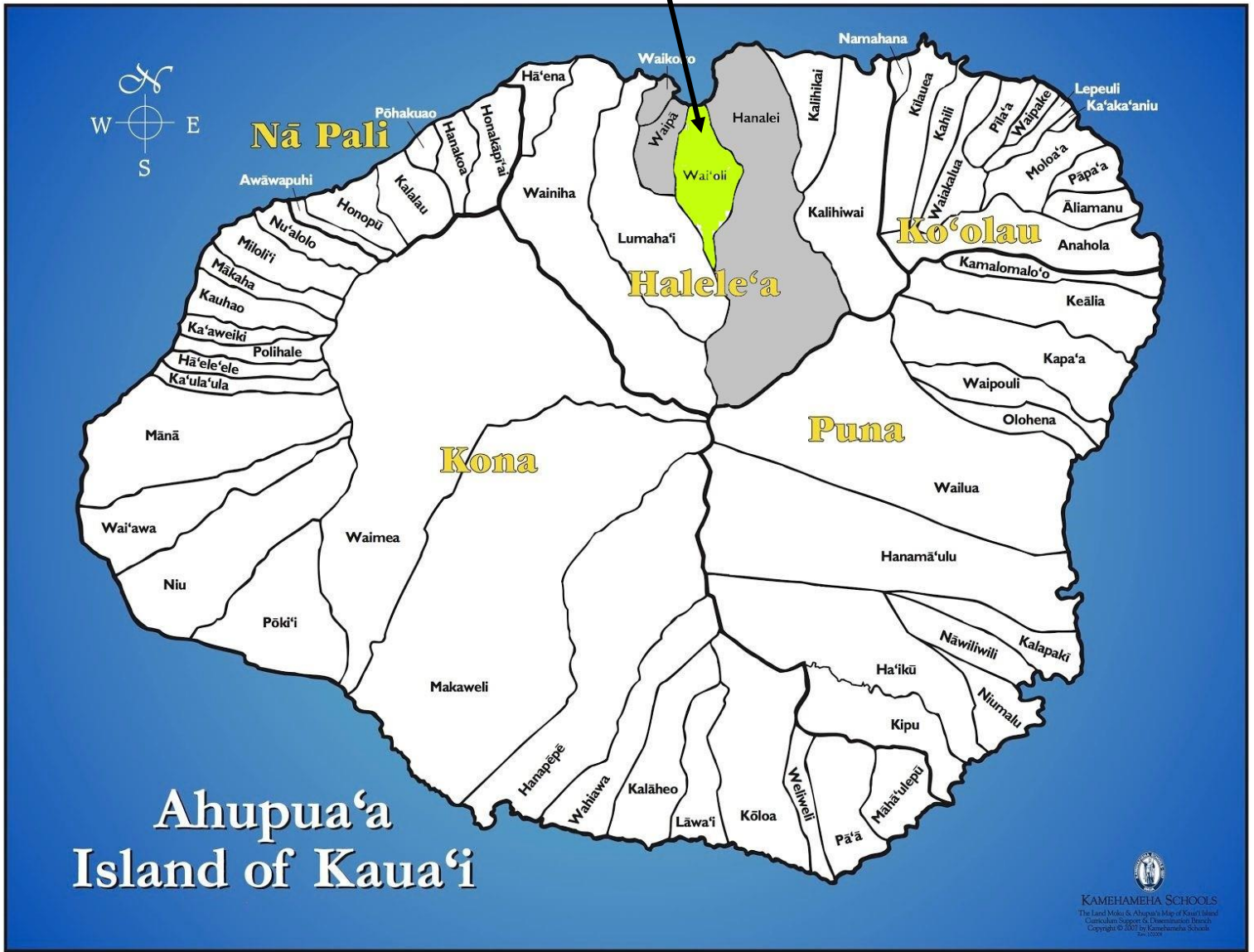
‘auwai	irrigation ditch used to transport water from one place to another
hā	stem or petiole of kalo
ho‘i	outtakes or return. The place where the water leaves the lo‘i and returns to the stream
ho‘olako	to supply, provide, enrich, having enough to share with others
huli	portion of kalo that is re-planted after removing leaf and corm; similar to the concept of a plant seed or keiki, crown of corm or ‘i‘o
‘ike	knowledge, experience, awareness, the practice of learning by doing and adapting
‘ili‘ili	pebbles, small stones
‘i‘o	corm
kahawai	stream, a source of water that begins in the mountains
kalo	taro, or <i>Colocasia esculenta</i>
kalo pa‘a	cooked table kalo
kama‘āina	people of the place; literally, a child (kama) of the land (‘āina)
Kānaka Maoli	Native Hawaiian
kalana	area or sub region; a traditional Native Hawaiian land division term associated more with systematic biocultural resource management and community identity rather than governance
kīpuka	a variation or change in form; a hole; as a clear place or oasis of vegetation surrounded by a lava bed
kuāuna	bank or border of a kalo patch
kuleana	responsibility, right, privilege, innate duty
lau, lū‘au	kalo leaf
lo‘i	flooded terraces
lo‘i kalo	wetland irrigated field for taro where water passes through and corms are submerged
Lo‘i Kalo Irrigation System	traditional Native Hawaiian irrigation system used for kalo cultivation; used to divert stream water from the stream

	to the lo‘i. Water flowing from the ‘auwai into the lo‘i can be controlled. Water eventually returns to the main stream via ho‘i and empties into the sea.
loko i‘a pu‘uone	inter-tidal fishpond
loliloli, loli	soft, water soaked
mahi‘ai	farmer
ma kai	to / towards the ocean
mālama ‘āina	to care for the land
mana wai	tributary
mānowai	breakaway dam rock structure that slows the water to help channel it into the subsequent Lo‘i Kalo Irrigation System
ma uka	to / towards the mountain
moku	division; one smaller than island
mo‘olelo	story, tradition, literature, Hawaiian history
muliwai	stream / river mouth
nūpepa	Hawaiian language newspapers
pae ‘āina	archipelago
pilina	relationships, connection, association
pono	just, moral, correct or proper
po‘owai, po‘o	headwater where water enters into the irrigated ditches where it flows until reaching the lo‘i
wai	fresh water
wai hālau	an area with a large number of tributaries, similar to a watershed or basin

1.3. Purpose of the Environmental Assessment

As a requirement to secure a long-term water lease, this Environmental Assessment (“EA”) has been prepared pursuant to Hawai‘i Revised Statutes (“HRS”) section 171, HRS chapter 343, and Hawai‘i Administrative Rules (“HAR”) title 11, chapter 200.1. Compliance with HRS chapter 343 and HAR title 11 is triggered by the use of water that originates on State land and flows through the State Conservation District, and is later used for kalo cultivation on private land located within the State Agricultural District. **See Figure 1, Location Map and Figure 2, Hanalei Bay Watershed and State Land Use District Map.**

Subject Area



Source: KSBE. Kauai a Manokalanipo, 2020





-  Hanalei Bay Watershed
-  Waiʻoli Stream Watershed
-  Ahupuaʻa (land division) Boundaries
-  Moku (district) Boundaries

Figure 1: Location Map

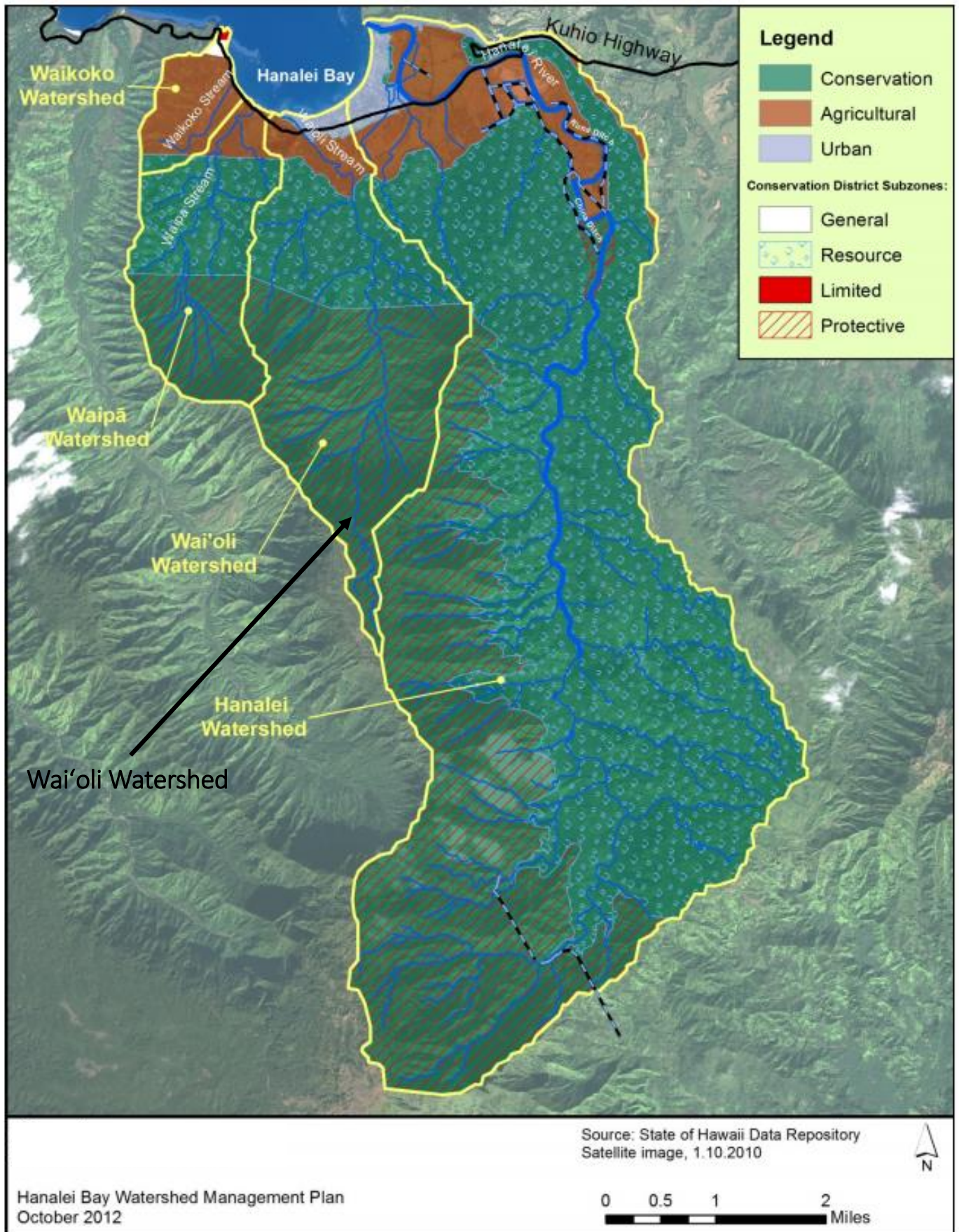


Figure 2: Hanalei Bay Watershed and State Land Use District Map

1.3.1. Framing for the Environmental Assessment

Hanalei, the district traditionally known as Halele‘a, is a revered place. Wai‘oli Ahupua‘a is a part of what was once commonly known as the larger Hanalei Kalana³ (Ka Leo Hawai‘i, H.V. 24:14, 9 November 1972). Kalana is a traditional Native Hawaiian land division term associated more with systematic biocultural resource management and community identity rather than governance (Winter et al., 2018, 4-5). This EA aims to describe kalo⁴ cultivation generally, and in Wai‘oli Valley specifically, while also focusing on the requirements of the Hawai‘i Revised Statutes (“HRS”) chapter 343. See **Figure 3, Wai‘oli Ahupua‘a**.

This document was written on behalf of the Wai‘oli Valley Taro Hui, Inc. (“Hui”) representing a little over a dozen individuals who each have a unique personal and family history with kalo, kalo cultivation, and Wai‘oli Valley. As a reflection of its kūpuna, and as the Hui’s ancestral homeland, most of the Hui can trace their genealogy to Wai‘oli Valley specifically. The practice of kalo cultivation in Wai‘oli is noted extensively and outlined throughout this EA. To understand the purpose of this document, it is important to first provide context about kalo and Kānaka Maoli (Native Hawaiian) history and worldviews.

Kalo cultivation is firmly rooted in mo‘olelo Hawai‘i,⁵ traditional and customary practices, and ‘āina.⁶ It is a “vital part of the cultural and agricultural traditions of [N]ative Hawaiians” (Gingerich et al., 2007). In Hawaiian cosmology, kalo is revered as the elder brother of Kānaka Maoli and establishes humans’ familial relationship with ‘āina. The first kalo plant sprouted from the grave of Hāloanaka, the first child of Wākea⁷ and Ho‘ohōkūkalani.⁸ David Malo recalls the origin story of kalo:

The first born son of Wakea was of premature birth (keiki alualu) and was given the name Haloa-naka. The little thing died, however, and its body was buried in the ground at one end of the house. After a while from the child’s body shot up a taro plant, the leaf of which was named lau-kapa-lili, quivering leaf; but the stem was given the name Haloa. After that another child was born to them, whom they called Haloa, from the stalk of the taro. He is the progenitor of all the peoples of earth (Malo, 1903, 320).

Mary Kawena Pukui expounds on Malo’s account with her own Hāloa tradition from her homeland in Ka‘ū, Hawai‘i:

The first Haloa, born to Wakea and Hoohokukalani, became the taro plant. His younger brother, also named Haloa, became the ancestor of the people. In this way, taro was the elder

³ Area or sub region; a traditional Native Hawaiian land division term associated more with systematic biocultural resource management and community identity rather than governance.

⁴ Taro, *Colocasia esculenta*.

⁵ Hawaiian history.

⁶ Land, that which feeds.

⁷ Sky father.

⁸ Daughter of Papa, earth mother.

brother and man the younger--both being children of the same parents. Because our chiefs were of the senior line, they were referred to in respect and affection as “kalo kanu o ka aina” (The taro grown in the homeland) by the junior branches of the family (Handy et al., 1991, 80).

Dr. Lilikalā Kame‘eleihiwa notes that this relationship between ‘āina and kānaka⁹ is informed by kānaka’s role as the younger sibling (Kame‘eleihiwa, 1992). Out of this relationship arises a kuleana¹⁰ and duty to mālama ‘āina.¹¹ In many ways, kalo cultivation is the manifestation of both aloha ‘āina¹² and mālama ‘āina. Importantly, these concepts go beyond cultural values and mere feelings; they are practices grounded in ‘ike¹³ and relationships. These lifeways are integral to “Kānaka Maoli survivance for generations” and serve as links to the past and connections to the land and sea as sources of life (Goodyear-Ka‘ōpua, 2013).

In addition to kalo itself, wai¹⁴ that flows through and feeds the lo‘i kalo is held in highest esteem. For Hawai‘i’s people, culture, and resources, ola i ka wai.¹⁵ Spiritually, water is revered as a kinolau¹⁶ of Kāne, one of the principal akua¹⁷ in the Kānaka Maoli pantheon (Sproat, 2009). Kāne was the “embodiment of male procreative energy in freshwater, flowing on or under the earth in springs, in streams and rivers, and falling as rain (and also as sunshine), which gives life to plants” (Handy et al., 1991, 64).

As a modern day practice, the practice of kalo cultivation is still holistic; with the farmer recognizing the connection of his or her work to the “land, the streams and the reefs” (Taro Security and Purity Task Force, 2009). The details of kalo cultivation are very personal, and like many traditional and customary practices, vary by island, by ‘ohana, and by farmer. Describing the Proposed Action under HRS 343 at times seems to be finite or inflexible; especially given that this EA evaluates the use of stream water as opposed to a defined project site. Further, the practice of kalo cultivation is constantly evolving and the Hui feels that they are part of Wai‘oli’s kalo growing lineage and continue to learn and grow with the kalo.

This EA outlines techniques and practices that are representative of and specific to the Hui. These practices were learned and refined through actively working on the land, passed down through oral and family traditions, written sources, and from the network of kalo growers and researchers throughout Wai‘oli, Hanalei Kalana, Kaua‘i, and the larger Hawai‘i pae ‘āina.¹⁸ It is important to

⁹ Human.

¹⁰ Responsibility, right, privilege, innate duty.

¹¹ Care for the land.

¹² Love of the land. See NOENOE K. SILVA, *THE POWER OF THE STEEL-TIPPED PEN: RECONSTRUCTING NATIVE HAWAIIAN INTELLECTUAL HISTORY* 4 (2017) (highlighting that “aloha ‘āina is a complex concept that includes recognizing that we are an integral part of the ‘āina and the ‘āina is an integral part of us.”); KEKUEWA KIKILOI, *REBIRTH OF AN ARCHIPELAGO* 75 (2010) (asserting that “‘āina sustains our identity, continuity, and well-being as a people.”).

¹³ Knowledge, experience, awareness.

¹⁴ Water.

¹⁵ Water is life.

¹⁶ Physical Manifestation.

¹⁷ God or diety.

¹⁸ Hawaiian archipelago.

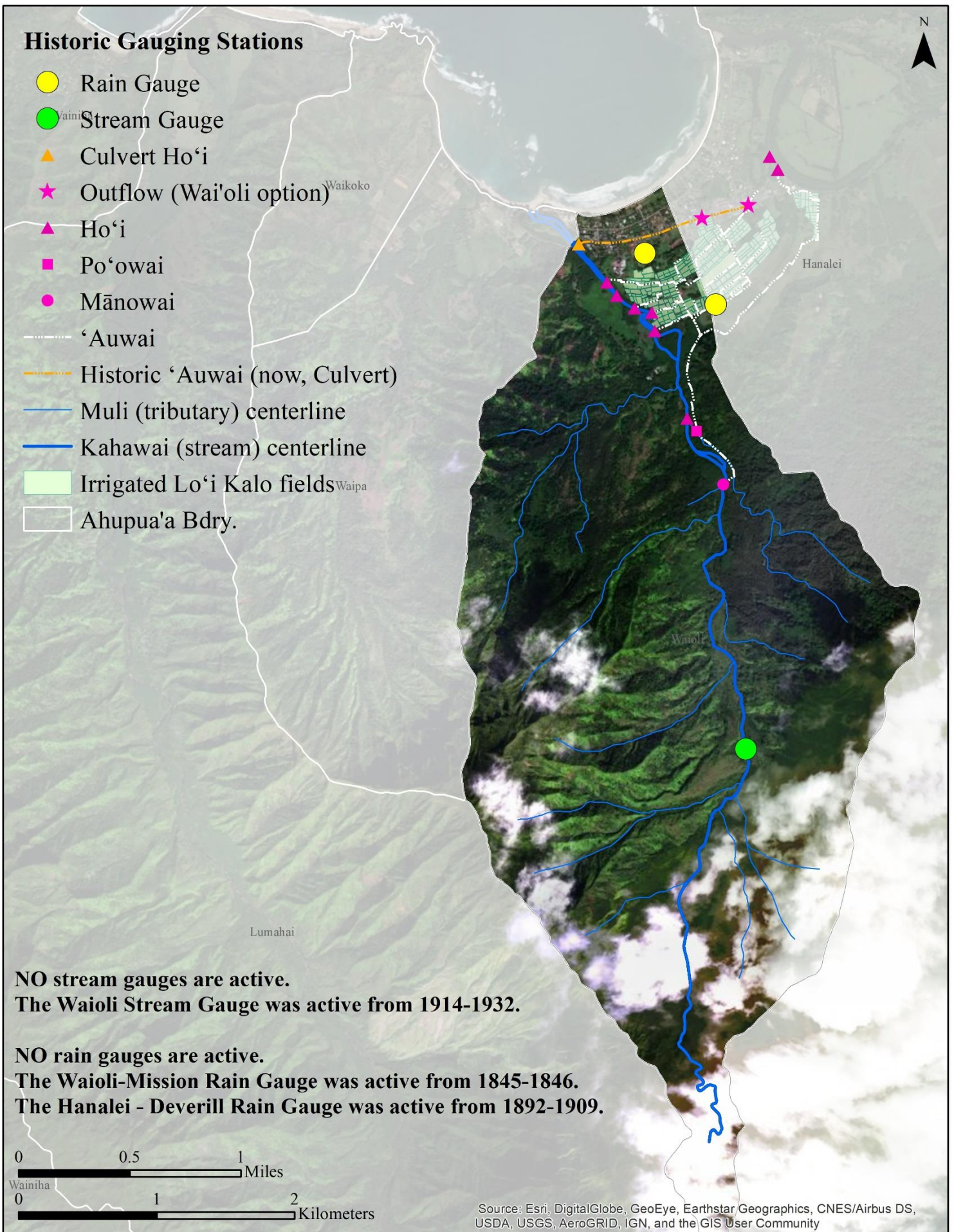


Figure 3: Wai'oli Ahupua'a

note that other kalo farmers, practitioners, or researchers may not use these same terms or methods shared within this report. This EA generally encapsulates the array of practices within Wai‘oli and is written by a planning consultant, a malihini¹⁹ to Wai‘oli, to articulate the Proposed Action to fit into the framework of HRS 343.

The Hui’s practice of kalo cultivation in a traditional manner is constitutionally protected as a traditional and customary Native Hawaiian practice and is a shining example of one important aspect of the State’s environmental policy. In an effort to secure the legal entitlements to effectuate these important provisions, the Hui seeks to secure necessary legal authority to perpetuate kalo cultivation for generations to come.

1.4. Agencies, Organizations and Individuals Contacted in Early Consultation

Following the devastating 2018 floods on the North Shore of Kaua‘i, government agencies, organizations, and community members came forward to address the damage. This included initiating the repair of the the traditional Lo‘i Kalo Irrigation System²⁰ that utilizes Wai‘oli Stream for kalo cultivation. Specific to the EA, pre-consultation included various agencies with jurisdiction over specific permits and organizations and individuals that have expertise and/or connections to the Proposed Action and ‘āina. **See Appendix A, Summary of Pre-consultation Outreach.**

Agencies expressed support for the Proposed Action as a reflection of community-led collaboration and natural resource management, and highlighted the significance of kalo cultivation as a Native Hawaiian traditional and customary practice and kalo’s contribution towards food security. Agencies and stakeholders provided background information and related documents and responded to specific questions related to agency and stakeholder-led studies and plans utilized in this EA. The list of agencies, organizations, and individuals contacted is provided in Part 8 of the EA and in Appendix A.

2. Background

The Proposed Action is the use of Wai‘oli Stream water to support traditional lo‘i kalo cultivation, a unique, ongoing, and traditional and customary Native Hawaiian practice. It proposes the use of less than what has been historically documented in Wai‘oli Valley – both in terms of kalo cultivation and in water use. The Proposed Action does not propose any structures, infrastructure, or additional use of State land. Rather, this EA is part of the process to request a long-term water lease that will ensure the necessary cool, free flowing water for traditional kalo cultivation. Importantly, disaster recovery efforts in the wake of the 2018 floods determined that the Hui’s mānowai²¹ was on State Conservation land. So, this EA seeks legal approval for a Native Hawaiian use that has persevered in Wai‘oli Valley for centuries.

¹⁹ Newcomer, guest.

²⁰ Traditional Native Hawaiian irrigation system used for kalo cultivation; used to divert stream water from the stream to the lo‘i. Water flowing from the ‘auwai into the lo‘i can be controlled. Water eventually returns to the main stream via ho‘i and empties into the sea.

²¹ Native Hawaiian break-away structure that diverts some water from Wai‘oli Stream into the Lo‘i Kalo Irrigation System.

Unlike projects typically reviewed under HRS chapter 343, this action does not have a precisely defined perimeter. Water use for kalo cultivation, as the focus of this EA and as this Proposed Action proposes, is a product of the hydrologic cycle; from precipitation that reaches inland that then becomes flowing surface and ground water. The Proposed Action focuses on the surface water that flows through the existing Lo‘i Kalo Irrigation System as an instream, throughflow system that works in coordination with the natural environment. Throughflow is water that flows through the lo‘i and carries heat away; throughflow is needed to meet the cooling requirements of the lo‘i (Gingerich et al., 2007). Throughflow is distinct from water that is “consumed.” “Used” water is water that is lost to percolation through the soil, transpiration by the plant, and evaporation. Together, throughflow and used water comprise the total water flowing into the lo‘i, or the “inflow.” Although water is only one of many physical components needed for kalo cultivation, without its quality and quantity, lo‘i kalo cultivation would be impossible.

Pre-contact, Kānaka Maoli engineered lo‘i²² and related agriculture irrigation in alluvial plains and valleys with sufficient stream resources, enabling them to transform vast areas into farmland to support kalo production. Complex ‘auwai²³ were built to direct and redirect water from free-flowing streams, controlling water flow and circulation within the system to prevent stagnation, keep water and also kalo temperatures low to prevent disease (Kurashima et al., 2019).

Like many Indigenous Peoples throughout the Pacific, kalo is the primary staple crop of Native Hawaiians, achieving agricultural dominance prior to Western contact in Hawai‘i. Thus, kalo nourished the bodies of the earliest Hawaiian people becoming a traditional cultural food source that is the foundation of ‘ai pono.²⁴ Preparing and eating traditional foods such as kalo (e.g., poi, pa‘i‘ai, kūlolo, laulau, and lū‘au) that incorporate the lau,²⁵ ‘i‘o,²⁶ and hā²⁷ are a bedrock of health in Native Hawaiian communities (Shintani et. al. 1991).

While the vast environmental benefits and habitat creation that lo‘i provided for Native species were not always evaluated by Western measurements, recent scholarly research confirms what has sustained Kānaka Maoli for generations: lo‘i are instrumental and ideal conservation efforts that promote, protect, and perpetuate Native species because these species have adapted to these ancient systems (USDA, 2009). Lo‘i are, therefore, not only culturally important and have significant connections to Kānaka Maoli custom, practices, and communities, but they also play a vital environmental role in the preservation of endemic and Indigenous species, many of which are found nowhere else in the world.

2.1. About the Applicant

The Proposed Action is led by a group of small-scale family farmers who have lived and farmed in Wai‘oli for generations. Collectively, the Hui has been cultivating kalo in Wai‘oli to continue the work of their kūpuna and to maintain a traditional food source to feed family, friends and community.

²² Flooded terraces.

²³ Irrigation ditch used to transport water from one place to another.

²⁴ Eating healthy foods.

²⁵ Leaf.

²⁶ Corm.

²⁷ Stem.

The Hui has also assumed primary kuleana over maintaining Wai‘oli Stream (e.g., clearing debris especially after storms, monitoring water flow and quality, etc.). **See Draft Hui Watershed Management Plan.**

The Hui relies and acts upon intergenerational knowledge passed down throughout Kaua‘i generally, and Wai‘oli Valley specifically. By sharing experiences, adapting to natural changes, and stewarding this ‘āina for decades, the farmers of the Hui have practiced kilo²⁸ and have learned through ma ka hana ka ‘ike²⁹ (Pukui, 1983). They intimately understand the ‘āina in Wai‘oli, the movement of the earth, and the rhythm and patterns found in the natural environment. This informs and guides their place-based practices and processes of kalo cultivation in Wai‘oli.

The throughflow that supports kalo cultivation naturally flows from its source, its wai hālau,³⁰ to the ocean. The Proposed Action flows across nine (9) plat maps before reaching Hanalei Bay. The Tax Map Keys (TMKs) that represent Wai‘oli Stream and the Wai‘oli Lo‘i Kalo Irrigation System include: (4) 5-4-003:999, (4) 5-5-005: 999, (4) 5-5-006: 999, (4) 5-5-007: 999, (4) 5-5-008: 999, (4) 5-5-009: 999, (4) 5-6-001: 999, (4) 5-6-002: 999, and (4) 5-6-004: 999. **See Figures 4 to 13, Tax Map Keys of Wai‘oli Stream and Wai‘oli Lo‘i Kalo Irrigation System.**

The Hui’s request for a long-term water lease requires the completion of the HRS chapter 343 environmental review process, consultation with DHHL and DLNR - Office of Conservation and Coastal Lands, completion of a Watershed Management Plan, and the establishment of numeric Interim Instream Flow Standards (“IIFs”) with the Commission on Water Resource Management. Several of these steps are well underway, if not completed by the time of publication.

For the Hui, kalo cultivation is both an individual and collective kuleana. It connects families over generations and is a time-honored part of this community’s history and legacy. For instance, kalo farming defines the Kaona ‘ohana, whose practice that spans four (4) generations. The eldest member of the Kaona family is 100% Native Hawaiian and continues to farm full-time on his ‘ohana’s kuleana land. With a lifetime of knowledge, Clarence “Shorty” Kaona’s understanding of the process of caring for kalo and resources continues to be passed down to the next generation. A portion of this kuleana is ensuring that the lo‘i kalo, the traditional Lo‘i Kalo Irrigation System, and supporting ecosystems are also cared for and balanced as they are all important to sustain generations to come (Kaona, 2019).

In response to the severe April 2018 flooding on the North Shore of Kaua‘i, the farmers formally organized to establish themselves as the Wai‘oli Valley Taro Hui. The Hui is a 501(c)(3) domestic non-profit corporation with federal tax-exempt status for the purposes of education and community engagement to empower future generations with traditional knowledge. The Hui, as a legal entity, has the ability to work directly with government agencies as well as apply for and hold permits. Pursuant to its articles of incorporation:

²⁸ The practice of keen observation.

²⁹ The practice of learning by doing and adapting.

³⁰ An area with a large number of tributaries, similar to a watershed or basin.

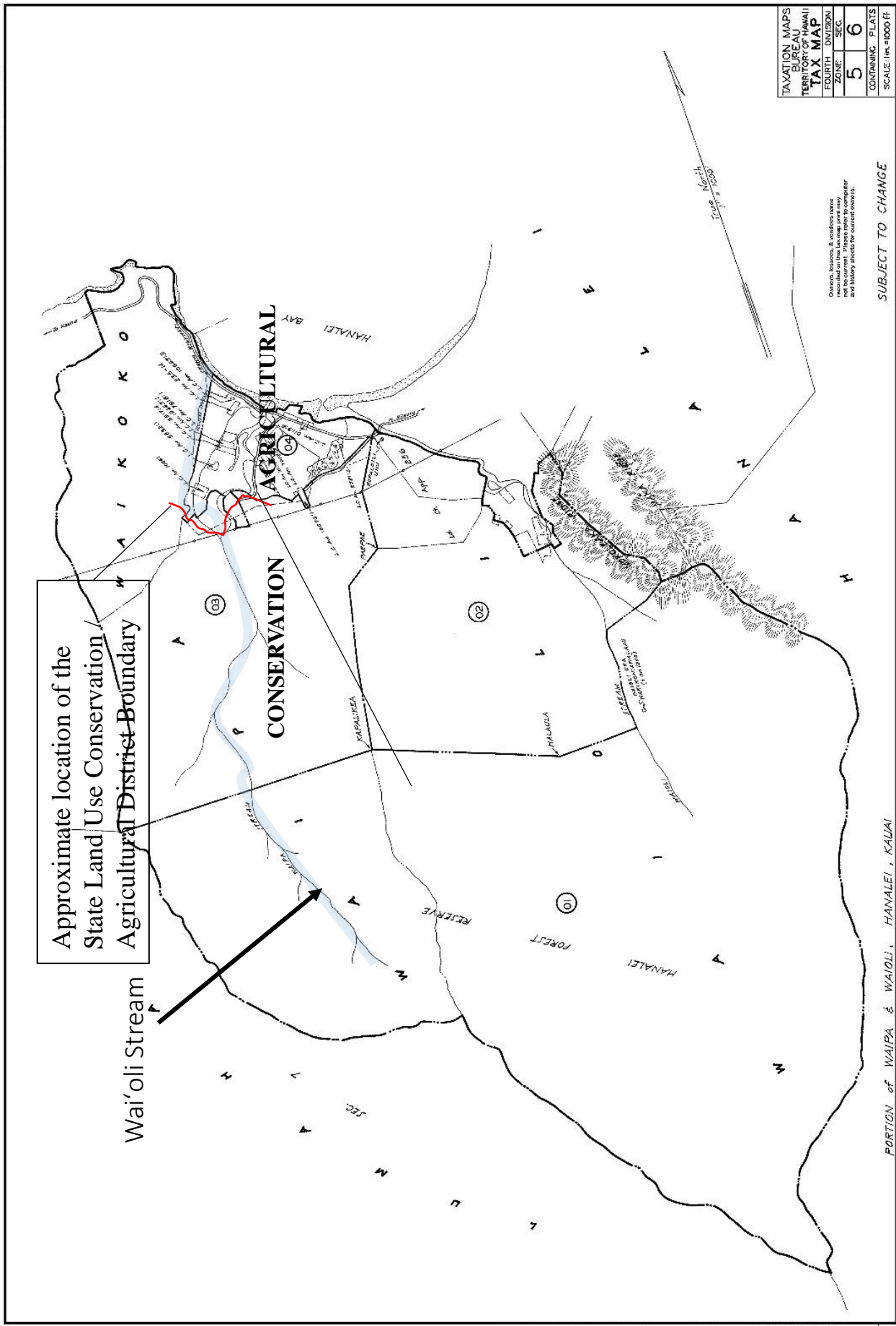


Figure 4: TMK Overview of Upper Wai'oli Stream and Wai'oli Lo'i Kalo Irrigation System

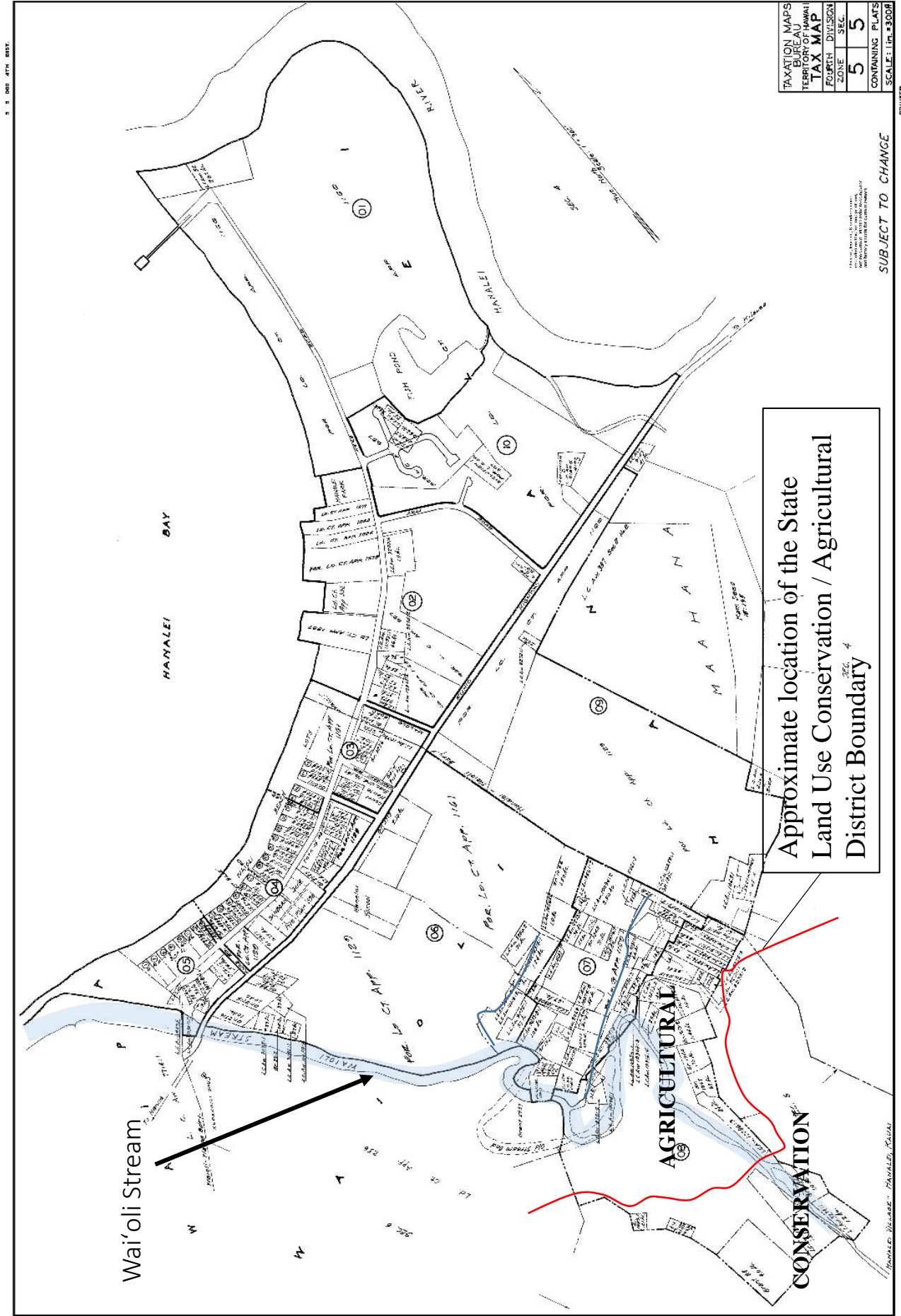


Figure 5: TMK Overview of Lower Wai'oli Stream and Wai'oli Lo'i Kalo Irrigation System

TMK 5-4-03

5 4 03 4TH DIST.

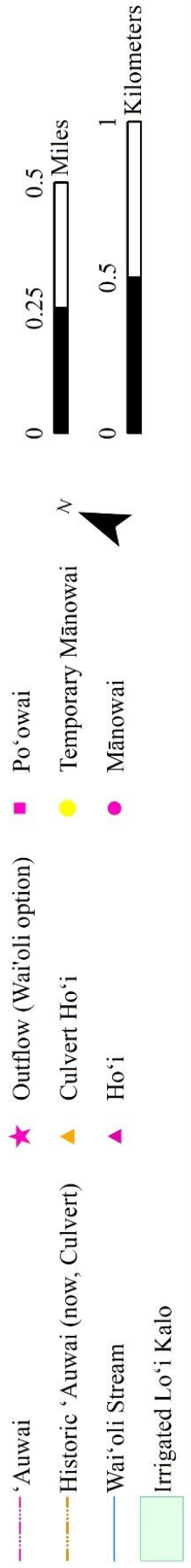
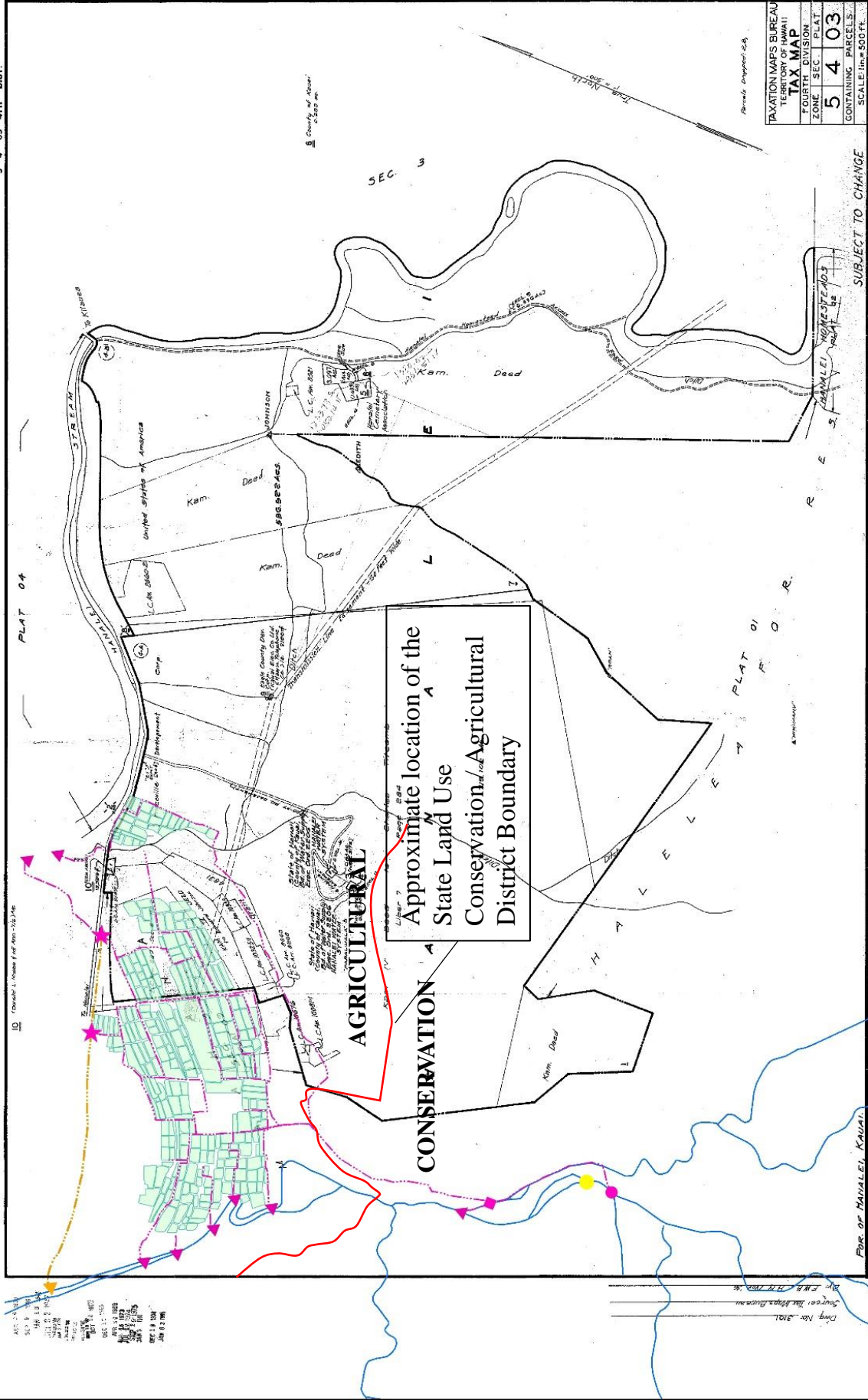


Figure 6: TMK 5-4-003:999

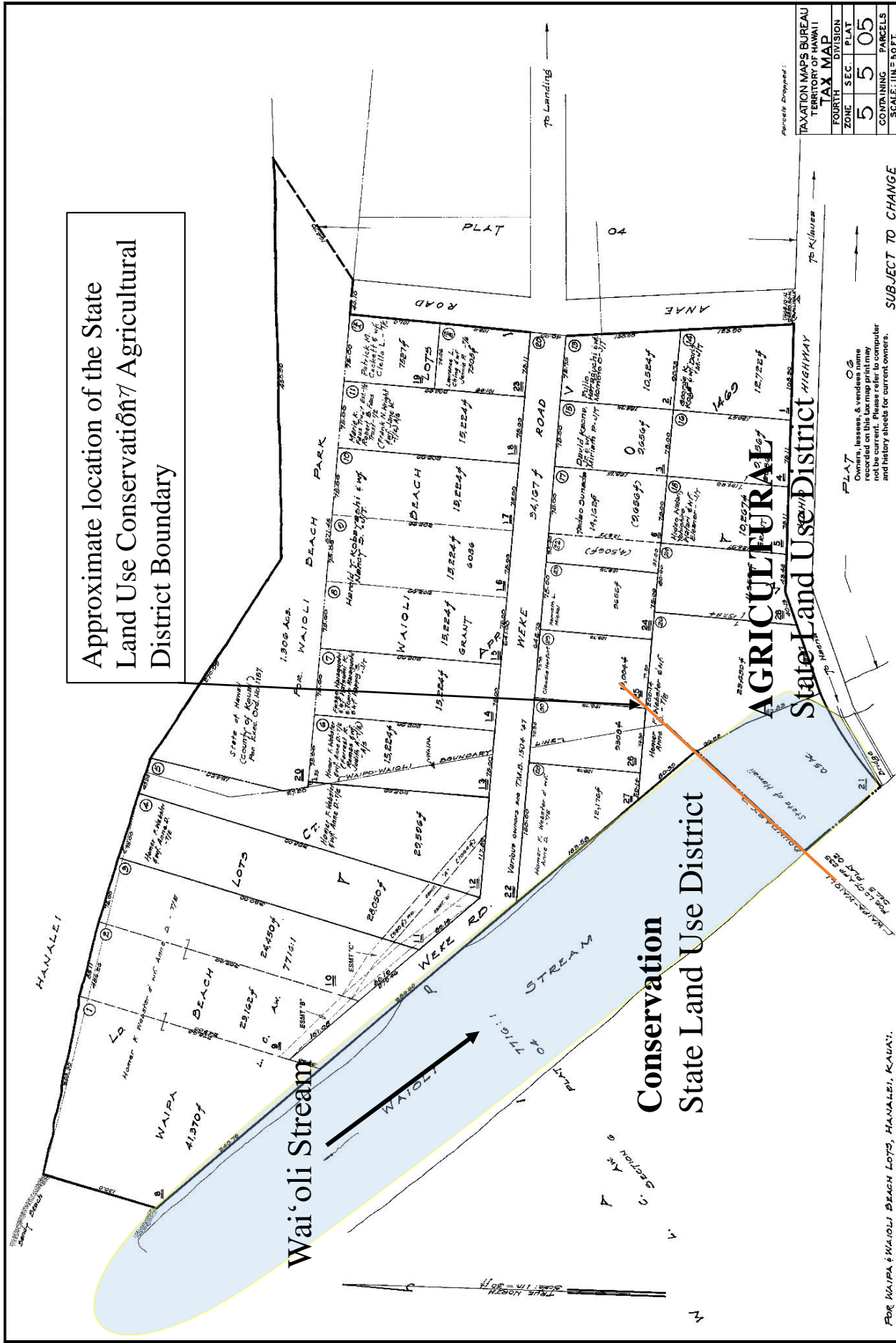


Figure 7: TMK 5-5-005:999

TMK Plat 5-5-06

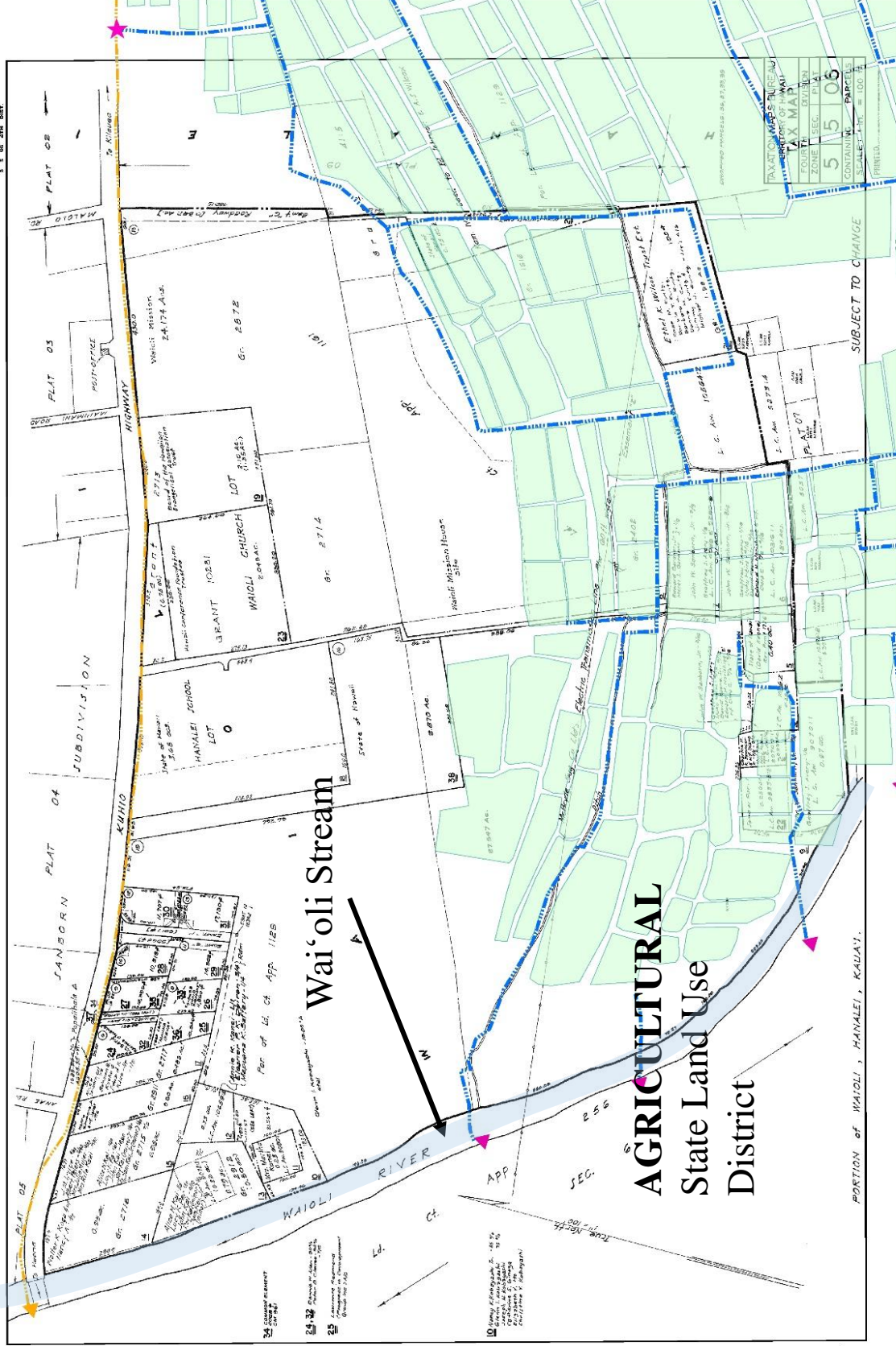


Figure 8: TMK 5-5-006:999

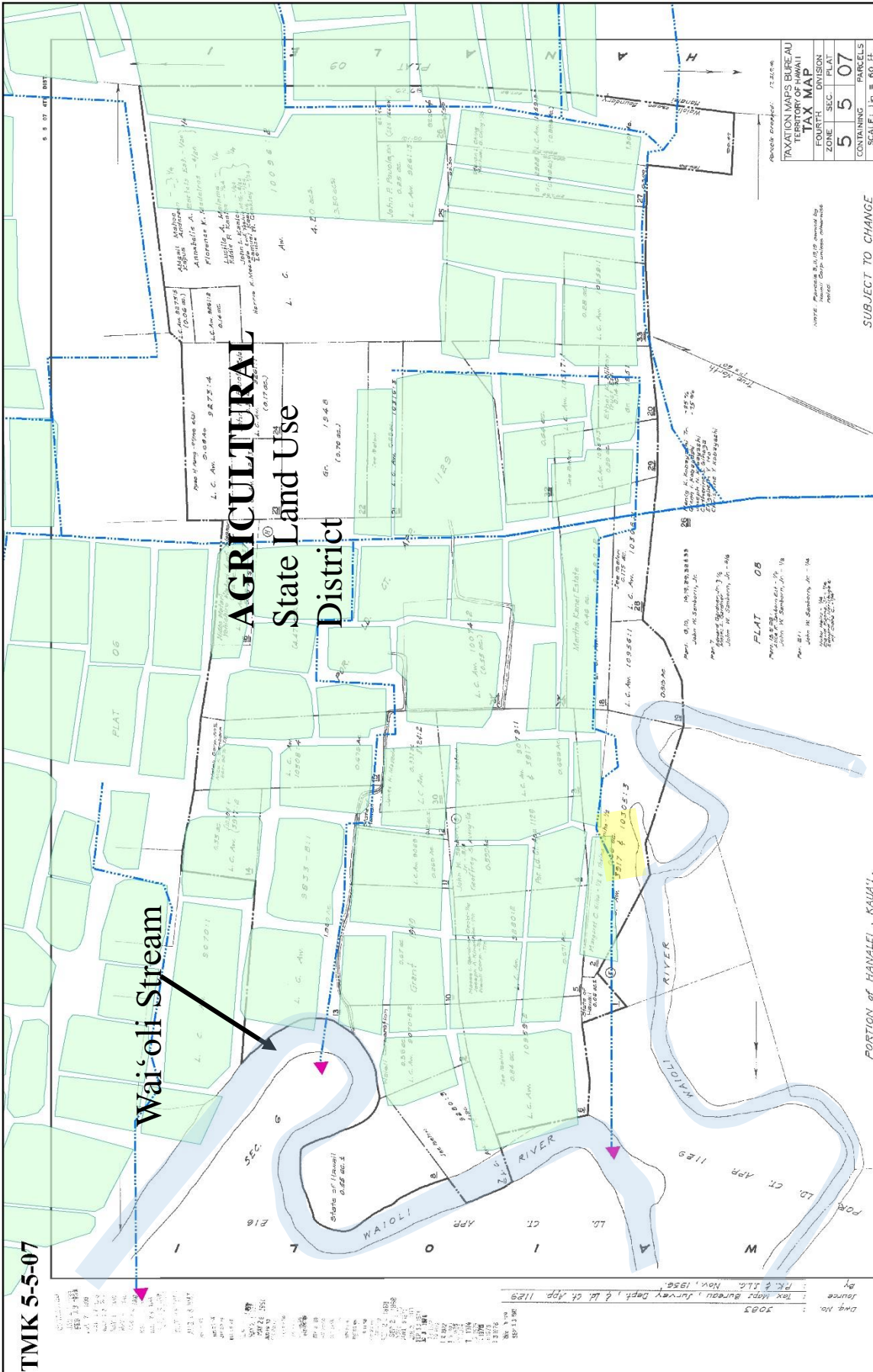
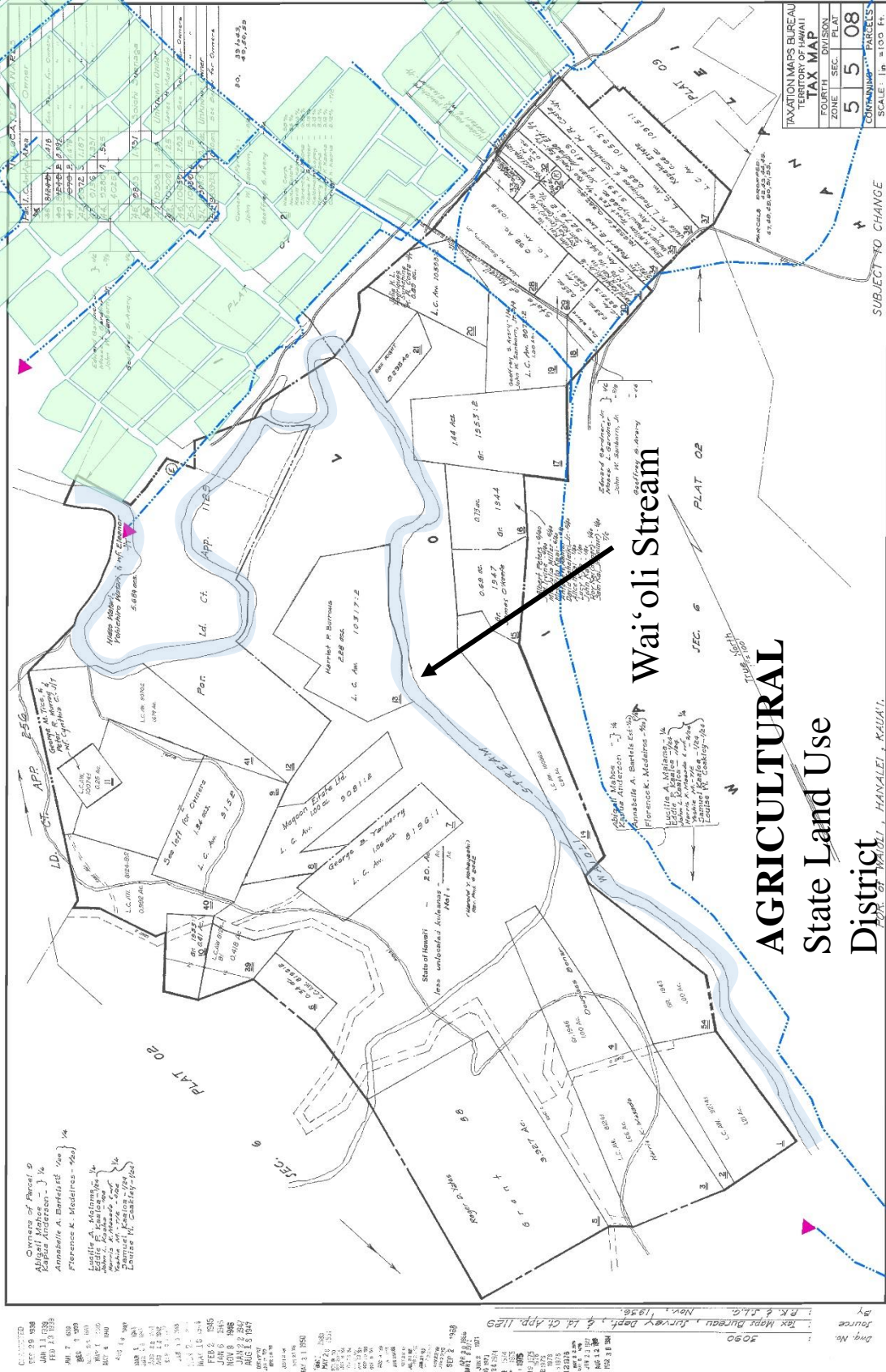


Figure 9: TMK 5-5-007:999

TMK Plat 5-5-08



- Legend**
- Irrigated Lo'i Kalo
 - Ho'i
 - 'Auwai

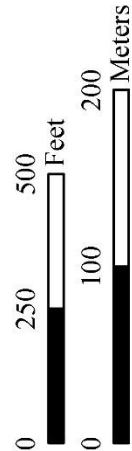
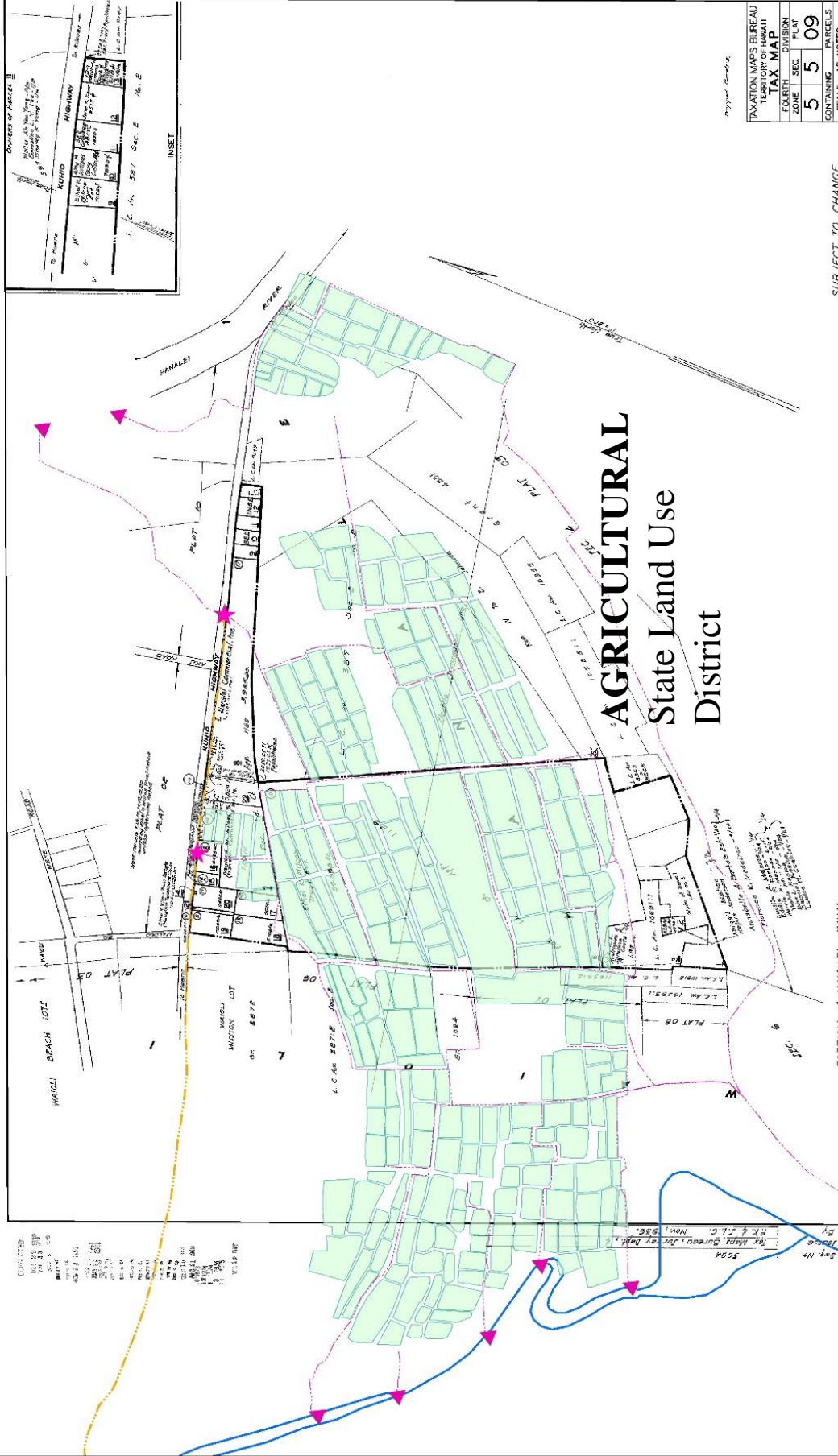


Figure 10: TMK 5-5-008:999

TMK 5-5-09



Legend

- Historic 'Auwai
- 'Auwai
- ▲ Ho'i
- ★ Outflow (Wai'oli option)
- Wai'oli Stream
- Irrigated Lo'i Kalo

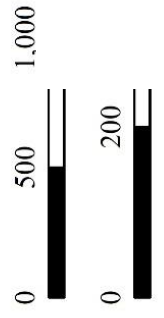


Figure 11: TMK 5-5-009:999

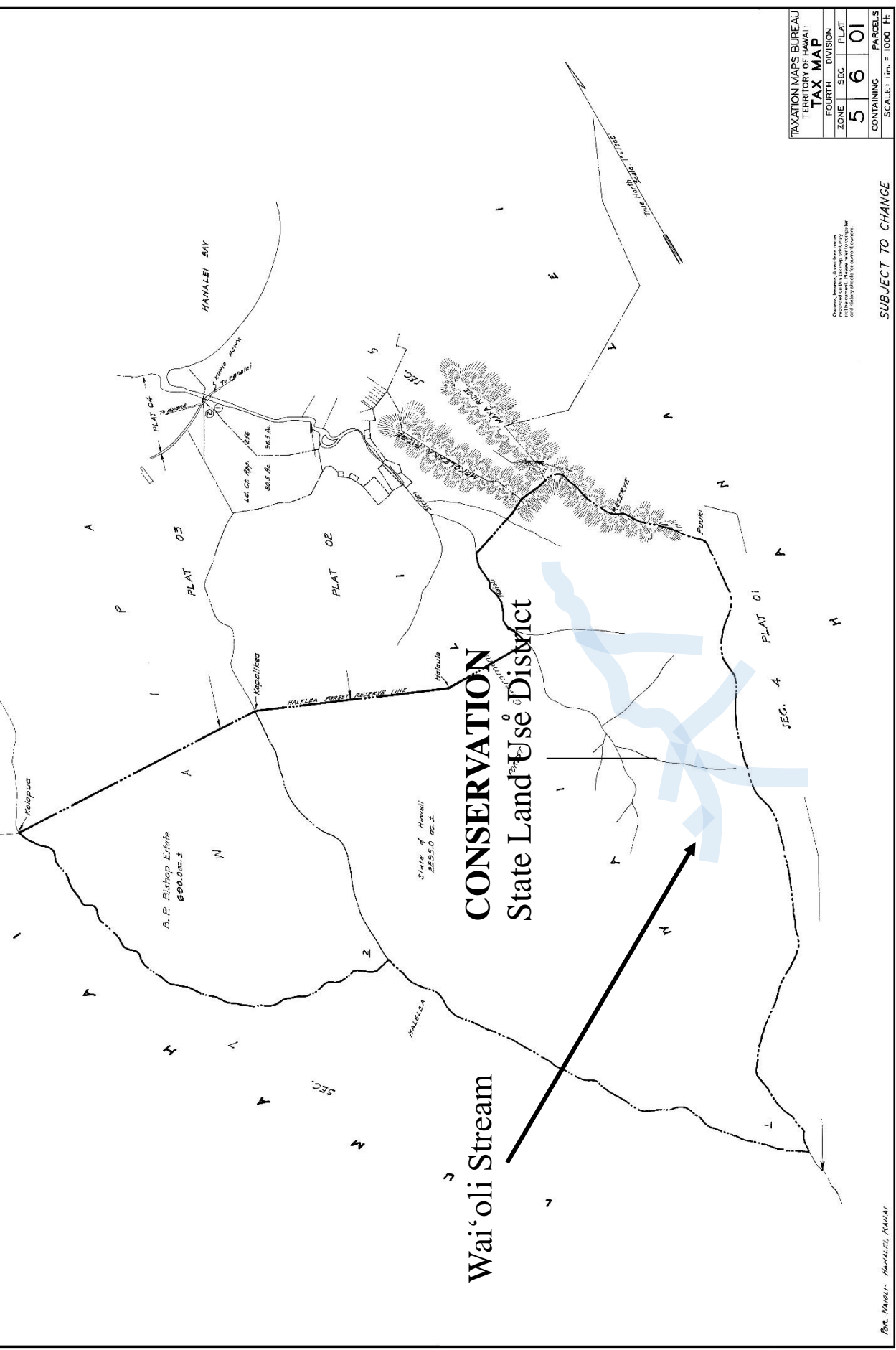
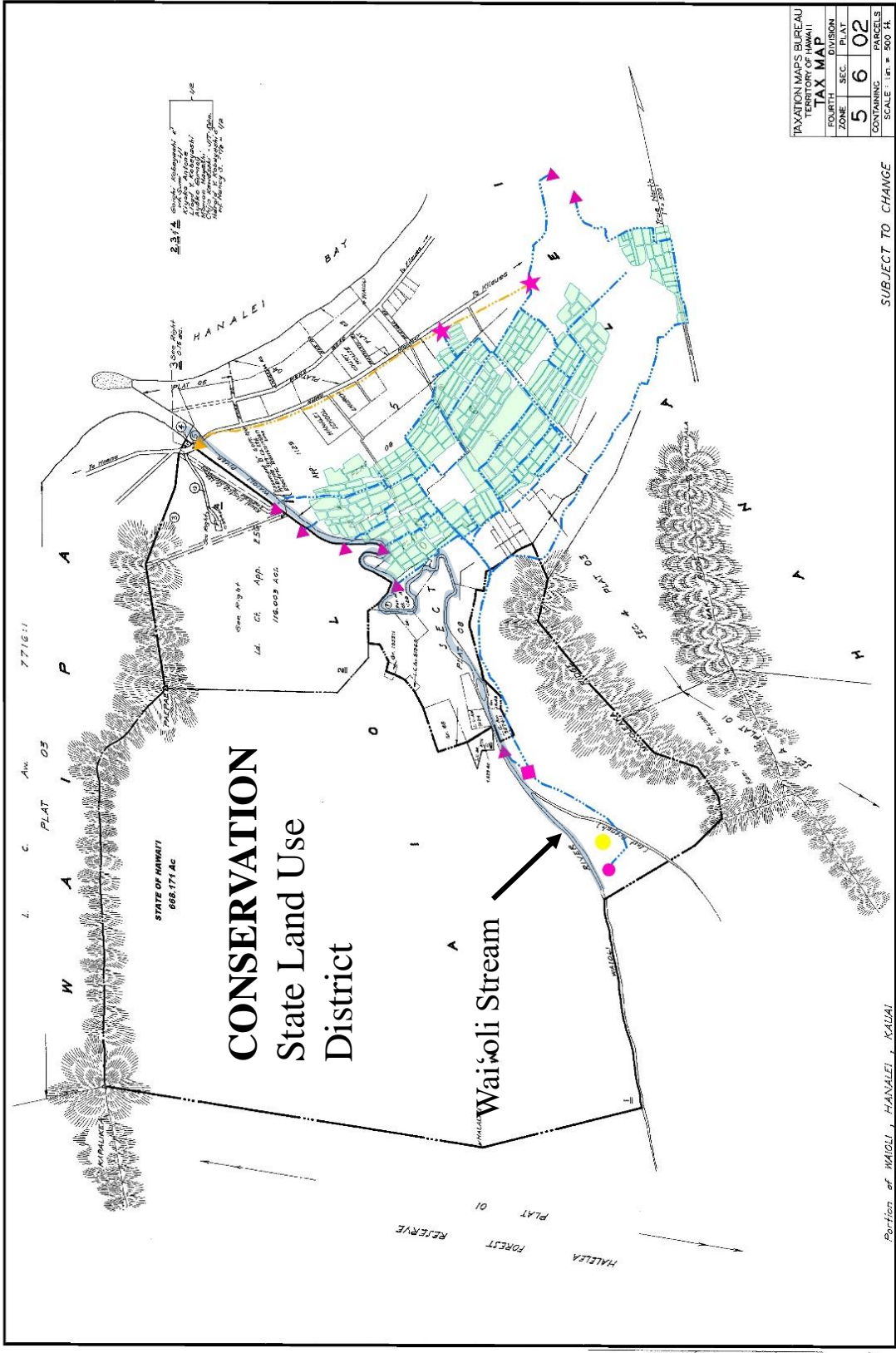


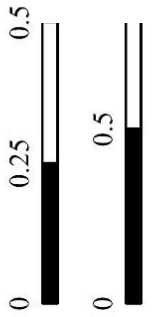
Figure 12: TMK 5-6-001:999 (Upper Reach)

TMK 5-6-02

5 6 02 4TH DIST.



CONTRACTED BY: STATE OF HAWAII, DEPT. OF LAND & NATURAL RESOURCES, DIVISION OF LAND MANAGEMENT, 1500 KALANANĀ'OHU DRIVE, HONOLULU, HI 96813. DATE: 11/15/2011. DRAWN BY: MRS. T. RICH. SOURCE: G.R. 7571-5512 & SURVEY DEPT. TR. MAP 7559 BY: R.K. & J.L.C. NOV. 1986.



- ★ Outflow (Wai'oli option)
- ▲ Historic 'Auwai (now, Culvert)
- ▲ Irrigated Lo'i Kalo
- Po'owai
- Temporary Mānowai
- Mānowai

- 'Auwai
- Culvert Ho'i
- Irrigated Lo'i Kalo

Figure 13: TMK 5-6-002:999

The Hui supports and enhances mauka to makai biocultural resources in the Wai‘oli Valley watershed, protects natural and cultural resources that enable traditional and customary Native Hawaiian practices, maintains habitat(s) for endangered Hawaiian waterbirds, and engages the larger Kaua‘i communities through educational outreach programs and initiatives related to kalo farming and community-based stewardship of water resources.

Today, the Hui consists of 14 farms and 16 kalo farmers in Wai‘oli Valley, whose families have been living and working in Wai‘oli for generations. These families operate small-scale farms that range from half (1/2) an acre to eight (8) acres in size with a majority on the smaller size. The farmers primarily farm on privately owned lands in Wai‘oli Valley. At most, the Hui identifies approximately 84 acres of lo‘i kalo within its collective complex. Together, the Hui historically produced an estimated two (2) to three (3) million pounds of kalo annually. An additional 45 acres of both leased and privately-owned lands include lo‘i kuāuna,³¹ access roads, and pathways. These lands also host a variety of other plants gathered and utilized by the Hui (e.g., hala, kukui, kī, mai‘a, hau, etc.).

The Hui has collaborated informally for over a century to steward and maintain Wai‘oli Valley’s natural and cultural resources. Within the Hui, nearly all the farmers were raised growing kalo in Wai‘oli, learning the practice from their parents, grandparents, and, for some, their great grandparents. Today, the Hui still maintains pilina³² to this ‘āina; and, while many of the farmers still live in Wai‘oli Valley, others live in nearby communities, including Hawaiian Home Lands in Anahola.

As a constitutionally protected traditional and customary Native Hawaiian practice, kalo cultivation is a cultural lifeway and is foundational to the community’s identity. For many kalo farmers, kalo cultivation actively maintains their connection to ‘āina and ‘ohana. The Hui humbly recognizes the importance of passing on generational knowledge and this cultural practice to their families and others committed to learning and practicing this way of life. The Hui does not wish to engage in or create a profit-driven system; rather, the Hui seeks to continue to uphold the nohona³³ of the North Shore of Kaua‘i. The Hui also aims to ho‘olako³⁴ and feed kama‘āina³⁵ as a means to sustain and maintain a relationship-based economy with shared values of aloha ‘āina – aloha for each other and aloha for the land – as a kahua³⁶ for Halele‘a.

The Hui, similar to many lo‘i kalo farmers across Hawai‘i, relies on the surrounding watershed, its water, and the Lo‘i Kalo Irrigation System to support and perpetuate kalo cultivation. For Wai‘oli, the system of interconnected fields and flowing water has defined the Wai‘oli plain for hundreds of years, producing Native and rare kalo varieties. Once harvested, this important food source is processed into poi and other kalo products (e.g., lū‘au leaf, kalo pa‘a, etc.). Majority of the Wai‘oli kalo is processed by Waipā Foundation in the neighboring ahupua‘a of Waipā. In line with Kānaka Maoli familial ties to kalo as their elder brother, community members in Halele‘a, Kaua‘i measure

³¹ Bank or border of lo‘i kalo.

³² Relationships, connection, association.

³³ Lifeway, mode of living, life.

³⁴ To supply, provide, enrich.

³⁵ Locals; literally, child of the land.

³⁶ Foundation.

wealth in ho‘olako – having enough to share with others. Farmers participate in trade or exchanges for other resources and distribute poi or other kalo products at or below cost. Local organizations also buy kalo directly from the Hui. In most cases, any potential revenues from the commercial aspects go directly back into their farming operations. **See Section 5.8.3, Economic Characteristics.**

The Hui is memorializing Wai‘oli’s traditional kalo cultivation practice through the modern legal system by securing a variety of permits and required approvals. HRS chapter 171 governs water leases, revocable permits, and the appraisal methods by which these entitlements are valued. The long-term water lease will legally ensure the continuation of Wai‘oli Stream water for traditional lo‘i kalo cultivation. In 2016, Hawai‘i’s First Circuit Court determined “holdover” revocable permits were unlawful. Later that year, through Act 126, the Legislature amended HRS section 171-58 to require “holdover” revocable permits to convert to long-term water leases by June 30, 2019. The Hawai‘i Supreme Court is currently in the process of deciding *Carmichael v. Board of Land and Natural Resources*, an appeal that is expected to resolve the allowable duration for revocable permits. Some may assert that for a number of reasons – including the Hui’s continuous use since time immemorial and the fact that many have appurtenant,³⁷ riparian,³⁸ and traditional and customary Native Hawaiian rights – the Hui should be exempted from this onerous process altogether. The Hui is still undertaking the kuleana to apply for a water lease from the State Department of Land and Natural Resources (“DLNR”). This process entails approval of a Watershed Management Plan, consultation with the Department of Hawaiian Home Lands (“DHHL”) and the Office of Conservation and Coastal Lands (“OCCL”), the adoption of numeric interim instream flow standards (“IIFs”) by the Commission on Water Resource Management (“CWRM”), as well as compliance with HRS chapter 343.

In tandem, as part of the Hui’s mission and a lifelong commitment to the preservation of natural and cultural resources, the Hui is dedicated to activities and efforts that are beneficial to Wai‘oli Stream, Wai‘oli Watershed, and its resources. This includes maintenance and restoration, experiential educational opportunities, and community outreach, thereby creating a highly effective educational method to cultivate pilina ‘āina³⁹ and to further understand kalo cultivation as a means towards food security, Native species habitat protection, a cultural practice, and longstanding practice of aloha ‘āina.

2.2. Project Location and Site Characteristics

The Proposed Action uses water from Wai‘oli Stream and directs water through the Lo‘i Kalo Irrigation System before returning it to Hanalei Bay. **See Section 3.2.1., Wai‘oli Lo‘i Kalo Irrigation System.** As a part of Hanalei Bay Watershed and within Wai‘oli Ahupua‘a, Wai‘oli Stream is located on the island of Kaua‘i, along its north-facing coast in the traditional district, or moku, of Halele‘a and the State District of Hanalei. Halele‘a extends from Kalihiwai to Hā‘ena, and

³⁷ Appurtenant rights attach to land that used water, usually to cultivate the traditional staple kalo, at the time of its conversion to fee simple (usually, the Māhele of 1848).

³⁸ Riparian rights protect the interests of people who live along river or stream banks to the reasonable use of water from that river or stream on the riparian land.

³⁹ Relationship to ‘āina.

includes seven (7) ahupua‘a.⁴⁰ The State District of Hanalei is slightly smaller and extends from Princeville to Hā‘ena. **See Figure 1, Location Map.**

Wai‘oli Valley is situated within Hanalei Bay Watershed which is comprised of four (4) traditional ahupua‘a: Hanalei, Wai‘oli, Waipā, and Waikoko. From the mountains of these four (4) ahupua‘a, four (4) perennial streams (Hanalei River, Wai‘oli Stream, Waipā Stream, and Waikoko Stream) flow their lengths and empty into Hanalei Bay (DLNR, 2008; Tetra Tech-DOH, 2008). Hanalei River returns to the eastern portion of the Bay, while the remaining three (3) streams return to the westernmost portion of the Bay. The four (4) ahupua‘a in Hanalei Bay Watershed share similar environmental landscapes. Sandy shores along Hanalei Bay give way to low dunes. Immediately inland of the dunes are lo‘i that stretch into the upper valleys and into the shallower valleys on the western portion of the Watershed.

Wai‘oli translates to “joyous waters” (Handy et al., 1991) and is the legendary “birthplace of rainbows” (Handy et al., 1991, 419). Wai‘oli Ahupua‘a is near the center of the Hanalei Bay Watershed, between Waipā Ahupua‘a and Hanalei Ahupua‘a. The Wai‘oli Watershed and Ahupua‘a is 3,483 acres and includes the majority of Wai‘oli Stream (Wai‘oli’s estuary crosses into the neighboring Waipā Ahupua‘a). Wai‘oli Valley is smaller, but much broader and shorter than the valleys surrounding it. **See Figure 2, Hanalei Bay Watershed and State Land Use District Map and Figure 3, Wai‘oli Ahupua‘a.**

Wai‘oli Stream is perennial with a total length of 5.4 miles from the mouth to the base of Nāmolokama Mountain (State OP-GIS, 2020). The stream is fed by at least ten (10) well-formed, intermittently flowing mana wai,⁴¹ originating at the wai hālau on Nāmolokama, Hīhīmanu, and Māmalahoa. The centerline of Wai‘oli Stream is dynamic, and it is historically documented to have changed course within its basin. Even with these shifts, all historic maps show a clear stream channel (Kīpuka Kuleana, 2020). **See Figure 3, Wai‘oli Ahupua‘a.**

As a whole, the larger Hanalei Bay Watershed has been described as a kalana, a traditional Native Hawaiian land division term associated more with systematic biocultural resource management and community identity rather than governance (Winter et al., 2018, 4-5). For centuries, Kānaka Maoli have managed natural and cultural resources within the Hanalei Bay Watershed as a single integrated system to maximize the cultivation of traditional crops and lifeways and to distribute water resources, which has the ability to further mitigate the impacts of flooding. For example, the Wai‘oli Ahupua‘a, in particular, shares stream resources with the ahupua‘a of Waipā and Hanalei. The muliwai⁴² of Wai‘oli is located within the Waipā Ahupua‘a, and two (2) ho‘i⁴³ from Wai‘oli return water to Hanalei River, all eventually terminating into Hanalei Bay. Wai‘oli’s traditional Lo‘i Kalo Irrigation System supports continuous stream flow – a necessary component for Native stream animals and wetland kalo farming. The use of water for kalo irrigation is largely non-consumptive, instream, almost entirely within the Wai‘oli Watershed, and completely within the Hanalei Bay Watershed,

⁴⁰ Land division.

⁴¹ Tributaries.

⁴² Stream/river mouth.

⁴³ The place where the water leaves the lo‘i and returns to the stream.

consistent with the Indigenous tradition of this kalana (DLNR - Land Division, 2020). **See Figure 2, Hanalei Bay Watershed and State Land Use District Map.**

2.3. 2018 Floods

From April 13 to 16, 2018, severe flooding caused major disruption to farmers, residents, visitors, and businesses, triggering State and County Emergency Declarations. Both the Governor of Hawai‘i and the County of Kaua‘i Mayor’s emergency proclamations were extended into October 2020 (County, 2020; State, 2020). In addition, the subsequent March 2020 flood triggered a new County Emergency Decalaration that was extended under the Fourth Supplementary Emergency Proclamation to January 2021. The recent March 2021 severe weather damage triggered the latest Emergency Proclamation that is still in effect as of May 2021. In Governor Ige’s 2018 initial proclamation, he observed the severity of the occurrence as “of such a nature as to warrant rehabilitative assistance from the State.” (State, 2018, 1). **See Figure 14, Site Photos from the 2018 Flooding.**

The most severe flooding occurred over north Kaua‘i from Hanalei to Hā‘ena (NWS, 2018). During the floods, water overflowed the banks of Wai‘oli Stream and spread out across the lo‘i and into Hanalei Town. At several points, water flowed parallel to the coast; the opposite of its usual pattern of flowing towards the ocean (WVTH, 2018). Around midnight on April 15, the second rainfall episode recorded peak rates of five (5) to seven (7) inches per hour. Because the heavy rainfall covered most of the northern drainage basins, stream and river responses created flash flood conditions throughout the area. Documented flash flooding in the adjacent Hanalei River submerged portions of Kūhiō Highway near Hanalei Bridge five (5) to eight (8) feet under water. Around mid-morning on April 15, the thunderstorms anchored themselves further up the slopes of north Kaua‘i, sending another flood wave across area streams and rivers (NWS, 2018). The flash flooding on Kaua‘i destroyed seven (7) homes, with another 65 homes sustaining major damage, and 119 homes sustaining minor damage (State, 2018). Hanalei and Wai‘oli lo‘i kalo were flooded with silt, mud, and debris that ruined crops and destroyed agricultural infrastructure. Four months later, in August 2018, the indirect impact from Hurricane Lane in August 2018 compounded the April damage.

The April 2018 storm produced 53.57 inches of rain in 48 hours, including 49.69 inches during the 24-hour period ending at 12:45 PM on April 15. This 24-hour total has been certified by the National Climatic Extremes Committee (“NCEC”) and now stands as the 24-hour record precipitation for the United States (NCEC, 2019). For perspective, this value supersedes the previous records of 43 inches on July 25-26, 1979 at Alvin, Texas and 38 inches on January 24-25, 1956 at Kilauea, Kaua‘i (NWS, 2018).

The storm generated unprecedented and large-scale flooding of upland and lowland stream corridors, wetlands, and developed communities. The increased energy produced by the streams further mobilized bed load and debris. The transport of debris downstream incised streambanks and cut channels deeper (by as much as four (4) feet) (State DLNR-CWRM FIR, 2019). The flooding and heavy rain immediately changed the landscape and created several new random channels of water. The historic mānowai was destroyed and filled-in with boulders. Further down, the ‘auwai was filled



Image 6A



Image 6B

Above: Images taken from the western side of Hanalei Bay looking toward the south and southwest. *Wai‘oli* Stream is in the foreground. Some of the scars are old, there are fresh landslide scars clearly evident.

Source: NWS, 2020



2018 Flooding

Source: Hui, 2018



Above and right: 2018 Flooding in nearby Hanalei

Source: Hui, 2018



Obstructions along Waioli Stream Intake has reduced water flow to taro fields by 60%, leaving the majority of highly productive taro fields fallow. One year after the DLNR granted the County a right-of-entry to fix the upper intake and remove debris, no contract has been issued.

Source: Nakamura, 2020.

Figure 14: Site Photos from the 2018 Flooding

with materials from the landslide in several areas, fallen trees, debris, and ‘ili‘ili.⁴⁴ In some places, ‘auwai banks were completely washed away. The impact of debris and fallen trees caused water to be redirected, resulting in the immediate halt of all water flow into the lo‘i. The following weekend, over sixty farmers and community members from across the island joined the Hui to remove fallen trees, rocks, boulders, and debris. This enormous and urgent work was done by hand using hand tools, and manually restored stones to allow for the temporary water flow through the po‘owai.⁴⁵

The damage from the 2018 flooding destroyed most of the crop and what was left had to be harvested prematurely before it went bad. It also forced lo‘i out of production, and significantly altered the timing and sequence of lo‘i preparation, planting, kalo growth, and harvesting. Blockages and reduced water flow dried out individual lo‘i and exposed mature-stage kalo. The kalo quickly rotted and attracted feral animals, like pigs, that destroyed crops, and importantly, the huli – the portion of the kalo that farmers use to propagate the next generation of kalo plants. Some Hui members lost multiple crops in varying stages of growth, a process that typically takes at least a year (**see Section 3.2.2 Kalo Cultivation in Wai‘oli**), while many lacked sufficient water to plant new lo‘i. To compound the normal day-to-day challenges in any given year, every farmer had equipment or tools that were flooded, permanently damaged, or required significant repair (WVTH, 2020).

Approximately a year after the flood, in 2019, in support of the Hui’s efforts to maintain its Lo‘i Kalo Irrigation System, a team from the University of Hawai‘i (“UH”) at Mānoa Department of Natural Resources and Environmental Management (“NREM”) and UH Sea Grant interviewed over 70 community members, government representatives, first responders, and nonprofit leaders about lessons emerging from the floods. One of the study’s key findings was the importance of maintaining streams and waterways, as well as preventing future flooding by strategically clearing invasive plants and overgrowth that have the potential to create dams or redirect floodwaters to prevent future flooding.

By experiencing the immediate and crippling effect of water shortages amplified by upstream overgrowth, the Hui recognizes the critical need for collective coordination of ongoing maintenance and a commitment to continuous water flow to ensure a future for Wai‘oli kalo cultivation.

⁴⁴ Pebbles.

⁴⁵ Headwater where water enters into the irrigated ditches where it flows until reaching the lo‘i.

2.3.1. Flood Relief Efforts

During the disaster recovery and repair efforts, the Hui was informed that a portion of the Lo‘i Kalo Irrigation System, including the mānowai and upper portions of the ‘auwai that the Hui has stewarded for many generations, is located on State Conservation land. Thus, to complete the necessary repairs and ensure the ongoing use of Wai‘oli Stream for traditional lo‘i kalo cultivation, the Hui would be required to understand government compliance rules that could trigger a variety of permitting and related approvals.

Since the 2018 floods, the Hui has worked closely with the County and State to understand and pursue entitlements that ensure the long-term viability of lo‘i kalo cultivation. Given the severity of the damage caused by the 2018 floods and the potential for future destruction, other community partners have come forward to support immediate and long-term solutions. In January 2019, the Hui began collaborating with UH Mānoa’s William S. Richardson School of Law’s Environmental Law Clinic and Native Hawaiian Rights Clinic (“Clinic”)⁴⁶ to establish a more streamlined process with government agencies to permit and repair the Wai‘oli Stream mānowai and ‘auwai.

With the Clinic’s support, the Hui established itself as a 501(c)(3) nonprofit, formally organizing to apply for and hold permits, easements, and water leases, and to work with State, County, and Federal agencies as a legal entity. Next, the Clinic submitted the Hui’s application to the State Board of Land and Natural Resources (“BLNR”) for an easement to repair, maintain, and steward the historic Lo‘i Kalo Irrigation System. During the process, the Hui consulted with DLNR, CWRM, and OCCL. The mānowai is now registered with State entities, including CWRM and DLNR’s Land and Engineering Divisions. In addition, staff from CWRM and the Attorney General’s office have conducted site inspections of the mānowai system (State DLNR-LD, 2020).

In May 2019, BLNR voted unanimously to approve a gratis, 55-year Non-Exclusive Easement for the Hui for surface water diversion and irrigation purposes as well as an immediate right of entry. Then, in February 2020, the Board determined that a perpetual (versus 55-year term) easement was appropriate for this situation, noting research conducted by the Office of Hawaiian Affairs, which “concludes that this [irrigation] system existed in pre-contact times; e.g., prior to the arrival of Captain Cook in about 1778.” (State OHA, 2019, 5) The easement allows the Hui to construct, use, maintain, repair, replace and remove surface water diversion and irrigation systems over, under, and across State-owned land. The easement area spans approximately 6.627 acres within TMK (4) 5-6-002:001 and (4) 5-5-008:018. Located in the State Conservation District, the non-exclusive easement was deemed exempt from HRS chapter 343 review (State DLNR-LD, 2020). **See Figure 15, BLNR Non-Exclusive Easement Area.**

Notably, during this process, BLNR praised this partnership as the first co-management of natural and cultural terrestrial resources between a community group and BLNR. The Hui has agreed to share its intergenerational and local knowledge and expertise to guide and coordinate stewardship of this invaluable natural and cultural resource, along with the work it is already undertaking to restore the health of the Wai‘oli Stream, Wai‘oli Watershed, and ‘auwai system (Kīpuka Kuleana, 2020;

⁴⁶ As a second and third year course at the William S. Richardson School of Law, the Native Hawaiian Law Clinic and Environmental Law Clinic provide students with practical legal experience working on issues pertaining to environmental and Native Hawaiian rights and provides direct legal services to rural Hawai‘i communities.

WVTH, 2020). Because of the Clinic and the Hui’s efforts, repair and restoration of these areas begun in earnest in July 2020. In 2021, the Hawai‘i State Legislature passed HCR 163 – a resolution authorizing the Hui to engage in direct negotiation with BLNR for a water lease after the completion of Chapter 343 requirements. Today, the Hui, implementing its organizational mission, is actively stewarding both the watershed and Wai‘oli Lo‘i Kalo Irrigation System. As part of this effort, the Hui has drafted the Wai‘oli Valley Taro Hui Watershed Management Plan (“Draft Hui Watershed Management Plan”) pursuant to the DLNR water lease requirements under HRS section 171-58.

With support from natural and cultural resource partners and the County of Kaua‘i, the Hui continues to mitigate the damage caused by the devastating 2018 floods and more recent weather events. The County of Kaua‘i has expressed its commitment to repairing the traditional mānowai and supporting the work to repair other portions of the Lo‘i Kalo Irrigation System. At present, however, no government organization has taken responsibility for clearing the significant amount of invasive debris from Wai‘oli Stream, which continues to clog the waterway, impeding the water and contributing to water quality and flood conditions. The Hui has taken the initiative to formalize programmatic care of the larger Wai‘oli Ahupua‘a and Watershed. The Hui has also worked to request a County of Kaua‘i Grant to strategically clean Wai‘oli Stream. The Hui also seeks to submit proposals and grant requests to remove debris and damage caused by the 2018 floods. These additional efforts could allow the Hui to collect baseline data on water quality, stream flow, Native aquatic species, and Native fauna in Wai‘oli Stream as well as conduct outreach and educational efforts. Initial restoration analysis and strategic efforts could begin at the Wai‘oli Stream ho‘i and additional baseline data could inform a strategic long-term stream cleaning plan. Realizing the importance of this work, the Hui also plans to collaborate with other partners and organizations working within the Hanalei Kalana and Watershed.

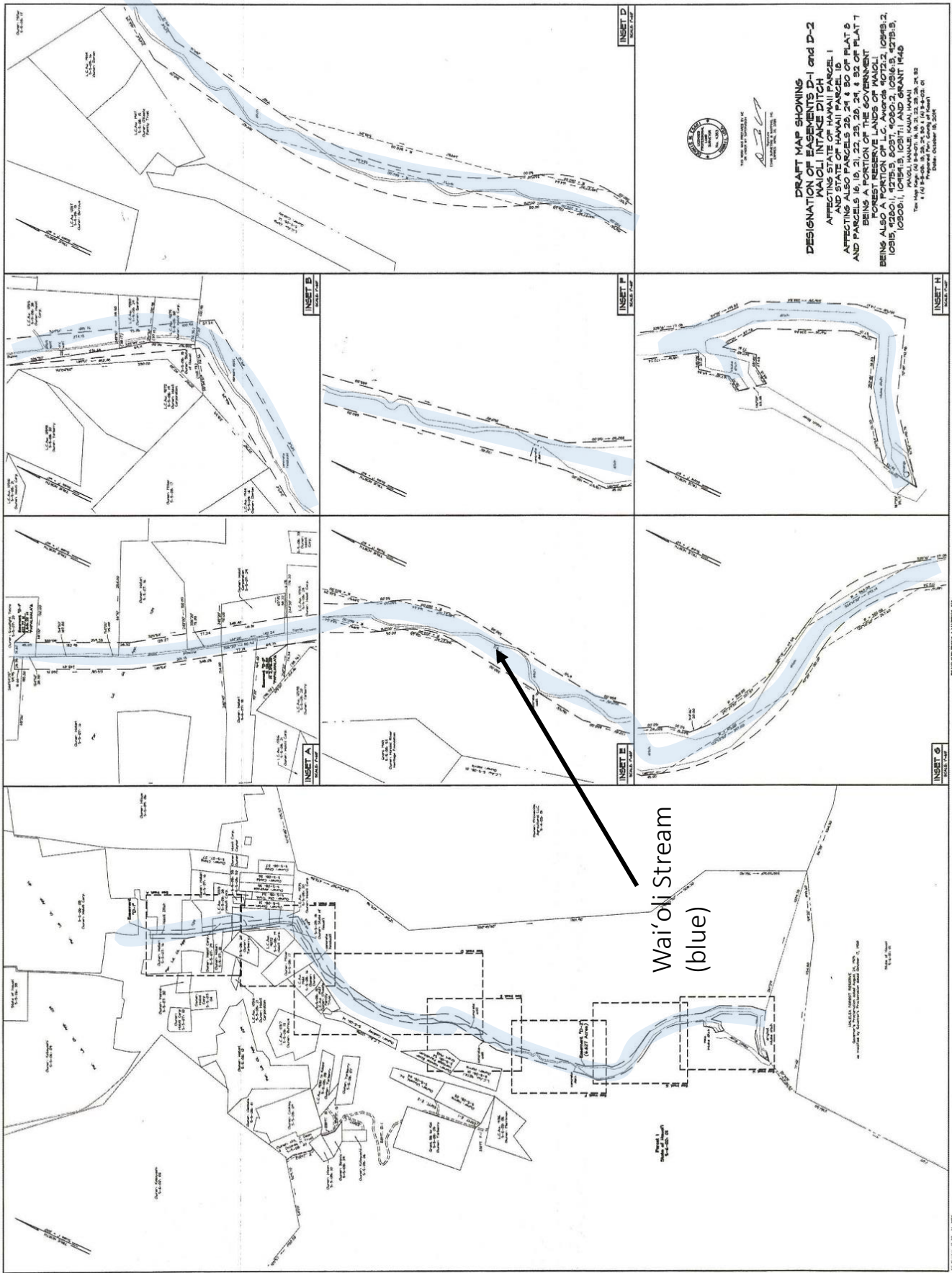


Figure 15: BLNR Non-Exclusive Easement Area

2.3.2. Lo‘i Restoration

Following the 2018 flood, the Hui began the slow and tedious work of restoring the physical Lo‘i Kalo Irrigation System in order to reorient the important cycles of kalo cultivation. Just as in generations past, the Hui continually addresses and mitigates potential and future damage caused by the severe weather events that have historically affected Wai‘oli Ahupa‘a and the larger Hanalei Kalana (Leu Cordy & Merrin, 2020, 20-22). While lo‘i maintenance is part of the Hui’s regular day-to-day farming operations, lo‘i restoration, entails more time- and labor-intensive work. Restoration work outlined below is often required after large rain and weather events when farmers must restore the system both in their individual lo‘i as well as with the greater irrigation system. Naturally, lo‘i restoration efforts overlap with lo‘i maintenance, which is outlined in greater detail in **Section 3.2.2, Kalo Cultivation in Wai‘oli.**

Removing Debris & Unblocking Waterways

After a flood or a prolonged water event, silt and other debris (e.g., leaves, downed trees, etc.) accumulate in the stream and Lo‘i Kalo Irrigation System and restrict water flow. In the stream and ‘auwai, shallow-rooted fast-growing trees like Albizia and Trumpet Tree fall over easily and block or damage the intake. Hau bush is also prevalent in the area and creates debris. ‘Ili‘ili and silt that have been pushed into the Lo‘i Kalo Irrigation System are dug out with shovels. The silt is then used to reinforce the banks of the ‘auwai or lo‘i around the area in which it had settled. There is no dredging or hauling of silt and sediment outside of or away from the area in which the waters have deposited it. The Hui uses hand tools like sickles, shovels, cane knives, loppers, and chain-saws to remove debris such as fallen trees, branches, and other plant matter from the ‘auwai to prevent clogging and jamming in the system.

Due to its impermanent nature, the mānowai may also break due to severe water flow(s). The rocks of the mānowai are loosely stacked which allows the dam to break away as a means to prevent flooding in the area. This prevents the full force of the water from rushing into the Lo‘i Kalo Irrigation System that could totally undermine banks and push more debris and sediment into the main ‘auwai. Because this affects the water flow to the lo‘i, the mānowai is repaired by restacking the rocks by hand.

Restoring Lo‘i And ‘Auwai Integrity

After severe floods like those in April 2018, ‘auwai banks are often completely washed away or breached in a way that water flows out of the main channel. Thus, banks must be restored and lo‘i must be re-leveled to adjust and adapt to changes in water flow. The Hui uses the silt that usually washes down into the ‘auwai and lo‘i to shore up the breaches or reinforce the banks. They use shovels to scoop out the silt and place it on the nearby bank. No machinery is involved in silt removal from the ‘auwai or the lo‘i. After this is done, the farmer will prepare their lo‘i for planting by tilling about four (4) to six (6) inches into the topsoil of their individual lo‘i. The dirt is then leveled to see if the outflow or intake pipes need to be adjusted due to a possible increase in dirt height and depth. After the 2018 flood, machines were needed to dig out silt that covered the lo‘i and parts of the ‘auwai system because of the severity of the damage and the amount of silt and debris.

Retaining Access To Areas Requiring Restoration

Especially after floods that change stream courses and the natural environment, retaining access to areas requiring maintenance and restoration of the Lo‘i Kalo Irrigation System is a challenge. After the 2018 flood, debris and trees limited the Hui’s access to the mānowai, po‘owai and some areas of ‘auwai. Similarly, the recent March 2021 flood ruined parts of the access road. Because parts of the system are located on State lands and this restoration work requires cooperation among all stakeholders, restoring parts of the Lo‘i Kalo Irrigation System necessarily includes collaboration with State and County agencies and officials.

Reconfiguring Preparation, Planting, & Harvesting Plans

Severe weather events interrupt the normal kalo cultivation cycle. After severe floods, the Hui must assess a number of factors: the weather, how damaged the system is, whether crops can be harvested or recovered, and whether equipment is working. Crops ruined in floods are used in several ways: huli may be taken and saved for replanting future crops, some parts are fed to animals, and others are plowed back into and feed the soil. Once weather permits and lo‘i are dry enough, or “reset,” the farmers must start the year-long planting process from the beginning. If farmers cannot recover huli, then planting is set back further, and they may have to acquire huli from others or wait until they can get a new generation of keiki.⁴⁷

Mitigating Invasive Vegetation & Overgrowth

As further discussed in Section 3.2.2, weeds are also an ongoing problem for all farmers – especially after heavy flooding (Evans, 2008). Like most kalo farmers, the Hui’s weed management strategy is to suppress, or eliminate weeds long enough to get a kalo leaf canopy that shades the soil and prevents weed growth. (Evans, 2008, 95). “Weeds can out-compete a young kalo plant and are particularly damaging during the first four months of kalo growth. Weeds can also harbor kalo parasites, such as insect pests, apple snails, and plant pathogens. When the maturing taro is in the final growth stages, weeds can reduce corm yields and make harvesting more time- and labor-intensive if left unchecked” (Evans, 2008, 95). Apple snails damage kalo plants by chewing into the i‘o or eating the younger shoots.

Overgrowth of vegetation and trees threaten ‘auwai integrity and restrict water flow through the Lo‘i Kalo Irrigation System. Downed trees also cause landslides because of their shallow roots. Hau can get thick and block waterways, causing a rush of floodwaters when it does break through. Floods bring in other weeds or move weeds and seeds, like buffalo grass, into the lo‘i fields themselves. If the lo‘i are dry because the ‘auwai is damaged and cannot channel water into the lo‘i, then weeds will continue to grow without the water level to drown-out weeds, and kalo leaf canopy that typically shades out weeds. When the fields are dry and unplanted, sickles or weedwackers are used to cut down grass and weeds in the lo‘i and along the banks. If the patch is already planted, all weeding is done by hand.

Combatting Pests & Feral Animals

While recovering from floods, the Hui must regularly monitor and control pests, animals, and any diseases they might carry. After severe flooding, there is often less food for pigs up ma uka,⁴⁸ so

⁴⁷ Young kalo.

⁴⁸ To / towards the mountain.

they come down to eat out of the fields and break up banks, threatening the lo‘i integrity and setting back cultivation further if huli are ruined and unable to propagate the next generation of kalo. Flood waters also carry snails and other pests into the Lo‘i Kalo Irrigation System, including into individual lo‘i. In addition to causing agricultural damage, these pests, and apple snails in particular, are also a threat to human health as well.

3. Project Description

3.1. Proposed Action

For the Hui and the Wai‘oli community, traditional kalo cultivation is a crucial part of the fabric of this small town’s identity. Located on the North Shore of Kaua‘i, and like many kalo farmers throughout Hawai‘i pae ‘āina, kalo cultivation is an integral part of the Hui’s kuleana ‘āina⁴⁹ and tie that binds them to Native Hawaiian customs, traditions, and worldviews. Wai‘oli kalo cultivation connects families through generations and is a time-honored part of Wai‘oli’s history and legacy. The water that flows through Wai‘oli’s ancient Lo‘i Kalo Irrigation System is a lifeway that supports kalo cultivation traditions and perpetuates a living Hawaiian culture; it feeds the community, facilitates pilina,⁵⁰ and prepares the next generation to carry on this vital practice. Ma ka hana ka ‘ike – the learning is in the doing (Pukui, 1983). For the farmers of the Hui, their ‘ike has been cultivated and refined by generations of kama‘āina of Wai‘oli.

The Hui seeks a long-term water lease for up to 13.5 million gallons per day (“mgd”) of instream, throughflow water to support up to 84-acres of existing lo‘i in Wai‘oli Valley. In 1989, the Hui declared and in the early 1990s the Water Commission verified that Hui members were using this amount of water for the same lo‘i they continue to cultivate today. There is no expansion of use. The Hui seeks only legal permission for the same amount of water necessary to cultivate the same fields these same families have stewarded on private land outside the Conservation Zone for four or more generations. Moreover, these 84 acres, are not in production at the same time because the cultivation cycle and process includes fallow lo‘i. **See Section 3.2.2, Kalo Cultivation in Wai‘oli.** The Proposed Action seeks the necessary throughflow to perpetuate traditional kalo cultivation, an ongoing traditional and customary Native Hawaiian practice; supports the stewardship of biocultural watershed resources that are closely intertwined with stream flow; contributes to local food security; sustains this small community of farmers; and, maintains an ancient system that has been vital to Wai‘oli for centuries.

The 2021 Draft Hui Watershed Management Plan, referenced in this EA, outlines the Hui’s intentions to establish baseline conditions to better assess threats and vulnerabilities into the future; identify best management practices to enhance watershed health; facilitate and monitor restorative work in the forested uplands; and maintain and improve surface and ground water quality. The Draft Hui Watershed Management Plan is informed by and enacts aspects of existing watershed management plans. The Hui seeks to identify and actualize best management practices as a means to embrace the community’s sense of kuleana as a means of fostering long-lasting sustainable

⁴⁹ Responsibility to land.

⁵⁰ Relationships.

management practices grounded in traditional Native Hawaiian biocultural knowledge (Draft State DLNR-DOFAW & Hui, 2021).

This EA will detail the potential environmental impacts of continued traditional water use in an effort to “fit an old [traditional] system into a new legal system” as BLNR Chair Suzanne Case highlighted (BLNR Meeting, Feb. 28, 2020).

3.2. Purpose of the Project

The purpose of this project is to secure legal approval for existing lo‘i kalo cultivation use of throughflow water from Wai‘oli Stream, a unique and place-based traditional and customary use. Based on and in line with historic and existing use of this traditional irrigation system, and consistent with the State Commission on Water Resource Management’s 2021 numeric Interim Instream Flow Standard (“IIFS”) for Wai‘oli Stream, the Hui is requesting all water in excess of the amended IIFS of 4.0 million gallons per day (“mgd”), up to 13.5 mgd as historically used to support lo‘i kalo cultivation on private land outside the Conservation district.

The Hui’s use of throughflow water – cool, fresh water flowing through the lo‘i – is for kalo cultivation. The usage is not “consumed” like typical off-stream users because the water returns to the stream over the course of a short period of time (CWRM, 2019). For these reasons, instream, in-watershed kalo cultivated in a traditional manner has earned special protection and respect under our State Constitution (including Article XI, sections 1 and 7 and Article XII, section 7), Water Code (HRS chapter 174C-101), and court decisions (*In re Waiāhole Combined Contested Case*, 94 Hawai‘i 97, 132, 9 P.3d 409, 444 (2000)).

Globally, kalo cultivation is lauded as a symbol and representation of Hawai‘i, its rich culture and its history. In Hawai‘i, the vast extent of kalo cultivation covered nearly 250,000 acres and supported between 300,000 to 800,000 people pre-contact (Kagawa-Viviani et al., 2018). Wai‘oli Valley, and Wai‘oli Stream in particular, is exceptional because of its historic and ongoing commitment to traditional kalo cultivation in a traditional manner. As a cultural practice, kalo cultivation’s significance is also found in its spiritual foundation and its connection to the past (UH-DURP, 2002). Kalo cultivation specifically within Wai‘oli Valley has been widely recorded in historical reports, journals, and nūpepa⁵¹ since the mid-1830s (Ka Nupepa Kuokoa, 1865). More recently, the State’s 1990 Hawai‘i Stream Assessment (“HSA”) recognizes Wai‘oli Stream as one of only six (6) streams throughout the pae ‘āina that historically supported more than fifty (50) acres of kalo cultivation; HSA’s largest category in terms of acreage of cultivation supported by a stream (Hawai‘i Stream Assessment, 1990).

This Lo‘i Kalo Irrigation System is a lifeway that supports kalo traditions – cultivation, harvest, preparation and sharing food – all of which create close ties within and among families and community. These traditions perpetuate a living Hawaiian culture. For Wai‘oli and Halele‘a, these communities’ genealogical connection and social relationships are intricately connected to ‘āina, its diverse ecosystems, and natural resources (Vaughn, 2018, 91). As described by Mehana Vaughn, a

⁵¹ Hawaiian language newspapers.

kupa (native, well-acquainted) of Halele‘a moku herself, in her 2018 book “Kaiāulu: Gathering Tides”:

‘Āina needs people to connect, call out, and care for it in order to retain its character, just as families need ‘āina to retain who they are. A place and its people are one and the same. Relationships to land are inseparable from the exercise of kuleana. People of a place have responsibilities that take work: perpetuating stories and names, watching for changes and chronicling them, protecting, welcoming, learning, and teaching. These responsibilities are larger than any one [isolated] piece...” (124).

In ancient Hawai‘i, “a farmer took as much as he required and then closed the inflow so that the next farmer could get his share of water - and so it went until all had the water they needed. This became a fixed thing, without greed or selfishness” (Handy et al., 1991, 58). This practice of cooperation is grounded in one’s contribution, and one’s acknowledgement of his/her kuleana to other kama‘āina and to ‘āina itself. As they have for generations, the Hui is always cognizant of the availability of water, the health of the ‘āina, how their use affects others, which means sharing the water with the other kalo farmers, especially those who are on the lower end of the ‘auwai system.

The Hui’s water use is generally non-consumptive and an instream, traditional and customary Native Hawaiian practice used for a public trust purpose. The State’s 2019 Water Resources Protection Plan notes that “typically, all water use in Hawai‘i is consumptive, with the exception of stream diversions for ornamental ponds or taro lo‘i that return water to the stream over the course of a short period of time and at a point relatively near the initial diversion. Water loss due to evaporation, seepage, and evapotranspiration in such diversion scenarios can be considered as negligible, due to the relatively small displacement in location and limited time frame” (CWRM, 2019, 72).

This traditional Lo‘i Kalo Irrigation System is consistent with the Indigenous tradition of this specific kalana that is associated with systematic biocultural resource management and community (State DLNR-LD, 2020; Winter et al., 2018). Water use in this context not only supports kalo growth, but also supports Native habitats and mitigates other technical challenges (weeds, pests, and disease) when cultivating kalo. To meet kalo’s biological needs, cool water must flow over plant roots to ensure the health and productivity of the kalo (Gingerich et al., 2007). Kalo grown in lo‘i requires “cool water flowing over plant roots to ensure the health and productivity of the crop. Irrigation, therefore, needs to provide more water than what is consumed in the lo‘i through evaporation from open water, transpiration through the kalo leaves, and percolation through the lo‘i bottom and sides” (Gingerich et al., 2007, 2).

The water use, or “water duty,” includes both the amount needed for actual consumption by the kalo plant and the amount required to flow through the lo‘i to maintain the naturally cool water temperatures, preventing unfavorable growing conditions that lead to crop failure (i.e., pests and diseases). Both amounts are necessary to farm kalo successfully and to calculate a realistic measure of water use. Thus, the per acre water use of kalo cultivation is an average over the entire area; including fallow lo‘i and uncultivated areas (i.e., kuāuna). Generally, areas with greater proportions of lo‘i that are in the planted and growing phase (i.e., not fallow) will approach the upper end of this range and require more water (Reppun, 2007).

Water duty – and securing a long-term water lease – is integral to kalo cultivation’s ongoing success in Wai‘oli. Paul Reppun, a kalo farmer with over three decades of experience, is an expert witness on kalo cultivation and its water duty in multiple proceedings before CWRM. In 2007, he was also a consultant on the United States Geological Survey’s (“USGS’s”) study “Water Use in Wetland Kalo Cultivation in Hawai‘i,” which broadly documented and confirmed water use and temperatures in wetland kalo farming operations across Hawai‘i, including Wai‘oli. The actual volume of water needed is location specific and dependent on a host of factors including elevation, soil type, percent shade, growth stage of the plant, variety of kalo, whether it is an individual lo‘i or part of a lo‘i complex, and where along the ‘auwai an individual lo‘i is situated (Reppun, 2007).

Recognizing that an appropriate water duty is site specific, the Hui recognized early on that the water duty is likely aligned with the 1989 CWRM’s verification in the range of 10 to 13.5 mgd. Moreover, the Hui will, in line with traditional practices and as it has for more than a century, divert only the amount needed with all remaining and excess water remaining in or returning to Wai‘oli Stream or Hanalei River – both of which return to Hanalei Bay. As part of the water lease process, the Hui worked with CWRM to establish a numeric IIFS of 4 mgd for low flow conditions, which is approximately 50% of Wai‘oli Stream’s flow. This model was designed to support the Native Hawaiian custom of keeping half of the stream’s flow remaining in the stream. **See Appendix B, CWRM May 2021 Submittal.**

3.2.1. Wai‘oli Lo‘i Kalo Irrigation System

Since time immemorial, the Wai‘oli Lo‘i Kalo Irrigation System was created and maintained for subsistence and cultural purposes.

“The earliest depictions of water in the Wai‘oli Lo‘i Kalo Irrigation System appear on a map surveyed and drafted 147 years ago. Surveyed depictions of the ‘auwai and recorded descriptions and testimonies of lo‘i kalo in the Wai‘oli System, by Hawaiian farmers, date back 169 years. The written history of Wai‘oli and records of irrigated kalo extend back 185 years. This research reveals not just the presence, but the abundance, of irrigated lo‘i kalo cultivation for hundreds of years in this specific area” (Leu Cordy & Merrin, 2020, 73).

This system, beginning with the mānowai, directs water through the ‘auwai to lo‘i and then returns it to the Wai‘oli Stream through ho‘i, with minimal loss to evapotranspiration and seepage (Draft State DLNR-DOFAW & Hui, 2021). **See Figure 16, Wai‘oli Lo‘i Complex Landscape and Figure 17, General Lo‘i Kalo Irrigation System.** The following describes the Lo‘i Kalo Irrigation System that begins at the historic traditional mānowai, which is 1.8 stream miles from the Wai‘oli Muliwai. **See Figure 18, Wai‘oli Lo‘i Kalo Irrigation System and Figure 16, Wai‘oli Lo‘i Complex Landscape.**

Mānowai: Located 1.8 stream miles⁵² from the Wai‘oli Muliwai, the mānowai is an impermanent traditional Native Hawaiian water intake system. The mānowai utilizes strategic natural rock placements to slow the speed and intensity of the stream, channeling some water to the po‘owai, a

⁵² Stream miles are based on ESRI ArcGIS measurements taken from the centerline of State GIS stream data. number was calculated using GIS measurements along the stream.

secondary water intake. The mānowai is where a portion of water from Wai‘oli Stream begins to flow towards the lo‘i. The impermanent rocks are designed to breakaway during heavy rains and flooding. The historic mānowai location is ideal because of the grade and slope in the Stream. See **Figure 19, Site Photos – Upper Reaches (State Conservation District)**.

The significance of the mānowai is found in ‘ōlelo Hawai‘i. A mānowai is the origin of any ‘auwai or traditional Lo‘i Kalo Irrigation System. In ‘ōlelo Hawai‘i, mānowai is also the word used to describe the human heart and circulatory system that pumps blood through the body’s veins. This dual meaning is an appropriate analogy for the way that the Lo‘i Kalo Irrigation System’s mānowai channels water through the various ‘auwai and the body of the Lo‘i Kalo Irrigation System.

Po‘owai: The po‘owai is the headwater and is located 1.42 flowpath⁵³ miles from the muliwai, and 0.38 flowpath miles downstream from the mānowai. The water then enters the ‘auwai where it flows until reaching the individual lo‘i. At the po‘owai, the water splits into two paths, with both paths running parallel to Wai‘oli Stream. The first path immediately returns water back into the Wai‘oli Stream (the first ho‘i). Thus, the po‘owai acts as a spillway, further regulating the speed and intensity of water entering into the Lo‘i Kalo Irrigation System, returning water back to the stream. The second path sends water along the main ‘auwai north into the Wai‘oli side of the Lo‘i Kalo Irrigation System and then flows east towards the Hanalei side of the Lo‘i Kalo Irrigation System. The po‘owai’s second path splits 0.96 flowpath miles from the muliwai at Hanalei Bay, entering the Wai‘oli plain, which is dotted with lo‘i.

‘Auwai: From the po‘owai, the water enters into the ‘auwai where it flows until reaching the lo‘i. With 6.16 flowpath miles of actively maintained ‘auwai, this particular irrigation ditch is used to transport water from one place to another and is fed by Wai‘oli Stream. From the main ‘auwai, many smaller ‘auwai branches flow in and out of individual lo‘i before returning to the main channel through eight (8) ho‘i that mark the terminus of the Lo‘i Kalo Irrigation System. From the po‘owai to the ho‘i, this system of interconnected fields and flowing water has defined the Wai‘oli plain for hundreds of years (Handy et al., 1991, 420).

Lo‘i: The lo‘i are the fields or complexes of individual lo‘i where kalo is grown and through which water flows. The lo‘i range in size from 0.08 acres to 0.6 acres. Just as kalo cultivation practices vary by individual farmer, the individual lo‘i also vary in size. To thrive, lo‘i kalo rely on the availability of continuously flowing cool, fresh water. Water use varies throughout the kalo growth stages and in response to unique natural environmental conditions such as rain or drought, sun or cloud cover, humidity, and temperature (Gingerich et al., 2007). The farmer must intimately understand the natural environment along with its relationship to kalo farming in order to successfully support kalo growth. This is done through the management and control of the water levels within each individual lo‘i and throughout the entire Lo‘i Kalo Irrigation System itself. See **Figure 20, Site Photos of Wai‘oli Lo‘i (State Agricultural District)**.

⁵³ Flowpath miles are based on ESRI ArcGIS measurements from the auwai centerline; shapfile data are from A.Strauch and D.Cordy.

Inflow and Outflow: Each individual lo‘i requires an inflow and outflow to accommodate throughflow water in the lo‘i kalo. The Hui farmers typically use an open ditch or a PVC pipe. Depending on the size of the lo‘i, larger lo‘i may utilize six-inch pipes or additional smaller pipes. A few medium-sized stones are usually positioned around the mouth of the pipe to prop up the pipe. Stones are also used at the inlet so water splashes on the stones as not to erode the dirt at the intake. Water does not continuously flow through all lo‘i at all times during the year. Rather, there are periods when some lo‘i are dry, or fallow, and require no water. There are also periods when the water inflow is limited and stages when the outflow is closed. To manage water needs, farmers often use elbow pipefittings. The elbow is fitted to the pipe that connects the lo‘i and ‘auwai. The elbow fitting creates a lock to stop water from entering the lo‘i and/or flowing out of the lo‘i. The elbow allows the farmer to adjust water flow by angling the top of the elbowed pipe so that the pipe’s opening is above water (no flow), skims the top of the water (limited flow), or is level with the water. This allows the farmer to control the volume of water flowing into or out of the lo‘i. Prior to the use of elbow pipefittings, farmers would limit water flow by using a flat surface such as a wood board, utilizing natural water pressure to stop the water flow into or out of the lo‘i. **See Figures 20a and 20b, Site Photos of Wai‘oli Lo‘i (State Agricultural District).**

Ho‘i: Water flowing through the Lo‘i Kalo Irrigation System, specifically the ‘auwai, is returned to Wai‘oli Stream or Hanalei River through eight (8) ho‘i. The ho‘i is a natural ditch or return that cannot be closed off. Of the eight (8) ho‘i, six (6) are staggered at 1.43, 0.89, 0.72, 0.64, 0.54 and 0.46 flowpath miles from the Wai‘oli muliwai at Hanalei Bay, and two (2) additional ho‘i support a further branch of the ‘auwai to the east located 0.92 and 1.01 flowpath miles from the Hanalei muliwai at Hanalei Bay. In relation to the po‘owai, the ho‘i are located 0.07, 0.61, 0.78, 0.86, 0.96, and 1.04 flowpath miles from the po‘owai. The two (2) additional ho‘i that return to Hanalei River are 1.71 and 1.56 flowpath miles from the Wai‘oli po‘owai (State OP-GIS, 2020). In addition to these eight (8) ho‘i, a historic ‘auwai has been transformed into a storm culvert by the County of Kaua‘i. The water still leads back to a culvert ho‘i into Wai‘oli Stream. The Lo‘i Kalo Irrigation System has two outflows into this historic ‘auwai. The culvert ho‘i and historic ‘auwai are no longer under the control of the Hui. **See Figure 20a, Site Photos of the Ho‘i at Wai‘oli Stream and Figure 20b, Site Photos of the ‘Auwai to Ho‘i at Hanalei River.**

The Hui has the kuleana of maintaining the ho‘i, primarily keeping them clear of debris and overgrowth that may hinder the Lo‘i Kalo Irrigation System. As a key component of the Lo‘i Kalo Irrigation System, the ho‘i also tempers and distributes any overflow from heavy rains and floods, reducing the force and impacts of floodwaters on the main stream and the residential and commercial areas further ma kai⁵⁴ (Kīpuka Kuleana, 2020). **See Figure 21a, Site Photos of the Ho‘i at Wai‘oli Stream and Figure 21b, Site Photos of the ‘Auwai to Ho‘i at Hanalei River.**

Muliwai: Upon exiting the Wai‘oli Lo‘i Kalo Irrigation System, stream water flows ma kai, moving between, through, and alongside privately owned properties. These properties include residential dwellings, vacation rentals, pastures, open lots, and general agricultural lots. The water then flows under Kūhiō Highway to Hanalei Bay. Finally, the water reaches the estuary and the muliwai at Hanalei Bay. Here, the water feeds Halulu Fishpond, a traditional loko i‘a pu‘uone⁵⁵ located within

⁵⁴ To/towards the ocean.

⁵⁵ Inter-tidal fishpond.

Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation
Final Environmental Assessment, August 2021

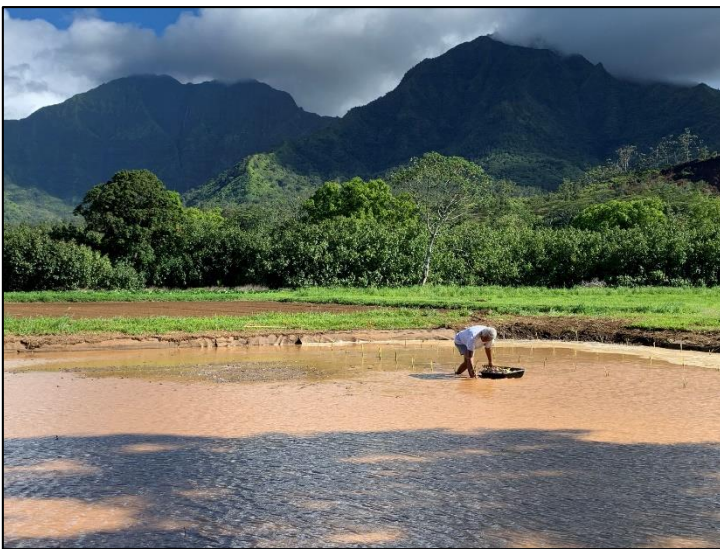
Kamehameha Schools’ land before entering the western side of Hanalei Bay. **See Figure 22, Site Photos of the Wai‘oli Estuary and Muliwai (State Conservation District).**



Source of Water – Nāmolokama – November 2019



Wai‘oli Stream Early Morning – January 2020



Planting huli – June 2020



Wai‘oli Valley – Hihimanu (left), Nāmolokama (center), and Māmalahoa (right) – July 2017



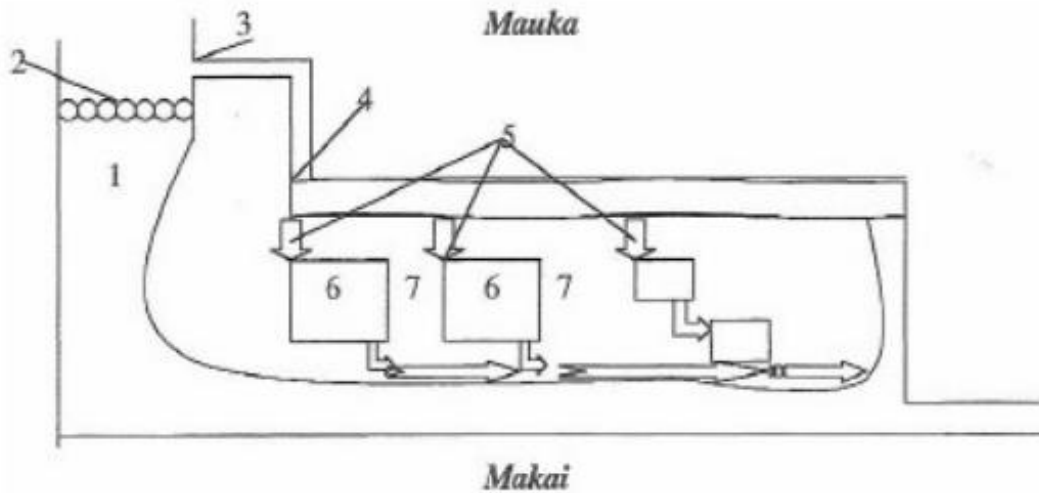
Harvesting – June 2020



Active lo‘i at various stages of kalo growth – 2020

Figure 16: Wai ‘oli Lo ‘i Complex Landscape

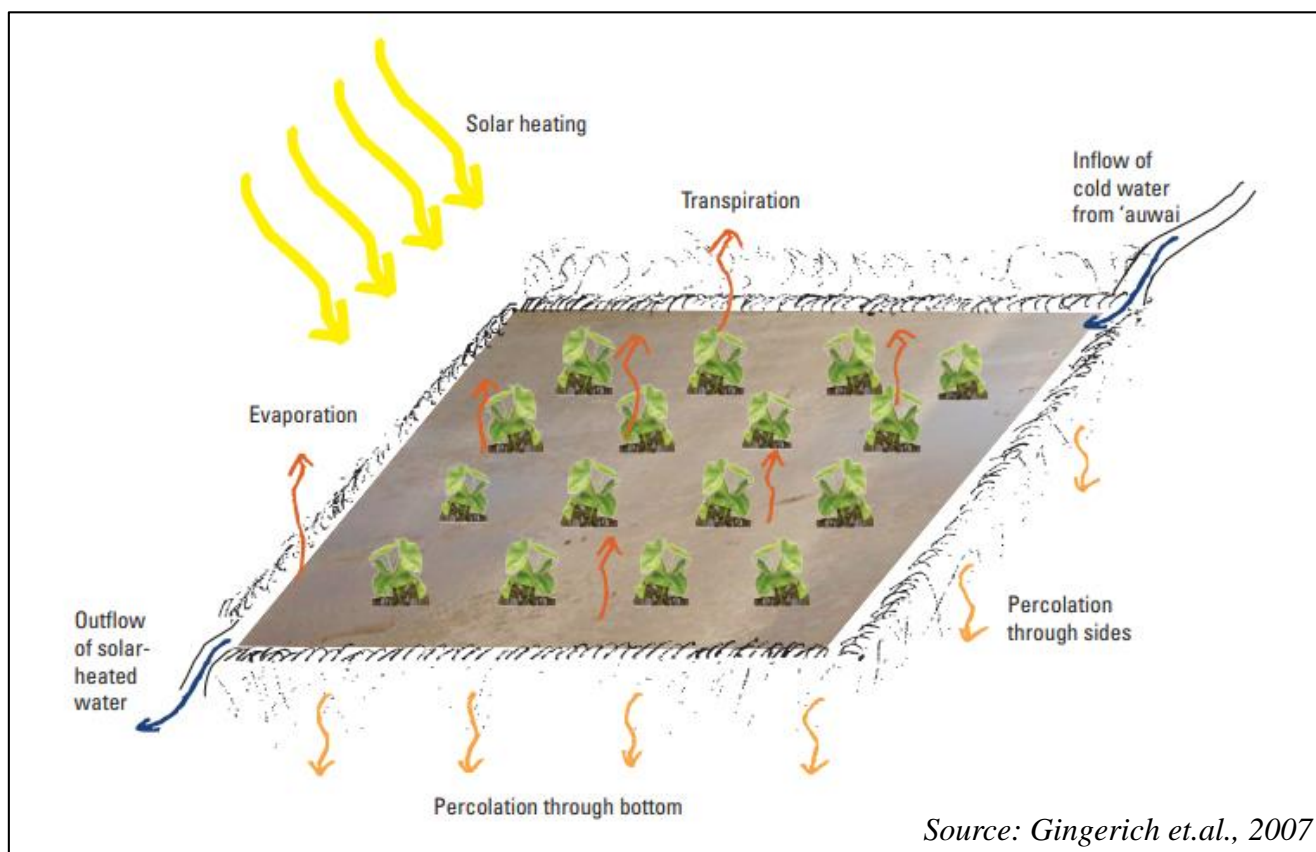
Source: Wai ‘oli Valley Taro Hui



Source: DURP, 2002, p. 59

- 1) Kahawai: main stream flow
- 2) Manōwai: dam barrier that redirects water flow from the kahawai into the 'auwai
- 3) Po'owai: headwaters of the 'auwai system
- 4) 'Auwai: irrigation ditch that takes water from the kahawai into the lo'i
- 5) Makawai: inflow points that regulate water flow from 'auwai into lo'i
- 6) Lo'i: wetland taro patch
- 7) Kuāuna: embankment areas separating the lo'i

Source: Waipi'o Valley: Towards Community Planning and Ahupu'a Management, 1999



Source: Gingerich et al., 2007

Figure 17: General Lo'i Kalo Irrigation System

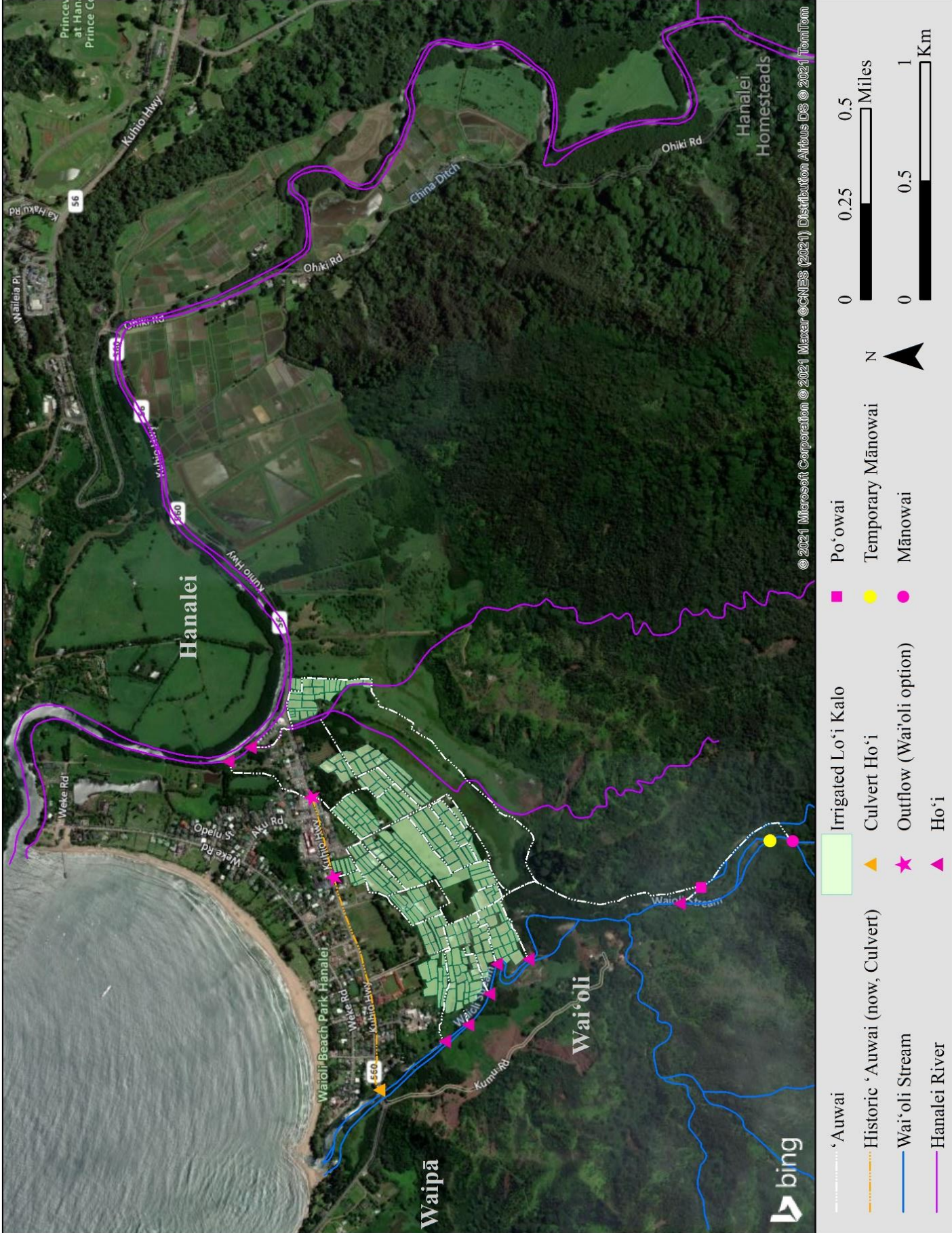
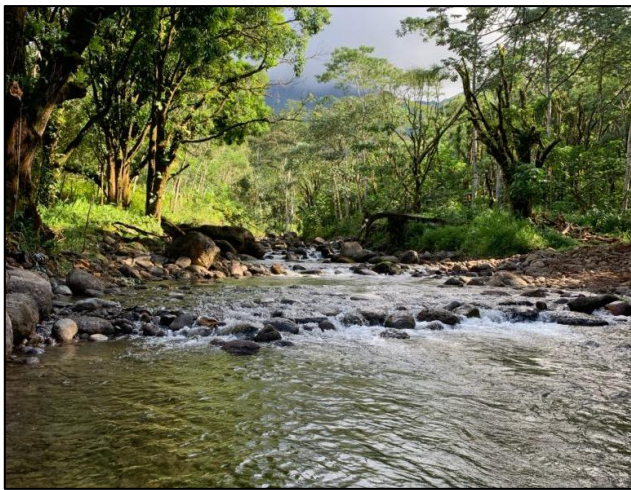


Figure 18: Wai'oli Lo'i Kalo Irrigation System



Mānowai - Near historic mānowai location looking upstream.

Source: Wai‘oli Valley Taro Hui, August 2020



Mānowai – Downstream view from historic mānowai.

Source: Wai‘oli Valley Taro Hui, February 2020



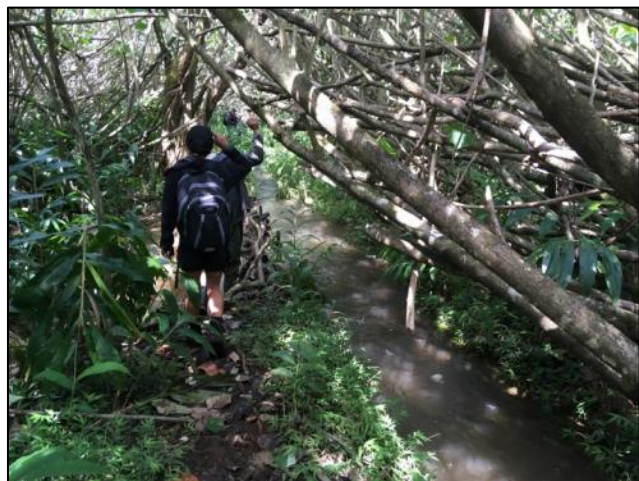
Po‘owai “Lower” Diversion – Upstream view of “lower” diversion on tributary of stream.

Source: Site 2, DLNR - CWRM, 2019



Po‘owai “Lower” Diversion – Downstream view of East Wai‘oli ditch.

Source: Site 2, DLNR - CWRM, 2019



East Wai‘oli ‘Auwai: Downstream view of ‘auwai near hau bush.

Source: Site 7, DLNR - CWRM, 2019



East Wai‘oli ‘Auwai: ‘Auwai split above various lo‘i complexes.

Source: Site 7, DLNR - CWRM, 2019

Figure 19: Site Photos – Upper Reaches (State Conservation District)



Wai'oli Lo'i Complex - August 2020



Wai'oli Lo'i Complex – August 2020



Wai'oli Lo'i and 'Auwai – May 2020



Wai'oli Lo'i and 'Auwai – October 2020

Source: *Wai'oli Valley Taro Hui*

Figure 20a: Site Photos of Wai'oli Lo'i (State Agricultural District)



Above: Using tractor to till the dry fallow field.
Source: Hui, 2020



Above: Inflow connecting 'auwai and lo'i.
Source: Hui, 2021



Above: Outflow connecting lo'i and 'auwai.
Source: State DLNR-CWR, 1992

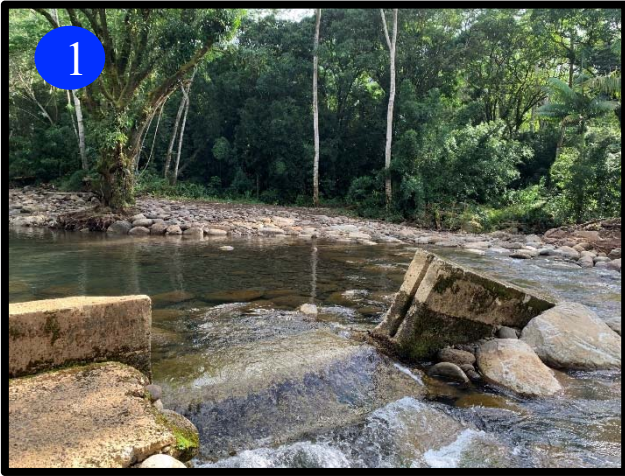


Above: Closed outflow connecting lo'i and 'auwai. Source: Hui, 2020



Above: Outflow connecting lo'i and 'auwai.
Source: Hui, 2021

Figure 20b: Site Photos of the Wai'oli Lo'i (State Agricultural District)



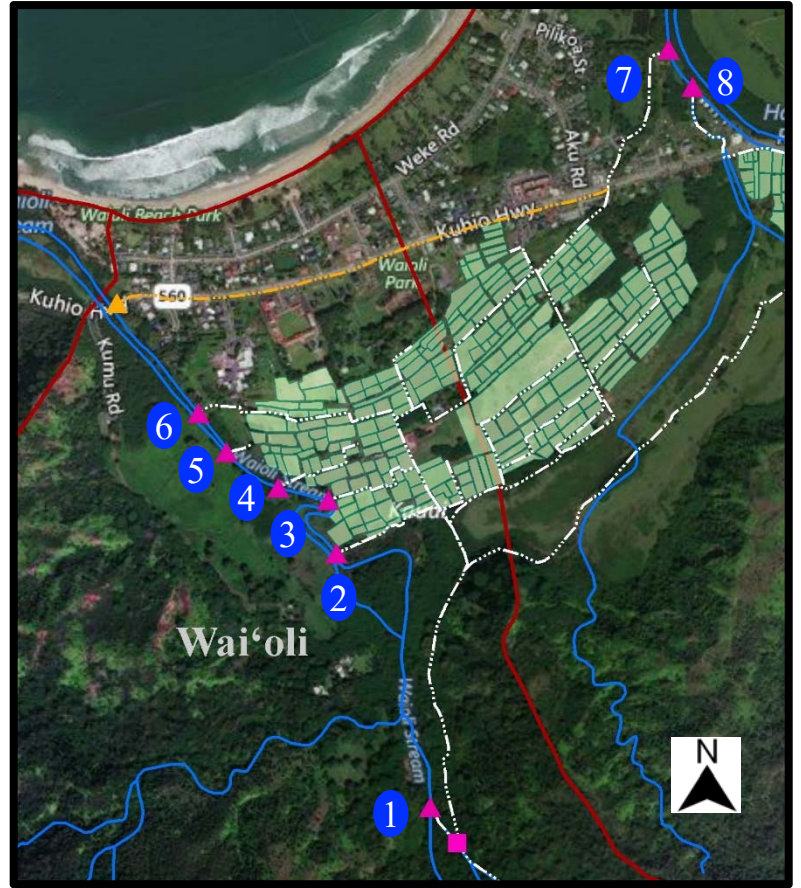
Above: Ho'i 2 located 1.43 miles from Wai'oli Stream Mouth and 0.07 miles from the po'owai.



Above: Ho'i 2 located 0.89 miles from the mouth of Wai'oli Stream and 0.61 miles from the po'owai.



Above: Ho'i 3 located 0.72 miles from the mouth of Wai'oli Stream and 0.78 miles from the po'owai.



Location Map of Ho'i



Above: Ho'i 4 located 0.64 miles from the mouth of Wai'oli Stream and 0.86 miles from the po'owai.

Source: Hui, 2020

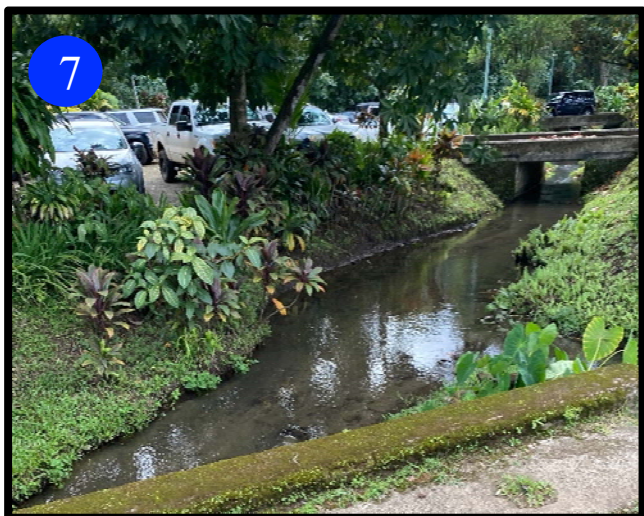
Figure 21a: Site Photos of the Ho'i at Wai'oli Stream



Above: Ho'i 5 located 0.54 miles from Wai'oli muliwai and 0.96 miles from the po'owai.

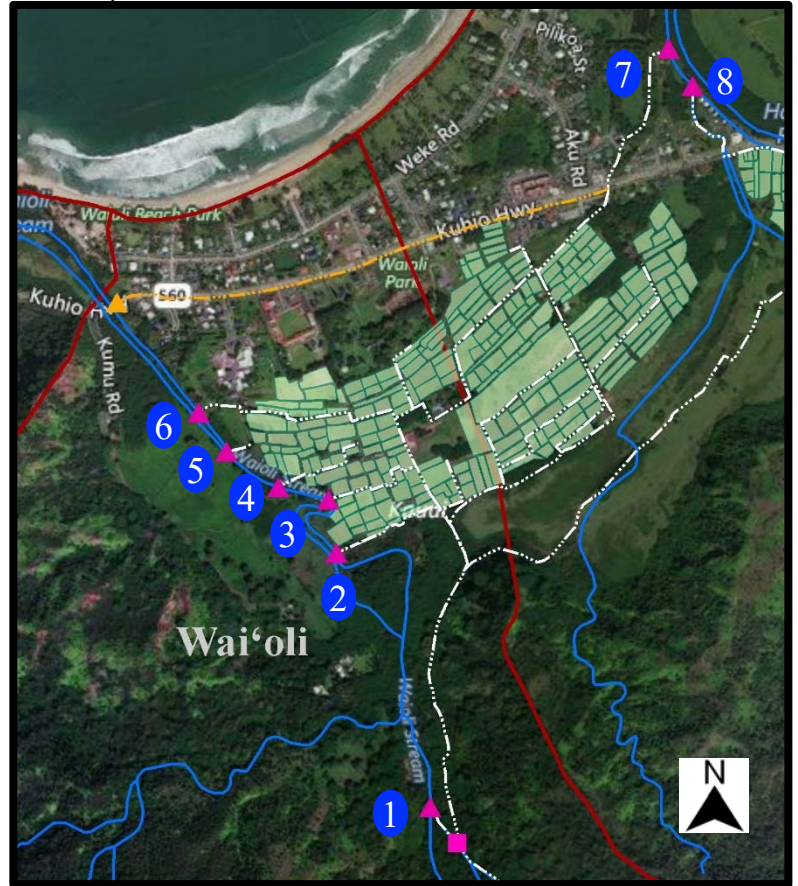


Above: Ho'i 6 located 0.46 miles from Wai'oli muliwai and 1.04 miles from the po'owai.



Above: Ho'i 7 located 0.92 miles from Hanalei muliwai and 1.71 miles from the po'owai.

Location Map of Ho'i



Above: Ho'i 8 located 1.01 miles from Hanalei muliwai and 1.56 miles from the po'owai.

Figure 21b: Site Photos of the 'Auwai to Ho'i at Hanalei River

Source: Hui, 2020.



Ma uka of Kūhio Highway



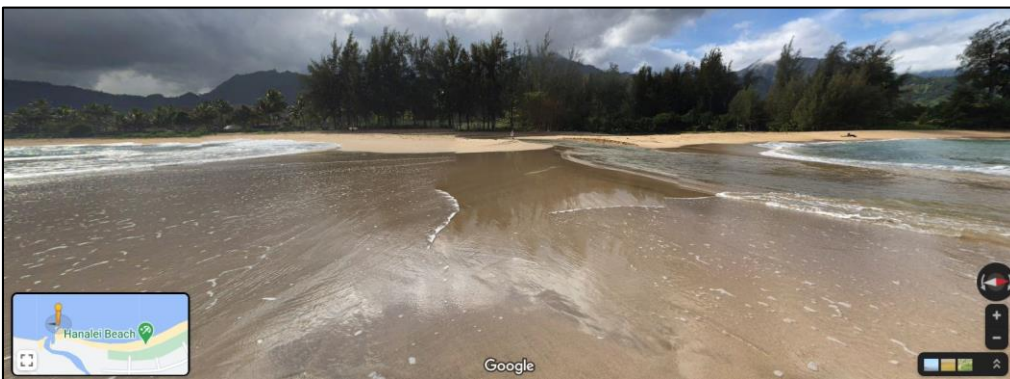
Ma kai of Kūhio Highway



Ma kai of Kūhio Highway



Ma uka of the Hanalei Bay



**The river mouth changes based on environmental conditions and seasonality. Photo reflects a point in time, and does not represent the various changes that occur through the year.

Above: Sand bar formation closes the mouth of the Wai‘oli Stream off from Hanalei Bay in the summer.



Source: Google Maps, 2020

Figure 22: Site Photos of the Wai‘oli Estuary and Muliwai (State Conservation District)

3.2.2. Kalo Cultivation in Wai‘oli

The farmers of the Hui strategically time their lo‘i to grow at different stages. This ensures a regular harvest and consistent process, while allowing for adequate fallow resting periods to ensure the health of the next generation of kalo. See **Figure 23, Lo‘i Kalo Maturity and Dissection**, **Figure 24, Working in the Lo‘i Kalo Irrigation System**, and **Figure 25, Kalo Cultivation and Use**.

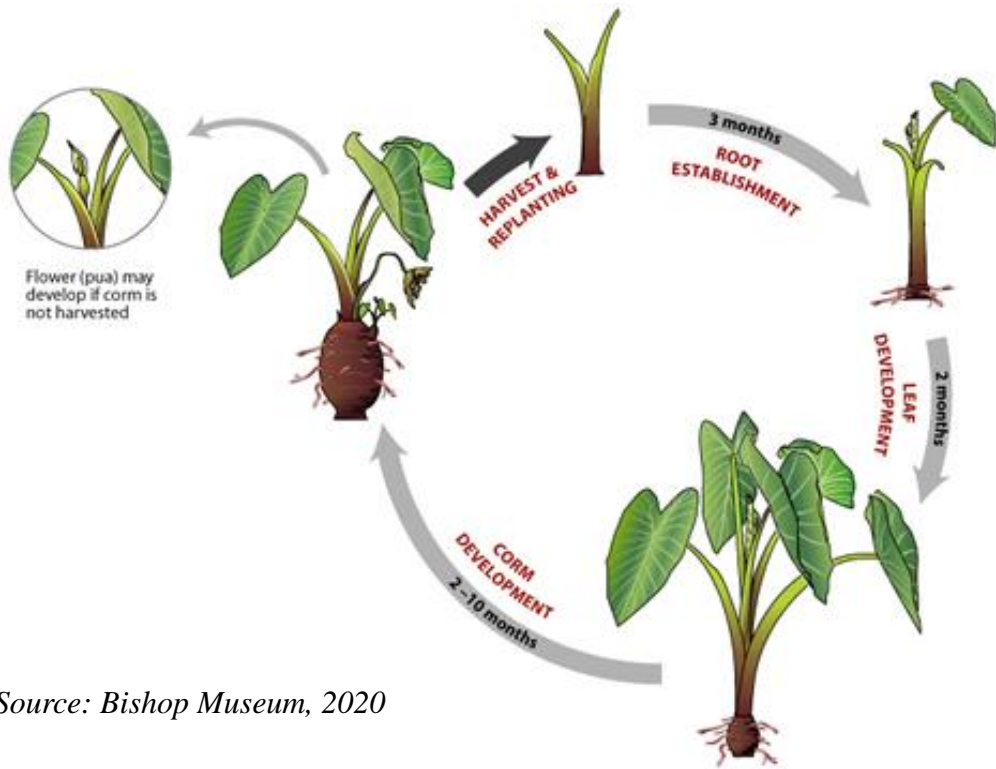
Cultivating lo‘i kalo requires an intimate understanding of ‘āina. As described by master navigator Nainoa Thompson in terms of deep sea voyaging, yet relevant to the practice of kalo cultivation, a practitioner such as a kalo farmer will make thousands of observations of nature, leading to hundreds of choices and decisions to support kalo growth. In the case of this Hui, these observations – or the practice of kilo – have been noted over decades, spanned generations, and are specific to Wai‘oli itself. The Hui members observe and anticipate needs of both the kalo and its surrounding ‘āina in order to make decisions that are in turn beneficial to the kalo and the long-term health of the lo‘i complex and watershed. The Hui recognizes that the health of the ‘āina – the stream, soil, forest, etc. – is integral to their practice, and in turn, they undertake the kuleana to care for the place. Farmers constantly observe the stream, Lo‘i Kalo Irrigation System, and crops to determine when to adjust water levels, apply amendments, and adjust methods to address recent/current/anticipated atmospheric and environmental conditions (e.g., stream cleaning). Often times, the farmers are able to predict what is going on upstream just by looking at the condition of the water flowing through their lo‘i kalo.

While specific kalo cultivation practices vary from farmer-to-farmer throughout Wai‘oli and especially throughout Hawai‘i, this document generally outlines the process of kalo cultivation by the farmers in the Hui. Kalo cultivation in any individual lo‘i can span an estimated two (2) years in duration from fallowing to harvest. This includes:

- Growing cycle: estimated twelve (12) to fifteen (15) months from planting to harvest, depending on the cultivar variety.
- Fallowing: may take an additional two (2) months to however long deemed necessary and is based on weather and the farmer’s circumstances.
- Cover cropping:⁵⁶ four (4) to twelve (12) months.

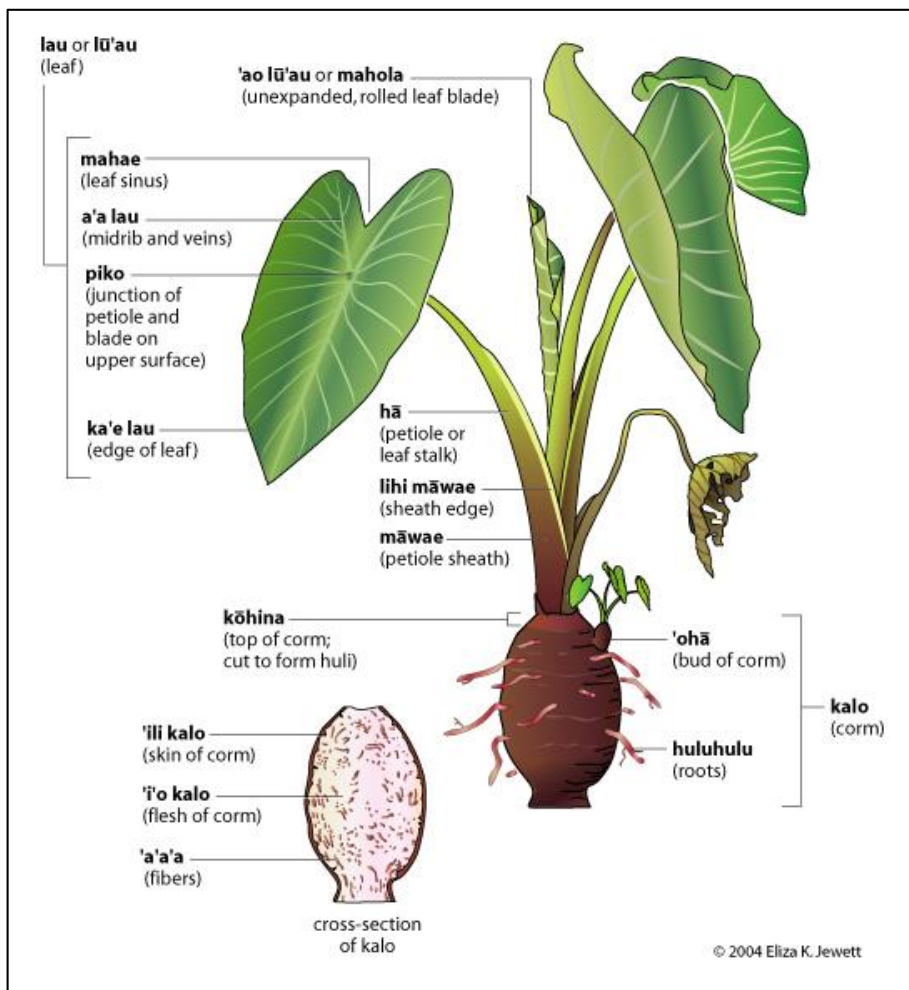
The overall time duration has been provided as a means to give context to the overall timeframe and planting cycle; timing is always subject to natural and environmental conditions. The process is highly dependent on natural, environmental conditions (e.g., rain, humidity, sun, season, cloud cover, and temperature), coupled with operational factors (e.g., equipment and labor availability). The following outlines the Hui’s general process of kalo cultivation, the stages of farming, and best management practices.

⁵⁶A cover crop is defined as a close-growing crop that provides soil protection, seeding protection, and soil improvement between periods of normal crop production (Soil Science Society of America, 2008).



Source: Bishop Museum, 2020

© 2004 Eliza K. Jewett



Source: Bishop Museum, 2020

Figure 23: Lo'i Kalo Maturity and Dissection



Hui member planting huli – July 2019



Hui member planting huli – April 2017



Hui member removing weeds – October 2020



Hui Work Day - 2018



Hui member maintaining mānowai - 2016



Youth Volunteer Workday – June 2018

Figure 24: Working in the Lo‘i Kalo Irrigation System

Source: Hui



Generations of family farmers working together in Wai'oli – July 2019



Next generation – September 2020



Varieties of Kalo found in Wai'oli – January 2020



Working in the lo'i – May 2020



Making poi from Wai'oli Kalo – March 2018



Fresh steamed laulau using Wai'oli lū'au (leaf) - February 2016

Figure 25: Kalo Cultivation and Use

Source: Hui

Lo‘i Preparation (Part 1):

Once an individual lo‘i is harvested, the inflow is closed and the outflow is left open. This allows the lo‘i to dry. Once a harvest is complete, the Hui members determine the next step(s) in preparation for a new cultivation cycle:

1. **Immediately Plant Huli:** Typically, if a farmer chooses to immediately plant huli from a recently harvested lo‘i within the complex, it could mean: (a) the farmer does not have access to a tiller or tractor; (b) weather conditions may be too wet to prepare the lo‘i; and/or (c) the huli need to be planted to ensure there will be a continuous source of planting material and crop for the near future.
2. **Fallow the Lo‘i:** As a best management practice, this process is beneficial to the environment as well as the kalo itself. Similar to adding amendments (see Growth Cycle Part 1 below), kalo benefits from being planted in “soil that is allowed to lie fallow, or ‘rest,’ for a period of time...The longer the fallow, the more chance the soil has to replenish itself” (Evans, 2008, 31) Lo‘i kalo research has also found that “[d]iseases of the corm and roots are found chiefly on wetland taro; they can best be controlled by thoroughly plowing and drying the soil and not replanting to kalo for 6 months to 1 year” (Parris, 1941). This process helps to break the cycle of disease causing microbes by allowing microorganisms in the soil to break down host tissues remaining after harvest, helps to lower pest populations (i.e., apple snail), and is a “means to reduc[e] pathogen populations and restoring soil quality and nutrient availability” (Evans, 2008, 33). In addition to intentional fallowing, a field may also be fallow due to weather, flooding, lack of water, drought, disrepair along the Lo‘i Kalo Irrigation System, or operational challenges (ie. equipment, funds, labor, etc.).
3. **Plant Intentional Cover Crops:** Planting intentional cover crops is another best management practice utilized by Hui members. It helps to break the cycle of disease causing microbes, lowers the apple snail and pest populations, and enriches the soil to enhance soil composition. Intentional cover crops include: sunn hemp (*Crotolaria* sp) and/or combined with male sterile sorghum sudan. In this stage, the farmer procures cover crop seeds, tills and dries the lo‘i, and times the seed planting. Timing is important in this stage because the farmer must ensure the right amount of rainfall to avoid any potential flooding in the lo‘i which may result in a subsequent loss of seed. Once the cover crop begins to flower, the farmer will cut and spade, then till in the cover crop, thereby improving the lo‘i soil structure. The inflow remains closed and outflow is open so that standing water does not hamper growth.

As a best management practice, the use of organic green matter and/or cover cropping residues help the soil to hold nutrients and water, improving the efficiency of nutrient use, suppressing weeds, improving the physical condition of the soil, and protecting soil from wind and water erosion/runoff (Grubinger, 2020).

4. **Allow Unintentional Cover Crops:** By allowing unintentional or naturally occurring cover crops to grow (e.g., honohono, buffalo grass/California grass), the farmer helps to break the cycle of disease-causing microbes, lower the apple snail and pest populations, and enrich the soil with beneficial microbes that enhance soil composition that improve overall plant health. This method of cover cropping would require the green matter to be cut or mowed, then tilled

in when the lo‘i needs to be prepared. The inflow is usually closed, and the outflow is usually open, to allow excess rainfall or floodwaters to leave the lo‘i and allow the lo‘i to dry.

5. **Add Organic Green Matter and/or Compost:** As another best management practice, adding composted or raw organic green matter enriches the soil with beneficial microbes that also enhance soil composition to improve overall plant health. The farmers use a range of green matter including: grass cuttings, hau leaves, kukui leaves, and other naturally occurring foliage from the area. This stage can take several months to break down, similar to the green biomass produced from cover crops. During this stage, the inflow is closed and the outflow is open to allow excess water (i.e., rain fall or floodwaters) to leave the lo‘i and to allow the lo‘i to dry.

Lo‘i Preparation and Planting (Part 2):

1. **Dry Tilling:** Tilling involves turning over the soil; usually with a tractor. The farmer must time tilling with drier weather. If the farmer enters the lo‘i with a tractor when it is muddy or wet, the soil structure can be destroyed. During this stage, the lo‘i outflow is open and the inflow is closed so that no water flows into the lo‘i from the ‘auwai.
2. **Applying a Soil Amendment (optional):** The farmer may opt to apply an amendment such as lime or another calcium source. This usually occurs after the lo‘i is dry-tilled. During this stage, the inflow and outflow are closed, and the amendment is tilled into the dry soil.
3. **Flood the Lo‘i:** With the outflow closed, the inflow is opened to allow water to flow into the lo‘i until the soil is completely covered. This step eliminates unwanted weed growth. The outflow remains closed.
4. **Tilling:** The watered lo‘i is tilled to fill any gaps in the lo‘i floor. This seals the bottom of the lo‘i so that it holds water more efficiently. This process also softens the soil in preparation for leveling the soil. Tilling is done using a tractor and some may use a handheld walk-behind tiller as well. Other methods may include manually treading or stamping with feet. During this stage, the outflow remains closed.
5. **Level the Soil:** The soil in the lo‘i is then leveled. With a tractor, or with a handheld walk-behind tiller, a board is pulled to level the mud. The farmer ensures that there are no exposed areas of soil/mud above the water level. This prevents grass seeds from rooting and eliminates unwanted weed growth. The lo‘i outflow remains closed and inflow is slightly open with water trickling in to ensure the standing water height continuously covers the soil.
6. **Plant Huli:** The farmer can commence planting after the soil is leveled. The farmer uses huli from recently harvested kalo (see below). During the harvest stage, the ‘i‘o is removed and the huli is cut and set aside to use for the next planting cycle. Ideally, the huli should be planted one (1) to three (3) days after harvest. During this time, the lo‘i outflow remains closed and the inflow is partially open with water trickling in to maintain the proper water level.

- a. **Soil and Water Levels:** Generally, as described in “Taro Mauka to Makai: A Taro Production and Business Guide for Hawai‘i growers,” “there should be at least 10 inches of good soil above the hardpan (a subsoil layer that will act as a barrier to retain water, if not disrupted). Deep soil will allow plenty of room for ‘i‘o growth. If the subsoil is shallow and relatively moist, as in a marshy area, you will typically not be able to excavate the soil from the center of the lo‘i to make the banks (kuāuna) because all the soil will be needed just to seal the bottom of the lo‘i. Therefore, you will need to locate enough additional debris-free soil to build the banks as necessary.” (Evans, 2008, 67).
7. **Settling In:** By the time planting the huli is complete, which can range from a few days to a few weeks, the sedimentation in the water is settled and the inflow and outflow can be opened and adjusted.
8. **Weeding:** With no leaf canopy on the kalo, the farmers closely observe the natural environment and the kalo in the first few weeks. Farmers monitor water levels to ensure the soil is covered with water which reduces weeds from taking root and growing. If weeds grow in the lo‘i during this stage, weeding is done by hand. During this time, the inflow and outflow can be opened.

Growth Cycle (Part 1) – Adding Amendments:

Amendment use varies by farmer and is highly dependent on natural and environmental conditions (e.g., plant growth stage, plant observation, lo‘i size, stage of growth, seasonality). Thus, each farmer and/or each individual lo‘i will differ as to if or when amendments are used, what type of amendment is used, and the amount applied.

1. **Types:** Amendments include a variety of sources of food-friendly nutrients that are needed to ensure healthy kalo growth for 12 to 15 months. The Hui’s amendments typically include naturally occurring lime or calcium, mined sulfate of potash for potassium, and nitrogen sources derived from chicken manure, sea bird guano, or feathermeal.
2. **Timing:** In Wai‘oli, lo‘i kalo can receive nutrients from approximately one (1) month to about eight (8) months of kalo age. When amendments are applied, the farmer will close the outflow and inflow. No water leaves the lo‘i to ensure that nutrients remain within the lo‘i and benefit kalo growth. After application, the farmer will open the inflow to briefly allow water to flow into the lo‘i and ensure the soil is covered to prevent unwanted weed growth. The outflow is kept closed. Once the lo‘i is sufficiently flooded, the inflow is again closed, and the amendment continues to dissolve and percolate into the lo‘i soil. This is done until there is no standing water in the lo‘i. This practice is repeated three (3) to five (5) times, so that any remaining amendment can dissolve and percolate into the soil.
3. **Quantity:** The quantity of amendment varies and is highly dependent on unique plant growth, lo‘i size, stage of growth, and seasonality (i.e., photosynthetic rate) – all key components in the farmer’s expert observations and decisionmaking. Balancing these components are important to the farmer’s success. Overusing amendments will attract pests and diseases that can affect the quality of the harvest, affect other lo‘i in the communal Lo‘i

Kalo Irrigation System and/or serve no additional beneficial purpose if excess is applied. The Hui complies with product recommendations.

Once the amendment has completely percolated into the soil (varying from approximately 1 to 2 weeks), the inflow and outflow are fully opened to allow the throughflow of water again.

Growth Cycle (Part 2) – Harvesting:

1. **Monitoring Water Levels:** As the kalo matures, the farmer must continue to monitor water level in the lo‘i. If the water is too high, plants could drown. If the water is too low, the farmer risks soil exposure that may attract feral animals and increase weed growth.
2. **Harvesting:** Lo‘i kalo in Wai‘oli are typically harvested around twelve (12) to fifteen (15) months of kalo age and varies based on the kalo variety and the natural and environmental conditions at that time. This stage could take anywhere from a day to a month to complete, depending on lo‘i size, quality of kalo, and demand. Harvest of each individual kalo is done by hand with patience; no machinery is used. At this stage, the inflow and outflow can be open or closed.
3. **Distribution:** Huli is harvested and used for the next planting cycle and generation of kalo. The ‘i‘o and leaves are bundled or separately bagged in both large (100 pound) and small (80 pound) bags. These bags are often shared with family, friends, community groups, and/or sent to processors. The bagged kalo is sent to neighboring Waipā Foundation or other nearby mills for processing. The Hui, itself, does not boil or process kalo other than for personal use.

Distribution is also done through the trading of goods and services. For example, the Hui may trade kalo and other kalo products (e.g. kulolo, lau, poi, kalo pa‘a) with fishers, hunters, vegetable/fruit farmers, or lomilomi practitioners. Kalo for friends and family or through trading is often provided in boxes, buckets, or bags, depending on the quantity needed. See **Section 5.8.3., Economic Characteristics.**

Ongoing Maintenance:

- **Mitigating Invasive Vegetation & Overgrowth:** The Hui’s weed management strategy is to suppress, or eliminate weeds. Overgrowth of vegetation and trees threaten ‘auwai integrity and restrict water flow through Wai‘oli Stream and Lo‘i Kalo Irrigation System. The Hui pulls weeds by hand and/or utilizes a variety of hand tools.
- **Removing Debris & Unblocking Waterways:** On a regular basis, the Hui monitors and removes debris, silt, ‘ili‘ili, etc. from the stream, ‘auwai, and larger Lo‘i Kalo Irrigation System in order to ensure healthy stream and water flow.
- **Combatting Pests & Feral Animals:** On a regular basis, farmers walk line by line to pick out apple snail eggmasses and the snails and place them into a bucket. In addition to causing agricultural damage, these pests, and apple snails in particular, are a threat to human health. To combat feral pigs, the Hui uses snare traps or shoot feral pigs on their private property, depending on the circumstances.

3.2.3. Instream Flow Standards

Given competing needs for Hawai‘i’s limited water resources, instream flow standards (“IFSs”) and interim instream flow standards (“IIFSs”) are the principal mechanisms to ensure that surface water rights and interests, including resource protection, are adequately considered. To facilitate IFSs and IIFSs, the Legislature mandated that the Commission “establish and administer a statewide instream use protection program” when the Water Code was passed in 1987. (HRS § 174C-71). This program was specifically designed “to protect, enhance, and reestablish, where practicable, beneficial instream uses of water.” (HRS § 174C-71(4)). To implement the program and establish meaningful IFSs and IIFSs, the Commission must conduct investigations and collect instream flow data including streamflow characteristics, fishing, wildlife, aesthetic, recreational, water quality, and ecological information necessary to determine instream flow requirements.

An IFS assures a minimum amount of stream flow “necessary to protect the public interest in [a] particular stream. Flows shall be expressed in terms of variable flows of water necessary to protect adequately fishery, wildlife, recreational, aesthetic, scenic, or other beneficial instream uses in the stream” and must be established “on a stream-by-stream basis.” (HRS §§ 174C-71(1), -71(1)(c)). In Wai‘oli, kalo cultivation, other traditional and customary Native Hawaiian practices, and the conveyance of irrigation supplies to downstream points of diversion, are beneficial instream uses. The Hui’s use of water – including the traditional and customary practice of kalo cultivation and the exercise of appurtenant rights – are also public trust purposes, which means they have legal priority over other uses and are considered “the norm or ‘default’ condition” (“*Waiāhole*”).

To establish an IFS, the Commission must “weigh the importance of the present or potential instream values with the importance of the present or potential uses of water from the stream for noninstream purposes, including the economic impact of restriction of such uses.” (HRS § 174C-71(1)(E)). It must also consult specific agencies and hold a public hearing before any IFS is established. (HRS. §§ 174C-71(1)(E), (F)). Because an IFS is intended to be permanent, it requires rigorous biological, hydrologic, and cultural data, as well as other information. In establishing an IIFS, the Commission must adhere to the same balancing standard established for an IFS. This process was designed to be expedited and adaptive, however, and the standard is more flexible in terms of how broadly it may be imposed, when compared to a permanent IFS. The administrative rules implementing the Water Code contemplated that by December 31, 1988 – approximately one year from the date of the Code’s passage – the Water Commission would establish scientifically-based IIFSs for all 376 perennial streams in Hawai‘i.

The current IIFSs for Kaua‘i streams including Wai‘oli were established by HAR 13-169-48. These “status quo” IIFSs are not numeric and instead adopted as the IIFS, the amount of water flowing in each stream as of June 15, 1988.

“Interim Instream flow standard for Kaua‘i. The Interim Instream Flow Standard (IIFS) for all streams on Kaua‘i, as adopted by the commission on water resource management on June 15th, 1988, shall be the amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted off stream through new or expanded

diversions, and under the stream conditions existing on the effective date of the standard...”
 (HAR 13-169-48).

In January 2021, the Water Commission published a draft Instream Flow Standard Assessment Report (“IFSAR”) for Wai‘oli Stream and began consultation with affected community members, including the Hui. In April 2021, the Water Commission received an informational briefing on the IFSAR, including a recommendation to establish the IIFS at a flow of 4 mgd. At that meeting, members of the public testified in support of the proposed IIFS. That value represents 50% of the 90th percentile flow (Q90) at the po‘owai, which was estimated to be 8 mgd. In line with Native Hawaiian custom, Commission staff expect that during drought conditions, only 50% of the water shall be diverted from Wai‘oli Stream to protect other instream values (in addition to the Hui’s instream use of kalo cultivation). Commissioners praised the Hui’s efforts and uplifted the process as a model for other IIFSs. In May 2021, the Water Commission voted to adopt the staff’s recommendation of a numeric IIFS of 4 mgd. In addition to regular monitoring requirements, the Commission also adopted an adaptive management approach. Consistent with the public trust and precautionary principle, the IIFS may be revised by future Commission action as more data is gathered. **See Appendix B, CWRM May 2021 Submittal.**

An IIFS is a legal determination regarding the amount of water required to protect the public interest in a stream, after weighing present and potential instream values and offstream needs. Any flow in a stream in excess of an IIFS is available for use. Given the adoption of a numeric IIFS for Wai‘oli Stream, the Hui may use any amount of water in excess of 4 mgd during low flow conditions. The Hui, however, is requesting up to 13.5 mgd only, which is what the Water Commission verified in the late 1980s as the Hui’s historic use.

3.2.3. Required Permits and Approvals

The following permits or approvals will be required prior to approval of a long-term water lease.

Table 1: Required Permits and Approvals.

<u>Permit or Approval</u>	<u>Approving Agency</u>	<u>Legal Reference</u>
Right of Entry Permit	DLNR, BLNR	Administrative
Non-Exclusive Easement	DLNR, BLNR	HRS section 171-13 and -55
Request for Water Lease	DLNR, BLNR	HRS chapter 171
Watershed Management Plan or Lease Covenant	DLNR, BLNR	HRS section 171-58(f)
DHHL Reservation or Statement of No Reservation	DHHL	HRS section 171-58(g), Hawaiian Homes Commission Act section 221; HRS sections 174C-49(d), 101(a)

Interim Standard	Instream Flow	DLNR, CWRM	HRS chapter 171, HRS section 174C-71(2)
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4. Proposed Action and Alternatives

4.1. Proposed Action (Long-term Water Lease)

As described in Section 1.1, the **Proposed Action**, a 65-year long-term water lease, seeks legal approval for the Hui’s existing, non-consumptive use of water from Wai‘oli Stream to sustain its Lo‘i Kalo Irrigation System. It would enable the perpetuation of the traditional and customary Native Hawaiian practice of lo‘i kalo cultivation in Wai‘oli, as it has operated for centuries on State Agricultural District land outside the State Conservation District. At the beginning of the Lo‘i Kalo Irrigation System, water from Wai‘oli Stream flows into the mānowai, located 1.8 flowpath miles from the muliwai. The water is then channeled into the po‘owai, ‘auwai, and eventually reaches the individual lo‘i. The water is then returned to Wai‘oli Stream or Hanalei River through eight (8) ho‘i. The **Proposed Action**’s use of water is a traditional Native Hawaiian use and is instream, almost entirely within the Wai‘oli Watershed, and completely within the Hanalei River Watershed (State DLNR-LD, 2020).

The Proposed Action will secure the legal entitlement for the ongoing use of water from the Wai‘oli Stream for kalo cultivation practiced in a traditional manner. Under the Proposed Action, lo‘i kalo cultivation will continue to support community-based cultural and agricultural education, reinforce community identity, and provide vital environmental benefits such as local food security, flood mitigation, ground water recharge, Native habitat preservation, and watershed stewardship. The Proposed Action will also ensure reliable access to the water resources intrinsically tied to traditional and customary cultivation practices that have been documented as an integral part of Wai‘oli’s rich history and bountiful ‘āina.

The **Proposed Action**, allows for and supports: the perpetuation of constitutionally-protected Native Hawaiian traditional and customary practices; the continued stewardship of biocultural watershed resources that are closely intertwined with stream flow and the maintenance of waters in their natural state; appurtenant and riparian rights; and local food production. The **Proposed Action** also allows for the continuation of an ancient land management system to survive the transition into Hawai‘i’s modern legal paradigm.

4.2. Alternative A: Shorter Lease Term Alternative (35-Year Lease)

Similar to the Proposed Action, Alternative A, the **Shorter Lease Term Alternative**, would provide the Hui with a long-term water lease for the Hui’s non-consumptive use of water from Wai‘oli Stream to sustain its Lo‘i Kalo Irrigation System. It would, however, provide a shorter lease term of 35 years. The **Shorter Lease Term Alternative** would still secure the legal entitlement for the ongoing use of water from Wai‘oli Stream for kalo cultivation in a traditional manner, support community-based education, uphold community identity, provide environmental

benefits, and support the constitutionally protected Native Hawaiian traditional and customary practice of kalo cultivation.

Given the shorter lease term, however, this alternative would provide considerably less stability than the **Proposed Action** and may minimize the potential security for kalo cultivation in Wai‘oli. A shorter lease term will make it difficult for the Hui to obtain potential partners to invest in improvements to the Lo‘i Kalo Irrigation System, infrastructure, and water lease area. For example, partners (e.g., County of Kaua‘i or the Federal Government) may be less willing to invest in implementing a USGS stream cleaning gauge, piping unlined portions of the ‘auwai to minimize loss, and/or fencing and stream cleaning efforts to improve water quality and the larger watershed. These potential partnerships offer improvements that would make the area more efficient, stable, and long-lasting.

4.3. Alternative B: Status Quo Alternative (Annual Revocable Permit)

Under Alternative B, the **Annual Revocable Permit Alternative**, the Hui would be required to continue to renew and/or obtain annual revocable permits for water. The Hui would need to submit a request each year with no guarantee that a permit will be granted and without the environmental protections afforded by the Chapter 343 process. This alternative not only threatens the continued practice of kalo cultivation in Wai‘oli but may also impede on the State’s ability to fulfill its constitutional duty under Article XII, section 7. Further, reduced maintenance and stewardship of Wai‘oli’s natural resources as a prerequisite to kalo cultivation would also significantly diminish and affect the surrounding North Shore community.

The Hui remains committed to kalo cultivation in Wai‘oli. This **Annual Revocable Permit Alternative**, however, provides no long-term legal commitment by the State to preserve and protect the water needed to continue the practice of kalo cultivation in Wai‘oli. Without a long-term water lease, the Hui has no security or certainty in their rights to access the water necessary to support their lo‘i. Given the many challenges around kalo cultivation (e.g., recovery from severe weather events, changing community, inherent risk in agriculture, etc.) the Hui fears that they may not be able to continue kalo cultivation as they have for generations.

The Hui relies on the **Annual Revocable Permit Alternative** as the current entitlement for water use. On February 28, 2020, BLNR unanimously voted to award the Hui a revocable permit for its water use (State DLNR-LD, 2020). As we await the Hawai‘i State Supreme Court’s decision in *Carmichael v. BLNR* (argued in April 2020), it is unclear whether renewal beyond a single year will continue to be a possibility in Hawai‘i. A forthcoming ruling may also set additional requirements; including, for example, Chapter 343 compliance, which itself takes more than a year to complete.

The **Annual Revocable Permit Alternative** likely impedes on the State’s ability to fulfill its constitutional duty under Article XII, section 7 to preserve and protect traditional and customary practices and to “assur[e] appurtenant rights and existing correlative and riparian uses.” Without a long-term water lease, the Hui’s ability to plan and invest in the future will also be severely impaired. For instance, since many varieties of kalo grown by the Hui typically take well over a year to grow, a year-to-year permit would not even support a single harvest.

From a natural resource management perspective and as it concerns the long-term viability of traditional kalo cultivation, requesting an annual water permit is significantly less desirable than the approval of a long-term water lease. Given the uncertainty of a year-to-year permit, should an annual water permit not be granted, the Hui faces significant challenges and negative impacts on their ability to cultivate kalo and for Wai‘oli to maintain its character and culture that has defined this North Shore community (as further elaborated in Section 4.3).

4.4. Alternative C: No-Action Alternative (No Permit Scenario)

Alternative C, the **No-Action Alternative**, would leave the Hui without a long-term water lease or a revocable permit. The denial of a long-term water lease and/or a revocable permit would cause irreparable damage to the Hui’s longstanding, intimate, and unique relationship to this ‘āina and wahi pana.⁵⁷ Leaving the Hui with few (if any) legal options to access water necessary for the Lo‘i Kalo Irrigation System, a **No-Action Alternative** threatens the Hui’s generations-old practice and would likely force kalo cultivation out of operation entirely. Under a **No-Action Alternative**, the State would violate its constitutional duty under Article XI, section 7 to preserve and protect this traditional and customary subsistence practice and to “assur[e] appurtenant rights and existing correlative and riparian uses.”

For legal or other reasons, if the Hui lacks access to the water necessary to maintain this Native Hawaiian Lo‘i Kalo Irrigation System, throughflow will stop, which will end lo‘i kalo cultivation in Wai‘oli all together. Like many cultural practices, the Lo‘i Kalo Irrigation System is intrinsically tied to and works in balance with ‘āina. Without the Lo‘i Kalo Irrigation System that has been a part of Wai‘oli’s natural environment for centuries, there would be significant negative effects to the ‘āina, including the natural, cultural, and historic resources in the area. For instance, without the Lo‘i Kalo Irrigation System and the kama‘āina that steward it, the community would have fewer opportunities for ‘āina-based experiential education, which has the power to reshape perceptions, attitudes, behaviors, and kuleana towards vital environmental and cultural resources such as the watershed, ecosystem, and traditional kalo cultivation.

Without a long-term water lease or revocable permit, the Hui will not be able to manage the Lo‘i Kalo Irrigation System as its members have for generations. The lack of regular stewardship and maintenance will have negative impacts on Wai‘oli’s unique environment, resources, and community. These damaging impacts include:

- Diminishing or outright eliminating important habitats for endangered and threatened water birds;
- Removing a long-standing and active food source for the people of Kaua‘i and Hawai‘i;
- Denying constitutionally-protected Native Hawaiian traditional and customary rights and appurtenant rights;
- Significantly altering the natural ecosystem that has relied on and adapted to this Lo‘i Kalo Irrigation System for centuries;
- Neglecting the long-term health of the Lo‘i Kalo Irrigation System and Wai‘oli Stream;
- Increasing presence of devastating pests and diseases related to diminished quality and quantity of water flow; and

⁵⁷ Storied place.

- Increasing external pressures that threaten the culture and environment of the area.

If the Lo‘i Kalo Irrigation System is not properly maintained, invasive species will amplify damage to the ecosystem by increasing soil nitrogen levels, outcompeting Native plants, reducing Native habitats, blocking waterways, damaging infrastructure, and stagnating the flow of water (State DLNR – Invasive Species Council, 2020 and WVTH, 2020). Without active and ongoing maintenance, throughflow water, and the continuation of traditional stewardship practices, the Hui will not have the water they need to sustain their lo‘i. As a result, Wai‘oli would no longer be able to support kalo cultivation. Instead, lands would likely regress to a swampy state, unusable for the traditional and customary subsistence practices that have thrived in this valley for centuries. If the lands were developed, the development would completely – and irrevocably – change the environment of Wai‘oli and the larger North Shore Kaua‘i altogether.

Without the Lo‘i Kalo Irrigation System, a greater volume of water would be channeled through the main branch of Wai‘oli Stream, and the increased volume and intensity of water in the main channel during major rain events will have more severe impacts on Kaua‘i’s North Shore community unless mitigated through other strategic stewardship activities. Thus, the Wai‘oli environment and its community are also left vulnerable to severe floods and other major weather events that have the potential to devastate the larger community. In addition, lack of long-term stewardship (that the **Proposed Action** would provide) would result in overgrowth of invasive species; the lack of regular stream cleaning and maintenance will result in clogged waterways; and the potential loss of kalo cultivation threatens community identity and values.

The potential impacts of the Hui not having legal permission to maintain the Lo‘i Kalo Irrigation System and surrounding areas are exemplified by surrounding areas in the ahupua‘a. In areas of Wai‘oli where lo‘i are no longer maintained due to lack of water, the natural environment (e.g., grasses, hau, shrubs, etc.) grows over the lo‘i and pathway areas. Further ma uka, albizia, extremely fast-growing trees, are prone to sudden failure and collapse, and are located along the ‘auwai and near the mānowai. Recently, the Hui has also observed the trumpet tree, cecropia, or cecropiaceae (*C. peltata*), a newly introduced high risk invasive (PIER, 2021), in the areas from Kūhiō Highway to pasture land and near the start of the Lo‘i Kalo Irrigation System. The shallow roots of these trees cause landslides into the ‘auwai or may completely fall over, creating blockages similar to the problems with albizia. If invasive species like the trumpet tree continue to grow rampantly, unchecked, the Lo‘i Kalo Irrigation System will be compromised by irreparable damage to the ‘auwai and lo‘i.

A **No-Action Alternative** threatens not only the Hui’s lifestyle of kalo cultivation but also the life and integrity of the Lo‘i Kalo Irrigation System and lo‘i kalo cultivation in Wai‘oli. The detrimental impacts of a **No-Action Alternative** would negatively effect Wai‘oli’s natural environment, its culture rooted in kalo cultivation, and the community’s resilience against major weather events and severe floods. If, under a **No-Action Alternative**, the Hui is unable to steward their lo‘i and the related Lo‘i Kalo Irrigation system, the purposes of the **Proposed Action** will be near impossible to meet and would result in the State’s abrogation of its constitutional duty to protect Native Hawaiian traditional and customary practices.

5. Environmental Setting, Potential Impacts, and Minimization and Mitigation Measures

This section discusses the environmental conditions and 'āina, provides an analysis of potential impacts, and proposes minimization and mitigation measures. The terms below are used to describe the scope, scale, and intensity of potential effects.

- *Beneficial* - Resources would be positively affected, with measurable benefits to wildlife or plant communities or other aspects of the human environment. No mitigation measures would be needed to offset favorable effects. This term may be considered atypical in the HRS chapter 343 process; however, the Proposed Action's uniqueness and significance to Hawai'i is reflected in the use of this additional analysis.
- *Neutral to Negligible* - Resources would not be affected, or the effects would be at or near the lowest level of detection. Resource conditions would not change or would be so slight there would not be any measurable or perceptible consequence to the natural and human environment (i.e., wildlife or plant communities).
- *Minor* - Effects would be detectable. Mitigation, if needed to offset adverse effects, would be easily implemented and successful based on knowledge and experience.
- *Moderate* - Effects would be readily detectable with measurable consequences to wildlife or plant communities or other aspects of the human environment but not readily detectable or measurable beyond the immediate area of impact. Mitigation measures could be extensive, moderately complicated to implement, and likely successful based on knowledge and experience.
- *Significant to Major Negative* - Region-wide effects would be obvious and would result in substantial consequences to wildlife or plant communities or other aspects of the human environment.

5.1. Climate

5.1.1. Climate

The Proposed Action is located in Wai'oli, on the north side of the island of Kaua'i immediately west of Hanalei Valley. Generally, the climatic conditions on Kaua'i are dominated by northeasterly tradewinds approximately 70% of the year, bringing warm, tropical, moisture-laden air to the island. At sea level, temperatures in the Hanalei Bay Watershed, where Wai'oli Valley is located, are mild and generally range from a daily mean minimum of 65 to 70°F to maximum of 80 to 85°F, with the warmest temperatures occurring in August and September. Temperatures vary with elevation and generally decrease 3°F per 1,000-foot elevation gain (HWH, 2012).

Over the last 30 years, data from the University of Hawai'i shows a rapid rise in air temperature, averaging 0.3°F per decade including the presence of warming at high elevations (above 2,600 feet). Although, the rate of temperature rise at low elevations (below 2,600 feet), 0.16°F per decade, is less

than the global rate (about 0.36°F per decade); yet, the rate of warming at high elevations in Hawai‘i, 0.48°F per decade, is faster than the global rate (Fletcher, 2010).

5.1.2. Rainfall

From 1845 to 1846, the Wai‘oli-Mission Rain Gauge actively tracked rainfall data in Wai‘oli. Then, from 1892 to 1909, the Hanalei-Deverill Rain Gauge actively tracked rainfall data in the area. Although there is no consistently present rainfall gauge in Wai‘oli Valley, annual rainfall in Wai‘oli is approximated at an average of 118.22 inches/year (3,000 mm) (Giambelluca et al., 2013; State OP-GIS, 2020). Although rainfall varies greatly throughout the year, the uppermost reaches of Wai‘oli Valley at its kumu wai,⁵⁸ Nāmolo-kama Mountain, annual rainfall has been recorded at 236 to 275 inches (Leu Cordy & Merrin, 2020).

For the last 111 years, there has been no active rain gauges within the Wai‘oli Ahupua‘a. The nearest active rain gauge to Wai‘oli is located in the neighboring Waipā Ahupua‘a to the west. Established in 2011, Waipā Foundation operates the Waipā Garden Rainfall Gauge. The highest annual rainfall recorded was in 2018 (the same year as the historic floods this EA seeks to address) with 209.77 inches of rainfall. The lowest annual rainfall recorded was in 2013 with 86 inches. The highest monthly rainfall recorded by the Waipā Garden Gauge was in April 2018 at 68.56 inches followed by monthly highs of 63.44 inches in March 2012, and then 28.96 inches in August 2018 (Hurricane Lane); a 34.48 inch difference between the second and third highest recorded rainfall months in the area (Waipā Foundation, 2020). Research estimates that climate change will cause the global hydrological cycle to intensify and result in an increased risk of flooding to Wai‘oli and the surrounding areas (State DOH, 2019).

Although climate change research estimates an increase in intensity, and thereby flooding, there has been a noticeable decrease in regular precipitation in Hawai‘i generally over the last century, decreasing the amount of ground water recharge that occurs (State DOH, 2019). “This decline in precipitation can also have a negative impact on Native species and sensitive ecosystems that rely on rainwater to survive.” Kalo is particularly vulnerable to any future decrease – and increase – of precipitation, which would pose a threat to this valued and vital traditional food sources for Kānaka Maoli and the greater community. (State DOH, 2019).

5.1.3. Air Quality

The Hawai‘i Department of Health (“DOH”) collects measurements of ambient level pollutants through a statewide monitoring network to ensure State and Federal air quality standards are met. The island of Kaua‘i’s Niualu Station measures particulate matter, sulfur dioxide, and nitrogen dioxide. The Station is located south of Līhu‘e Airport, 34 driving miles from Wai‘oli. Thus, there is no data available specifically for the North Shore of Kaua‘i.

A review of the 2020 Ambient Air Monitoring Network 5-Year Assessment for the island, however, notes that cruise ship emissions are the main air surveillance concern for Kaua‘i and it should continue to be monitored. Although a reduction in SO₂ was noted, DOH recommends, “in the future,

⁵⁸ Water source.

the station may be moved to the population centers of Līhu‘e or Kapa‘a, depending on the needs of the community” (State DOH, 2020).

5.1.4. Potential Impacts, Minimization and Mitigation Measures

Given the historical use and management of this area, *no significant impacts* are anticipated as a result of the Proposed Action. To the contrary, the Proposed Action will have *beneficial impacts*. The Proposed Action may affect air quality by generating some dust, but given the farmers’ practices and distance, it is unlikely to affect anyone other than the farmers working on their respective farms.

In evaluating projects generally, it is important to note that larger environmental settings like climate change cannot be entirely minimized and mitigated. There are, however, opportunities to mitigate the effects of climate change. In fact, the Hawai‘i State Climate Commission recently identified lo‘i kalo as important green infrastructure technologies that are central in helping Hawai‘i adapt to and respond to climate change. (DLNR, Climate Ready Hawai‘i, 2021). With this in mind, and in partnership with DLNR, the Hui’s Watershed Management Plan articulates mitigation measures with regard to Wai‘oli Valley. Specific to climate, the Draft Hui Watershed Management Plan includes:

- Cleaning and restoring Wai‘oli Stream to decrease hazards of future flood events;
- Removing and control of non-Native hooved animals (i.e., pigs) from important watershed forests; and
- Community outreach and education to facilitate citizen-based watershed protection and ahupua‘a-level resource management.

The **Proposed Action: Long-Term Water Lease** would ensure the continued and ongoing water flow through the traditional Lo‘i Kalo Irrigation System with access to up to 50% of flow during low flow conditions, consistent with the Water Commission’s 2021 IIFS of 4 mgd for Wai‘oli Stream. Kalo cultivation in this traditional manner has a *beneficial effect* on climate (including and pertaining to rainfall and air quality) by mitigating flood impacts and improving air quality.

The Hui works in the lo‘i daily, cultivating their intimate relationship with the ‘āina; the land and natural environment. The Hui is the first to experience the impacts of rainfall, because kalo cultivation occurs in the flood prone lowlands. They are thus accustomed to enacting regular flood prevention (stream and ‘auwai cleaning) and mitigation measures. Although severe storms have the ability to damage the traditional Lo‘i Kalo Irrigation System and subsequent harvests, the system has *beneficial effects* on community-wide flood mitigation. It distributes water in and across the ‘auwai and Lo‘i Kalo Irrigation System, protecting lowland areas from the potential force and impact of floodwaters. In fact, this is the very ingenuity of the system. For example, the mānowai is designed to breakaway in heavy rain so as to prevent flooding of the area, but it also distributes the excess flow and force of floodwaters through the system minimizing flood damage. The system requires continued maintenance and repair (Townscape, 2018).

The Proposed Action has *beneficial effects* on air quality through the cultivation of kalo and surrounding plants. As living, Native species, these plants contribute to reducing carbon dioxide through photosynthesis. In turn, creates more stable temperatures over time through transpiration; and, plays an active role in the natural water cycle. As wetlands, the lo‘i kalo themselves are also

extremely efficient at carbon sequestration. The Proposed Action also ensures ongoing cultivation of native plants and food, as opposed to alternative activities such as residential development, invasive grass/weeds growth that typically overtake lowland areas, or non-Native, intensive agriculture production. “Another threat to native species is the invasive or non-native species. Some of the non-native species are far better adapted to the warmer, drier climate, and can therefore easily replace the native species” (State DOH, 2019).

Under **Alternative A: Shorter Lease Term Alternative**, **Alternative B: Status Quo Alternative** and **Alternative C: No-Action Alternative** and a reduction or elimination of kalo cultivation would have a *neutral to moderate beneficial impact* on air temperature, water cycle, and air quality within the area. Without long-term entitlements, requisite throughflow may be compromised (i.e., inconsistent or reduced) resulting in a reduction of lo‘i and kalo cultivation by the Hui. Some individual lo‘i may be taken out of cultivation to support other individual lo‘i. The Hui would also need to address an increase in pests, weeds/non-Native species, and kalo rot/disease related to a reduction of throughflow. **See Section 4., Proposed Action and Alternatives.** With regard to climate and air quality, this would significantly reduce the existing *beneficial effects* on carbon dioxide reduction as outlined above.

In addition, a lack of or reduced amount of throughflow would make the Hui’s work exponentially harder and increase the overall burden on the Hui’s farming operations. For example, an increase in temperature has the ability to increase the presence of disease and pests that spread between plants and lo‘i. An increase in pests and disease also requires additional time and resources to mitigate and reduce its presence for farmers in and around Wai‘oli.

5.2. Geology and Soils

5.2.1. Geology

The Hawaiian archipelago was created by volcanic eruptions that formed mountains with heights from 2,000 to over 13,000 feet above sea level. The island of Kaua‘i is the oldest of the eight main Hawaiian Islands and consists of a single shield volcano. Topographically, Kaua‘i is a product of heavy erosion with broad, deep valleys and large alluvial plains.

Hanalei Bay Watershed consists of deep valleys cut by running water that destabilize the slopes by tearing away rock fragments. These localized collapses occur and remain in talus slopes or carried downstream by floods (HWH, 2012). The sides of the stream valleys have near vertical pali⁵⁹ with crests and ridgelines that divide the numerous sub-watersheds such as Wai‘oli. Generally, the valleys in the Hanalei Bay Watershed have broad coastal plains with elevations at 0 feet mean sea level (“msl”). The lower portion of the mainstream stems contain floodplains that are part of the coastal plain and provide topography conducive to kalo cultivation (HWH, 2012). The dramatic difference in topography is one of the reasons that makes the area so iconic, but it is also a major factor in the flood-prone conditions. The steep mountain slopes encourage a quick runoff response to rainfall, while the floodplains in the lower stream reaches have such low gradients that floodwaters accumulate during runoff events, taking days to drain away (Waipā Foundation, 2020). **See Figure 26, Topography.**

⁵⁹ Cliffs.

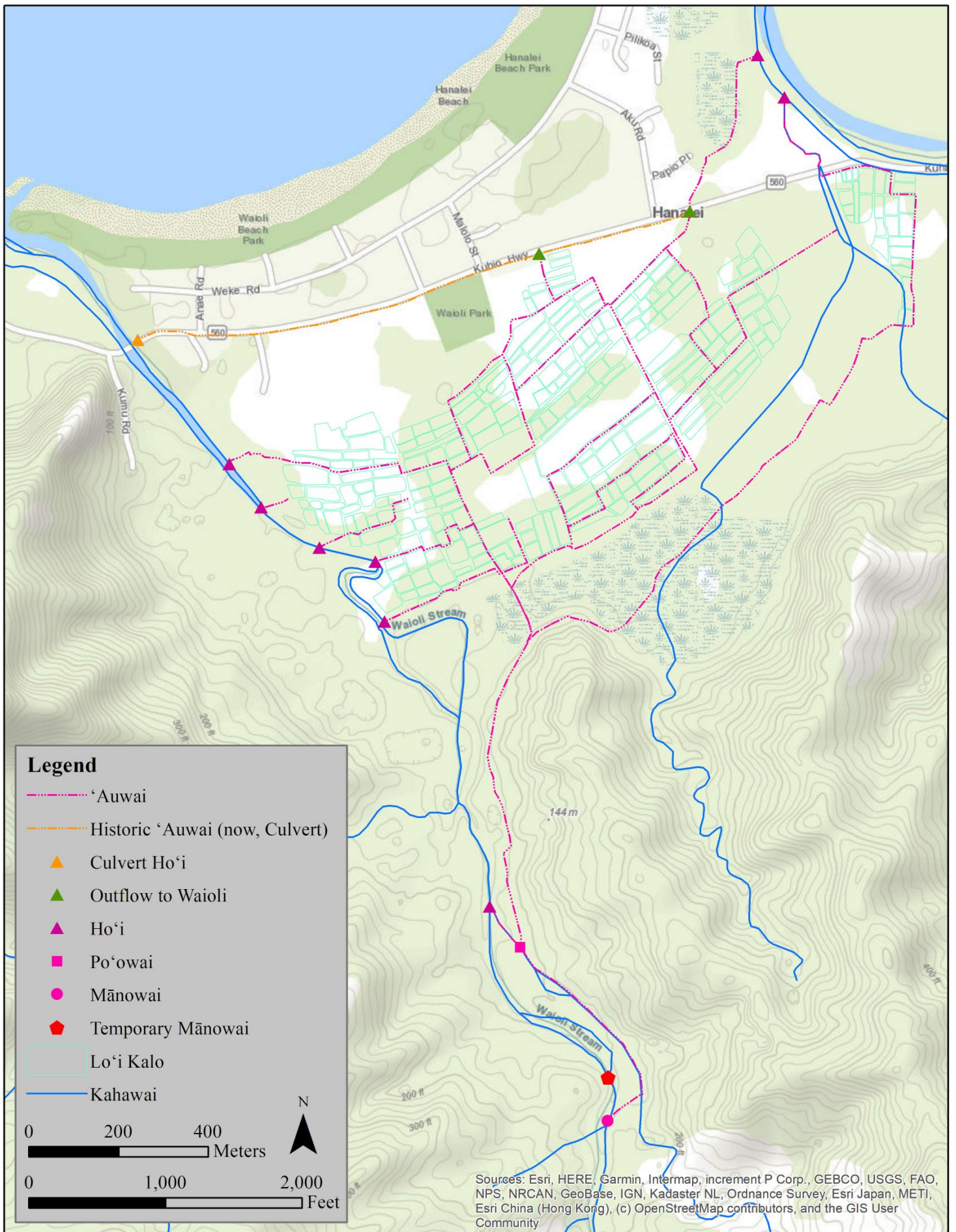


Figure 26: Topography

As a sub-watershed within Hanalei Bay Watershed, Wai‘oli is characterized by steep mountain slopes (45° with an average slope of 26°), steepest near the high ridgelines which then form concave drainage basins that transition into more moderately sloped valley walls (HWH, 2012). The upper portion of Wai‘oli contains three massifs, or mountain groups: Hihīmanu, NāmoloKama, and Māmalahoa. Hihīmanu is to the east and encompasses the back valley of Wai‘oli; Māmalahoa is to the west; and NāmoloKama is situated between the two to the south. The lower portion of Wai‘oli is bound to the east by the kalo lands of Kuhimanu, which abut Kamōkoleaka, a ridge that connects to Hihīmanu. On the western border, dividing the Wai‘oli Ahupua‘a from the Waipā Ahupua‘a is a ridge paralleling Wai‘oli River named Makaihuwa‘a.

Demonstrating the interconnectedness of the Hanalei Bay Watershed, or Hanalei Kalana, the Wai‘oli Lo‘i Kalo Irrigation System stretches across the coastal plains of Wai‘oli and into the Hanalei Ahupua‘a, while the Wai‘oli estuary is located in the Waipā Ahupua‘a. The majority of the Project Area elevation is at sea level to ten (10) feet above mean sea level (“amsl”). The elevation of the po‘owai is equal to or less than 50 feet amsl and the mānowai is between 100 to 125 feet amsl (GDSI data set, Kaua‘i 50-foot contours) (Leu Cordy & Merrin, 2020). The remainder of the ‘auwai, lo‘i and ho‘i are situated within zero (0) to ten (10) feet amsl (Leu Cordy & Merrin, 2020).

5.2.2 Soil

Wai‘oli’s soil composition consists of alluvial, non-calcareous flatland soils in the lowlands and along valley streams and considered to be most important for agriculture; coral sandy soil, mixed with calcareous marine organism fragments, concentrated in the ocean front (HWH, 2012).

Within the Wai‘oli Stream and breadth of the Lo‘i Kalo Irrigation System, the soil series vary depending on the topography or location ma uka to ma kai. Using the United State Department of Agriculture (“USDA”) Natural Resources Conservation Service Web Soil Survey, generally, the Wai‘oli Stream and Lo‘i Kalo Irrigation System are represented by six (6) soil series. However, roughly half of the Project Area is comprised of Kolokolo extremely stony clay loam (KUL) and Mokuleia clay loam (Mta) (USDA, 2020). **See Figure 27, Soil Map.**

Below is a detailed description of each soil series:

Rough mountainous land (rRT): These occur in mountainous areas. It consists of very steep land broken by numerous intermittent drainage channels. Elevations range from nearly sea level to more than 6,000 feet. Over much of the area, the soil mantle is very thin, ranging from one (1) to ten (10) inches in thickness. The land surface is dominated by deep, V-shaped valleys that have extremely steep side slopes and narrow ridges between the valleys. This land type is used for water supply and wildlife habitat (USDA, 1972).

Kolokolo series (KUL): Across the island, this series is predominantly found in the subject area. The series is on stream bottoms with slope ranges from zero (0) to two (2) percent. Permeability is moderate. Runoff is slow and the erosion hazard is no more than slight. The specific soil type KUL is extremely stony. The soil is subject to damaging overflow with some extreme boulder areas and some areas where the slope is as much as 12 percent (USDA, 1972).

Hihīmanu series (HMMF): The series consists of deep, well-drained soils that formed in material weathered from basic igneous rock. Hihīmanu soils are on very steeply sloping positions in the uplands of Kaua‘i. Slope is 40 to 70 percent. The series is well drained; medium runoff; moderately rapid permeability. These soils are used for watershed, wildlife and grazing (USDA, 2004).

Hanamā‘ulu series (HsB, HsC): These soils consist of very deep, well-drained soils and occur on stream terraces and steep terrace breaks and have slopes ranging from three (3) to 40 percent. These soils are developed in alluvium washed from upland soils. The solum is about three (3) feet to over six (6) feet thick over gravel, stones and boulders. A few highly weathered ‘ili‘ili and stones are throughout the solum in some pedons. They are nearly level to strongly sloping. Elevations range from 200 to 700 feet. The specific soil type at the site is Hanamā‘ulu silty clay, three (3) to eight (8) percent slopes (HsB), and is located on terraces. Permeability is moderately rapid. Runoff is slow, and the erosion hazard is no more than slight. Most areas are under cultivation (USDA, 1972)

Hanalei series (HmA, HnA, HrB): These soils consist of somewhat poorly drained to poorly drained soils on bottom lands. These soils develop in alluvium derived from basic igneous rock. They are level to gently sloping, located on bottom lands and low terraces along streams. The soil series is somewhat poorly to poorly drained, including slow runoff and moderate permeability. Most soil is used for kalo, pasture, and vegetables (USDA, 2004).

Mokulē‘ia series (Mr, Mta): The series consists of well drained soils on coastal plains from near sea level to 100 feet with slopes of zero (0) to two (2) percent. The series is well drained with very slow runoff and moderate permeability. The series is typically used for irrigated crops and pasture (USDA, 2004).

The following is a summary of the soil series and the various areas in which they exist in Wai‘oli Stream and Lo‘i Kalo Irrigation System (from ma uka to ma kai):

- Ma uka of Wai‘oli Stream: primarily rough mountainous land (rRT), Kolokolo extremely stony clay loam (KUL), Hihīmanu silty clay loam (HMMF), and Hanamā‘ulu silty clay (HsB).
- Mānowai: primarily Hanamā‘ulu silty clay (HsC), Hanalei silty clay, deep water table (HrB) and Hanalei silty clay (HnA).
- ‘Auwai and individual lo‘i: Hanalei silty clay loam (HmA) and Mokulē‘ia clay loam (Mta).
- Estuary and ma kai areas of Wai‘oli Stream: Mokulē‘ia fine sandy loam (Mr), Mokulē‘ia clay loam (Mta), and Hanalei silty clay (HnA).

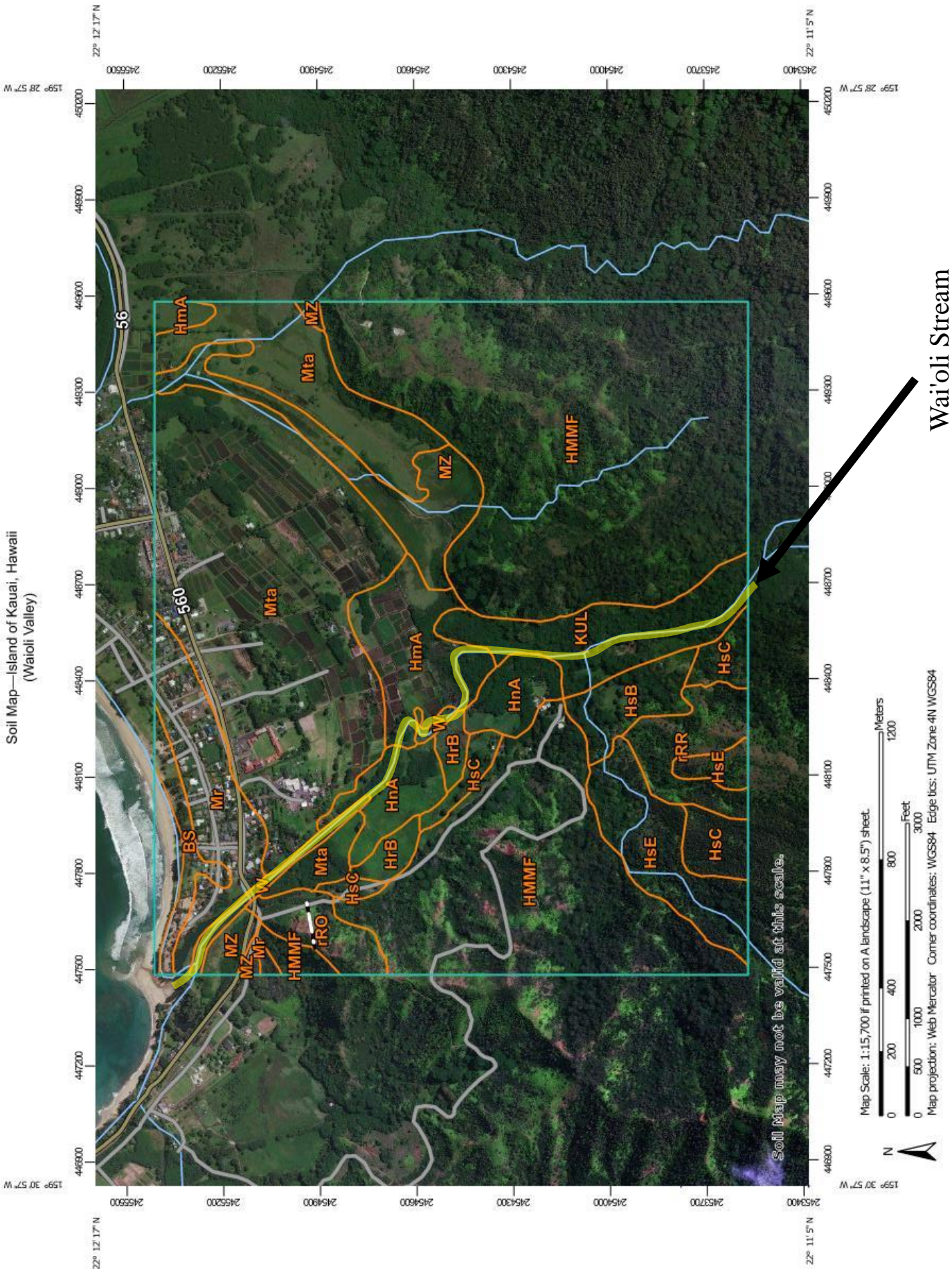


Figure 27: Soil Map

5.2.3. Potential Impacts, Minimization and Mitigation Measures

Given the historical use of the area and existing infrastructure and practice of kalo cultivation, *no significant negative impacts* are anticipated as a result of the Proposed Action. To the contrary, the Proposed Action will have some *beneficial impacts* on the geology and soil in the Project Area. Minimal potential impact to soil within the Lo‘i Kalo Irrigation System include run-off, dust, and seepage and are mitigated by implementing best management practices.

The **Proposed Action: Long-Term Water Lease** would have a *moderate beneficial impact* on geology and soil since the Proposed Action utilizes and seeks to maintain the naturally occurring topography and soil properties, as a cultural practices done for centuries in Wai‘oli Valley. In addition, as an integral part of the Hui’s kalo cultivation efforts and as a part of the Watershed Management Plan required under HRS 171-58, the Hui will undertake regular proactive mitigation efforts through regular farming practices, stream cleaning, and other efforts that actively maintain the geology and soil.

Under **Alternative A: Shorter Lease Term Alternative**, **Alternative B: Status Quo Alternative** and **Alternative C: No-Action Alternative**, the water lease for kalo cultivation would have a *neutral impact* on geology and soils. Under Alternative B: Annual Revocable Permit alternative, the maintenance of the Lo‘i Kalo Irrigation System would be similar. However, under Alternative C, a no-action alternative will lead to a decline in kalo cultivation, the frequency and quality of Lo‘i Kalo Irrigation System maintenance would likely be diminished, limited, or discontinued resulting in an overwhelming increase of invasive grass and weeds, leading to a higher rate of eroded soil, runoff, and natural debris flowing through the stream.

Minimization and Mitigations Measures

Erosion ma uka of the Proposed Action is natural and not caused by the Proposed Action. The Hui’s Watershed Management plan, however, minimizes the effects of such erosion including: arboreal maintenance, removing debris, moving naturally occurring rocks out of the ‘auwai, and in the nearby vicinity, and manually relocating rocks to support the purpose of the mānowai. Although the maintenance to the system may cause a degree of turbidity, the mitigation work to date has relied on manual labor and hand tools, which creates minor disturbances over short periods of time compared to mitigation measures that would require machinery.

The soil series within the lo‘i complex and surrounding area does affect the structure of the lo‘i itself and any potential seepage within the lo‘i. To minimize impacts to soil, the Hui utilizes best management practices and fallows each lo‘i (**see Section 3.2**). To minimize run off during lo‘i preparation, the individual lo‘i water outflow is closed, allowing water and soil disturbance to remain within the lo‘i. Any dust produced as a result of dry tilling does not affect the larger public since only the farmers are present during this practice. The Hui also implements standard agricultural methods that mitigate seepage and allows the lo‘i to retain water and allow for sufficient throughflow. For example, in Wai‘oli, the soil series within the lo‘i complex varies from Hanalei silty clay loam (HmA) and Mokulē‘ia clay loam (Mta). For individual lo‘i with Hanalei soil series, preparing the lo‘i requires slightly less tilling since the soil series is “poorly drained, including slow runoff and moderate permeability” (USDA, 2020) reducing the amount of seepage through the

ground. On the other hand, individual lo‘i with Mokulē‘ia soil series that are “well drained with very slow runoff and moderate permeability” (USDA, 2020) may require additional tilling during the lo‘i preparation to reduce seepage into the ground. With generational knowledge of this specific ‘āina, the farmers’ individual practices have adapted to the soil on their respective farms.

Removing and controlling non-Native hooved animals (i.e., pigs) from important watershed forests is also key to maintaining and restoring the biological integrity of the Wai‘oli Watershed by preventing soil erosion and limiting the spread of invasive species. The Hui will continue to control the ingress of ungulates and remove them through a coordination of active hunting and setting of snare traps in the watershed and Lo‘i Kalo Irrigation System. The Hui will partner with the community to coordinate active ungulate management within the Wai‘oli Watershed and will notify the Hui’s secretary and log each action and location. Ultimately, the continued control and removal of ungulates will help to prevent further watershed degradation caused by ungulate activity.

5.3. Wai: Water Resources

Understanding wai, or water, in a Kānaka Maoli context is best understood through ‘ōlelo Hawai‘i. Waiwai, a reduplication of wai, means wealth, and kānāwai meaning law, may pertain to the earlier pre-contact laws dealing with water (Pukui, 1986, 127). As an island community, “both wealth and the law were and continue to be defined by fresh water” (Sproat, 2009, 3). For Kānaka Maoli, and in this case, the Hui in particular, the use and management of water in Wai‘oli is a “true kuleana: both a privilege and a responsibility” (Sproat, 2009, 3). “For early Hawaiians, water (wai) was a symbol of abundance because it was essential for making taro, the staff of life, flourish. Because water was so important in daily life, a fundamental concept of property was based on water-use rights, rather than land ownership. The Hawaiian traditions related to water encouraged both water conservation and cooperation among farmers” (Evans, 2008, 17).

In Hawai‘i, water is recognized as a public trust resource, which must be managed for present and future generations. Today, Hawai‘i’s Constitution, Water Code, and case law strongly reaffirms the importance of protecting and carefully administering Hawai‘i’s limited fresh water supply for the public good, with the highest consideration given to specifically enumerated public trust purposes, such as kalo cultivation. Article XI, section 1 of Hawai‘i’s Constitution declares that “all public natural resources are held in trust by the State for the benefit of the people.” Article XI, section 7 of Hawai‘i’s Constitution makes specific reference to water, including the directive “to protect, control, and regulate the use of Hawai‘i’s water resources for the benefit of its people.” Significantly, “article XI, section 1 and article XI, section 7 adopt the public trust doctrine as a fundamental principle of constitutional law in Hawai‘i” (*Waiāhole*). The public trust imposes “a dual mandate of 1) protection and 2) maximum reasonable and beneficial use” (*Waiāhole*). This establishes an “affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible” (*Waiāhole*).

The “public trust purposes” identified by the Hawai‘i Supreme Court, which include environmental protection, traditional and customary Native Hawaiian rights, appurtenant rights, domestic water uses, and reservations for the Department of Hawaiian Home Lands, mandate a high level of

protection and consideration. The public trust also dictates that uses “consistent with trust purposes” such as the Hui’s uses are “the norm or ‘default’ condition” (*Waiāhole*).

The Hui’s proposed and ongoing use of water from Wai‘oli Stream is grounded in both traditional and customary Native Hawaiian rights and appurtenant rights. **The Cultural Impact Assessment, Appendix C (“CIA: I Mano ka Wai‘oli”)**, expands on the extent of traditional and customary Native Hawaiian practices and appurtenant rights in this area.

Kalo and kalo cultivation contribute to the collective water resources in the Wai‘oli Watershed. The hydrologic cycle is a building block for a healthy watershed: water evaporates off the ocean and land surfaces; it is then carried over the earth in atmospheric circulation as water vapor and returns to the earth as rain. This rainfall is intercepted by plants, runs off over the land surface, infiltrates into soils, recharges ground water, discharges into streams, and ultimately flows to the ocean from which the cycle continues. As a part of this cycle, water collects on kalo leaves, and then evaporates, drips to the ground beneath the canopy, or flows down the stem of a plant. Rainfall falls to the floor of the Lo‘i Kalo Irrigation System, and some infiltrates into the soil below. A portion of the infiltrated water percolates beneath the soil layer flowing into aquifers or along subsurface flow paths, emerging down slope as seepage into the estuary and Hanalei Bay and Estuary. A portion of the total rainfall reaching the ground also becomes surface runoff, which occurs when the rainfall rate exceeds a soil’s infiltration rate or when the soil is saturated and cannot absorb any additional water. As water percolates beneath the soil, however, a portion ends up floating on heavier sea water which forms an island’s freshwater aquifer (s), recharging our ground water supply (Hanalei Watershed Hui, 2012).

5.3.1. Ground water

According to the Watershed Management Plan for Hanalei Bay Watershed, 2012:

Ground water is water found in underground layers of rock or sediment, referred to as an aquifer. An aquifer is roughly defined as an area in which the spaces (voids) are filled with water. The water table is the upper elevation of the water in an aquifer. Similar to surface water, water in an aquifer flows under the force of gravity. The flow rate of water through an aquifer is a function of the elevation head (or slope) of the water table, the hydraulic conductivity of the substrate it encounters, the cross section of the area it flows through, and the viscosity of the water. In general flow rates through dense material are slower compared to flow through loosely packed materials if all other variables are the same. Water in aquifers can either be fresh, salt, or brackish (24).

The current sustainable yield for the Hanalei Aquifer System is 35 mgd, and the January 2021 12-month average pumpage from the aquifer system is 0.151 mgd. There are two existing wells in the Wai‘oli hydrologic unit, and one (2-1130-002) is reporting its use, with a 12-month average pumpage of 0 mgd (CWRM Staff Submittal, April 2021). The 1990 Kaua‘i Water Use and Development Plan indicated that at that time the well capacity for Hanalei was 0.36 mgd, and the demand was 0.88 mgd (CWRM, 1990, 9). Despite recent updates to other County Water Use and Development Plans, Kaua‘i Department of Water Supply has not yet revised the thirty-year-old plan.

The aquifers beneath the Hanalei Bay Watershed are in the same Sector (02) and System (02), both named Hanalei (aquifer code: 20201). The aquifers are separated into three types: High Level (2), Unconfined (1), Dike (2) located primarily in the steep sections of the Hanalei Bay Watershed; Basal (1), Unconfined (1), Dike (2) located in the middle elevations; and Basal (1), Unconfined (1), Sedimentary (6) located along the coastal plains (Hanalei Watershed Hui, 2012, 24).

The aquifer located in the steep sections of the watershed is found beneath the land surface from the top of the Hanalei Bay Watershed down to approximately 500 feet (152 m) elevation. High level means the water is fresh and does not contact seawater, unconfined means the top of the water table in the aquifer is the upper surface, and dike means that water is held in dike compartments (e.g., similar to boxes that can only overflow if full, or leaks). This aquifer function as mountain reservoirs and is a significant hydro-geologic feature of the watersheds (Hanalei Watershed Hui, 2012).

The aquifer located in the middle elevations is located beneath the Hanalei Bay Watershed from the contact line with the high level dike aquifers to the land surface elevation at approximately 100 feet (33 m) elevation. Basal water is a fresh water layer that is in contact with seawater, while unconfined means that water is percolating through soils, recharging the aquifer. In this aquifer, water is contained within the dike compartment, and as described above the rate at which it leaks out is variable (Hanalei Watershed Hui, 2012).

The aquifer located along the coastal plains is beneath the Hanalei Bay Watershed, from the land surface at approximately 100 feet (300 m) elevation to the shoreline. The water in this aquifer differs in that the ground water is contained in sediments carried by surface water running over the landscape. The water table in this aquifer varies, however, its depth below the ground surface is generally small. In areas with ground elevations equal to or less than 10 feet (3 m) the ground water table is approximately 3 to 4 feet (1 m) beneath the ground surface (Hanalei Watershed Hui, 2012).

Moreover, research from samples of ground water in temporary wells in the Wai‘oli beach face found that the coastal aquifer is a dynamic zone in which fresh ground water, saline ground water, and seawater mix. A small, but noticeable, salinity depression occurred nearshore in areas not located near a stream, indicating the discharge of fresh ground water. This indicates that ground water could be an important nutrient source to nearshore waters in Hanalei Bay. The sample groups, however, did demonstrate high variability representing a complex mixing zone rather than a uniform end (Field et al., 2007).

The 2007 study by Friedlander et al. found that neither rainfall nor surface water discharge was significantly correlated with bay bottom salinity, suggesting that fresh, turbid water from rainfall, discharged through streams into the bay, becomes horizontally distributed, and remains largely in the upper portion of the water column. This reflects the fact that stream discharge entering the Bay is both colder and fresher than seawater and that more discharge enters during the colder (rainier) part of the year (Friedlander, 2007, 234).

5.3.2. Surface Water

Surface water in Hawai‘i is a valued resource with significant economic, ecologic, cultural, spiritual, economic, and aesthetic importance. In Hawai‘i, there are approximately 376 perennial streams that

flow continuously throughout the year supplying more than 50% of the irrigation water in Hawai‘i. From the mountains to the sea, these streams give life to the diversity of ecosystems that form unique Hawaiian physical and cultural landscapes, all playing a vital role in the larger watershed and ecosystem (CWRM, 2020).

Since time immemorial, Kānaka Maoli engineered lo‘i and related agricultural irrigation in alluvial plains and valleys with sufficient stream resources, enabling them to transform vast areas into farmland to support the production of wetland kalo. They built complex irrigation ditches to direct and redirect water from free-flowing streams, and they closely controlled water flow and circulation within the fields to prevent stagnation, keep water and thus kalo temperatures low, and prevent disease (Kurashima et al., 2019).

The total length of Wai‘oli Stream is 5.4 miles from its mouth to the base of NāmoloKama (State OP-GIS, 2020), and it is fed by at least ten (10) well-formed, intermittently flowing mana wai, originating on Hīhīmanu, NāmoloKama, and Māmalahoa (Kīpuka Kuleana, 2020). The centerline of Wai‘oli Stream is dynamic and is historically documented to have changed course within its basin. Even with these shifts, all historic maps show a clear stream channel (Kīpuka Kuleana, 2020). The four (4) perennial streams that drain into Hanalei Bay Watershed have sections where ground water drains into the stream increasing surface flow volume in the channel, and other sections where the channel loses water through its bed and banks (Field et al., 2007; Hanalei Watershed Hui, 2012).

Water temperature in Wai‘oli was documented by a USGS study and examines four (4) independent Wai‘oli lo‘i complexes totaling 45 acres. The average temperature of the Wai‘oli lo‘i complex was 23.6 degrees Celsius (Gingerich et al., 2007). These lo‘i complexes were studied for a period of two (2) months, from August to September 2005. Water temperatures were taken in lo‘i with kalo near the harvesting stage during the dry season, when water requirements for cooling kalo are higher (from June to October) (Gingerich et al., 2007).

Stream temperature can be affected by a combination of many factors such as: water volume of surface flow or ground water discharge, geographic qualities such as topography and lithology, atmospheric conditions such as surface temperature, relative humidity or wind speed, and a stream’s physical characteristics (riparian vegetation, channel width, substrate). Within the ‘auwai and Lo‘i Kalo Irrigation System, water temperature is also affected by the lo‘i structure, evaporation, kalo crop stage, and water flow into the lo‘i (Kurashima et al., 2019 and UH-WRRC, 1970).

Surface water in the Project Area is primarily used for throughflow. It is the Hui’s primary means of maintaining the necessary cool surface water temperatures, a foundational concept in traditional lo‘i kalo cultivation. **See Section 3, Project Description.** Throughflow is defined as water that flows through the lo‘i and carries heat away. Throughflow is distinct from water that is “consumed.” This “used” water is water that is lost to percolation through the soil, transpiration by the plant, and evaporation. Together, throughflow and used water comprise the total water flowing into the lo‘i, or the “inflow.” With adequate throughflow, kalo can keep in the field for several months, up to 24 months for some varieties. Farmers who lack adequate throughflow, however, are “forced to choose between harvesting prematurely or incurring losses from rot” (Reppun, 2007, 7).

5.3.3. Watershed and Hanalei Bay

The Hanalei Bay Watershed is comprised of four traditional ahupua‘a: Hanalei, Wai‘oli, Waipā, and Waikoko. From the mountains of these four (4) ahupua‘a, four (4) perennial waters flow their lengths and empty into Hanalei Bay (State DLNR, 2008; Tetra Tech-DOH, 2008). As a traditional kalana, Kānaka Maoli have managed the natural and cultural resources within the larger Hanalei Bay Watershed as a single integrated system to maximize the cultivation of traditional crops and aquatic resources. The lifeways and techniques that allocate and distribute water resources have the ability to further mitigate the impacts of flooding. From a watershed-wide perspective, Lo‘i Kalo Irrigation Systems “enhance environmental sustainability by maintaining aquatic and riparian habitat, integrity of the hydrologic cycle (especially coastal discharge, stormflow dissipation, and ground water recharge), instream flow for other water uses, and integrity of the cultural landscape” (Penn, 1980, 132). Thus, the health of the Lo‘i Kalo Irrigation System is critical for the sustainability and resilience of the watershed as a whole.

The Wai‘oli Watershed is 3,483 acres and as part of Hanalei Kalana, shares stream resources with the ahupua‘a of Waipā and Hanalei. For instance, the Wai‘oli muliwai (estuary) is located within the Waipā Ahupua‘a, a portion of the Wai‘oli lo‘i and ‘auwai are located within the Hanalei Ahupua‘a, and two (2) ho‘i from Wai‘oli return water to Hanalei River, all eventually terminating in Hanalei Bay. See **Figure 2, Hanalei Bay Watershed and State Land Use District Map, and Figure 3, Wai‘oli Ahupua‘a**. It is for these reasons, that Kānaka Maoli managed wai, or water resources, within a kalana.

Table 2: Summary of Subwatersheds within Hanalei Bay Watershed.

<u>Watershed</u>	<u>Total Stream Length (mi)</u>	<u>Watershed Area (ac.)</u>	<u>Watershed Area (sq. mi.)</u>
Hanalei	77	15,125	23.63
Wai‘oli	16	3,483	5.44
Waipā	9	1,592	2.48
Waikoko	1	458	0.72
Total	103	20,658	32.27

Source: Hanalei Watershed Hui, 2012.

Wai‘oli is near the center of the Hanalei Bay Watershed and is the second largest sub-watershed within the Hanalei Bay Watershed comprising approximately 17% of the total area (Tetra Tech-DOH, 2008). The Bay is northwest facing, crescent shaped, framed by two rocky points, Pu‘upoa to the northeast and Makahoa to the northwest. “Hanalei River, one of the largest in the State of Hawai‘i, enters the bay from the east, and is a major source of fresh water, sediment, and organic input. The much smaller streams, Wai‘oli, Waipā, and Waikoko, enter from southwest” (Friedlander, 1997, 14). In general, the water in Hanalei Bay is more saline and cooler farther offshore, as depth increases, which is influenced and explained by the presence of freshwater discharge or ground water effluence, especially near the estuary (Field et al., 2007). See **Figure 28, Hanalei Bay Surface Water Column Properties**.

The four (4) ahupua‘a in Hanalei Bay Watershed share similar environmental landscapes. The inner shore of the Bay is lined with stretches of sandy beach that give way to low dunes. Immediately inland of the dunes are lo‘i that stretch into the upper valleys and into the shallower valleys on the western portion of the Watershed.

Within the Bay, the marine environment is characterized by well-developed fringing reefs bordering an extensive area of unvegetated carbonate sediments (Friedlander et al., 1997, 54), which is historically known to support diverse invertebrate assemblages (158). Study observations “suggest that the soft bottoms function as shelter and/or foraging grounds for many nearshore fishes, including several important resource species” (Friedlander et al., 1997, 54). Immediately extending 500 meters out from Wai‘oli muliwai into the Bay, the substrate consists of soft substrate and shallow reef flat, ranging in water depth of 0 to 12 meters (Friedlander et al., 1997, 18 and 21). The area directly in front of Wai‘oli muliwai was also one of three (3) sites that were found to be a high coral area, which also had greater protection from large surf than other sites in the bay (Friedlander et al., 1997, 28).

From 1993 to 1994, coral cover within Hanalei Bay was generally low due to exposure to high energy waves for long-periods during winter months depressing coral coverage. On average 17.88% of sample transects substrate was scleractinian (hard) corals with *Montipora patula* the most abundant coral species in the bay, accounting for over half of the total coral cover. *Porites lobate* and *M. capitata* were the next most abundant species of coral commonly encountered and usually appeared in encrusted forms. Encrusting growth forms were also found to maximize surface area for survival in Hanalei Bay, a light limited environment where heavy rainfall and freshwater inputs can greatly increase the sediment load (Friedlander et al., 1997, 26).

Prior to the published 1997 Friedlander et al. study, the biology (fisheries, biological resources, or processes) of Hanalei Bay had been little studied using Western research methods. A few small-scale, short-term, individual studies were done within the Bay irregularly over the prior two decades for limited purposes, in a few locations (Friedlander et al., 1997, 10). For this reason, DLNR-DAR selected Hanalei Bay for a multi-year study examining the marine biological resources, quantifying important fauna and habitat features, and relating habitat characteristics to fish communities and resource species. The study found that seasonal variability was present in most of Hanalei Bay’s environmental variables (e.g., wind speed, surf height, rainfall, Hanalei River discharge, water column temperature and salinity) experiencing large variation from broad seasonal patterns as well as significant year-to-year variability (Friedlander et al., 1997, 235). In particular, large surf events and heavier than average rainfall during the winter and spring seasons appeared to be the major environmental variables affecting the local marine system. Studies of Hanalei Bay found:

“...a relatively healthy nearshore marine environment ecosystem persisting in a dynamic and relatively harsh environment that at times includes high wave energy, heavy influx of fresh water, and high turbidity. Although the system is not pristine nor highly diverse, the Bay maintains a considerable variety of plants and animals, including a good many harvestable species...In view of the limited size of the bay and the apparent sizes of its resource populations, as well as the nature and level of natural stresses it experiences, it seems unlikely that the system has the capacity to support much increase in exploitation” (Friedlander et al., 1997, 7).

The 1997 Friedlander et al. study found that fine and medium-fine sands make up the majority of the sedimentary habitat of Hanalei Bay. Medium-fine sands are associated with reef edges of the outer Bay and the shoreline area, whereas fine sands are distributed through the more central Bay. The area fronting the Wai‘oli muliwai is reef and immediately to its east is medium-fine sand and to its west is coarse-medium sand (Friedlander et al., 1997, 61). The most distinctive feature of the soft-bottom habitat of Hanalei Bay, nearly 0.7 miles to the north east of Wai‘oli muliwai, is the presence of a large silt/mud depression associated with the Hanalei River mouth, known locally as “the Black Hole.” Its center or depression appears to be an area for depositing terrigenous material from the Hanalei River and based on the 1997 study, appears to play an important ecological role for many fish species (Friedlander et al., 1997, 60). The research published in 1997 suggests, “an important trophic link between the featureless, unvegetated sand habitat and the structurally complex reef substrate in Hawai‘i” (Friedlander et al., 1997, 28). The number of fishes in Hanalei Bay were found to utilize soft-bottom habitats as foraging grounds, while reef edges in the Bay supported significantly more species and individuals of fish than other reef habitats in the bay (Friedlander et al., 1997, 228). **See Figure 29, Sedimentary Habitat Types of Hanalei Bay.**

5.3.4. Water Quantity

Generally, streamflow consists of five (5) components (Oki, 2003):

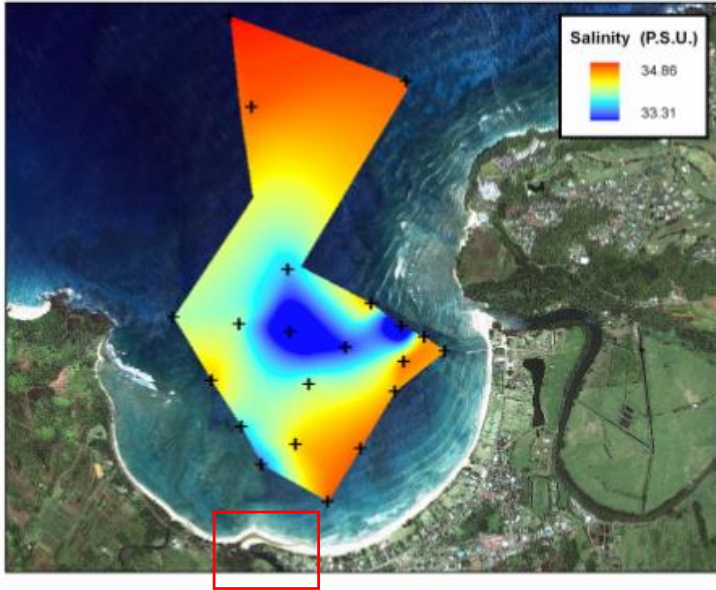
- Direct runoff from rainfall in the form of overland flow and subsurface storm flow that rapidly returns infiltrated water to the stream;
- Ground water discharge in the form of base flow, where the stream intersects the water table;
- Water returned from bank storage;
- Rain that falls directly on streams; and
- Any additional water, including excess irrigation water discharged to the stream by humans.

The amount of direct runoff and base flow that contributes to total streamflow depends on factors including rainfall amount and intensity; drainage-basin geology, morphology, and size; soils; and land cover. Streamflow characteristics also can be affected by human-made diversions, channelization, dams, land-use changes, and other factors (Oki, 2003).

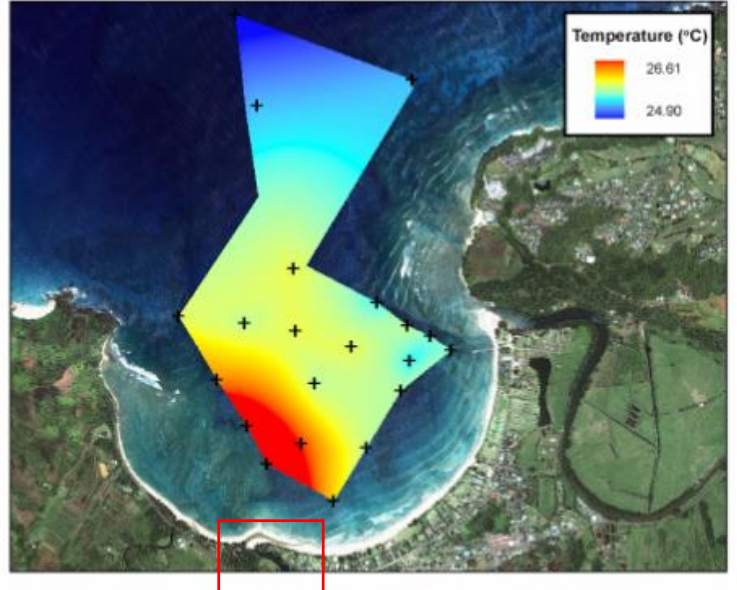
The Hanalei Bay Watershed – of which Wai‘oli is a subwatershed – originates at the summit of 5,240-foot Mount Wai‘ale‘ale, which receives an average of 450 inches of rainfall per year. The Hanalei Bay Watershed has a 32.3 square mile drainage area with the Hanalei River Watershed comprising 73.2% of the entire Hanalei Bay Watershed drainage area (23.6 square miles). The Wai‘oli Watershed is the second largest drainage area comprising approximately 5.5 square miles (Tetra Tech-DOH, 2008).

As part of the long-term water lease process, CWRM established a numeric IIFS of 4 mgd during low flow conditions that balanced beneficial instream needs and off stream uses in Wai‘oli. CWRM is the governing authority to review and make determinations regarding all claimed water rights, instream uses, and off stream needs. Wai‘oli’s kalo cultivation – and the requisite throughflow – is an appurtenant, riparian, and traditional and customary Native Hawaiian use of water for public trust purposes, which have some of the highest levels of protection under the Hawai‘i State Constitution and Water Code, HRS chapter 174C.

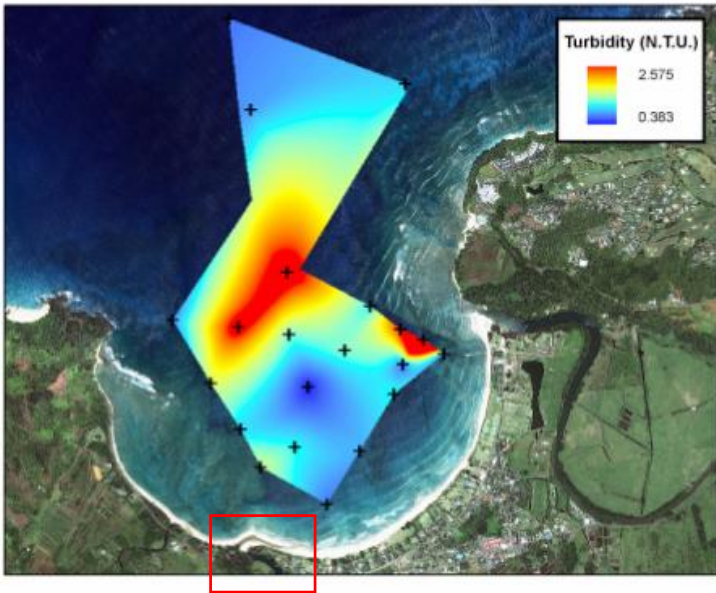
Salinity



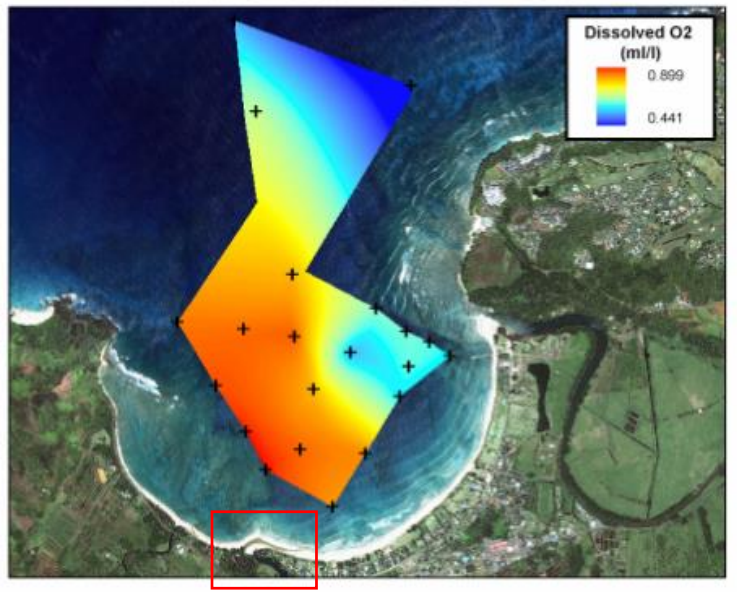
Temperature



Turbidity

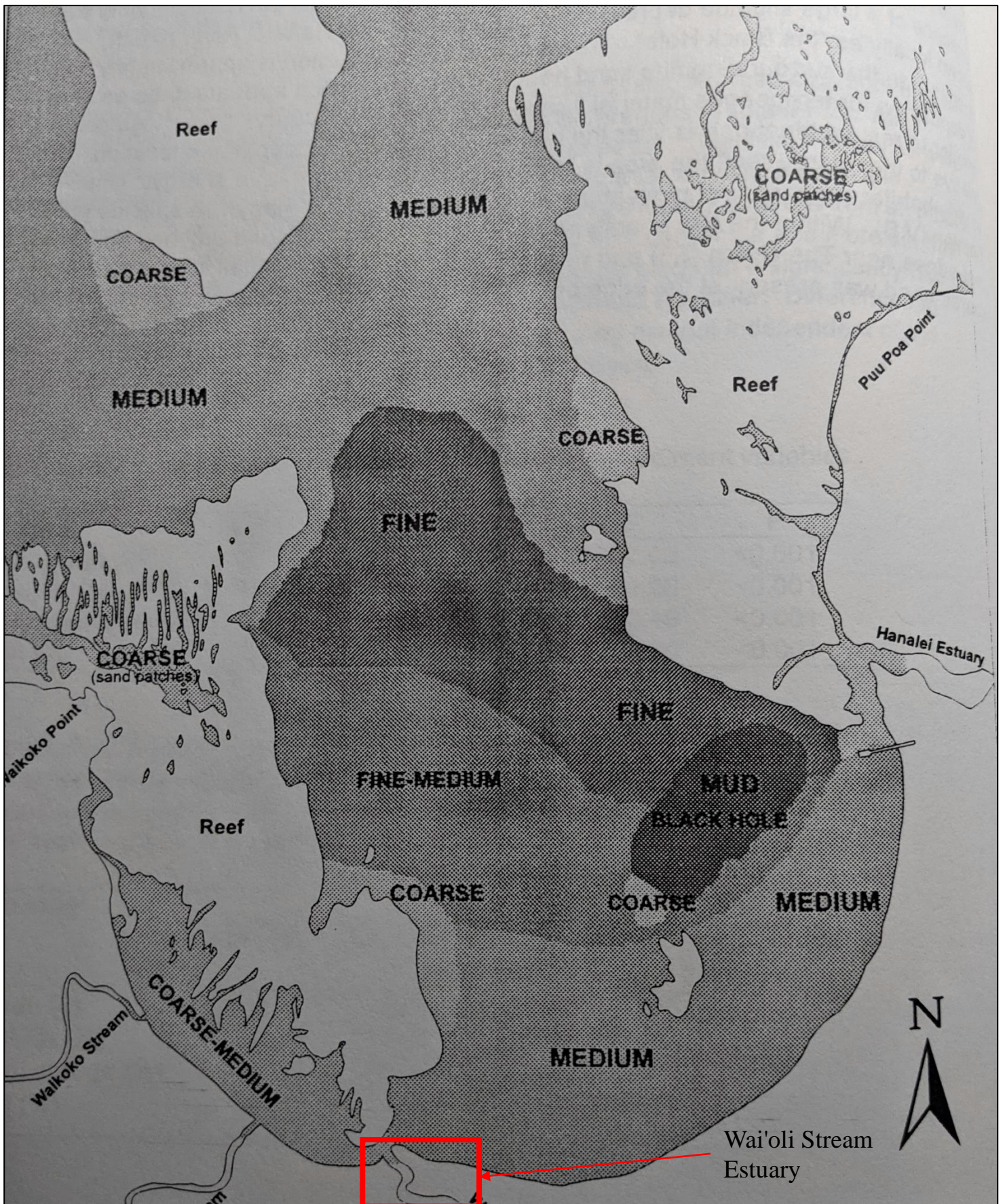


Dissolved O₂



Source: Field (Eds.), 2007

Figure 28: Hanalei Bay Surface Water Column Properties



Source: Friedlander, et.al., 1997

Figure 29: Sedimentary Habitat Types of Hanalei Bay

Historically, as a relatively smaller stream, flow data collection on Wai‘oli Stream has been inconsistent and limited. The original Wai‘oli Stream Gauge (USGS 16105000, 22.1676, -159.4952) documented daily discharge between 1914 and 1933. During that period of record, the median flow (Q50) was 20 cubic feet per second (“cfs”) or 12.9 mgd (State DLNR – CWRM, 2021). Over the same period, the Q70 – or the flow in the stream about 70% of the time, which also approximates the groundwater contribution to the stream – was 15 cfs or 9.7 mgd, while the Q90 – indicative of low flow conditions – was 11 cfs or 7.1mgd (State DLNR – CWRM, 2021). **See Figure 3, Wai‘oli Ahupua‘a.**

Over fifty years later, in 1989, during CWRM’s registration process, a number of Hui members declared their water uses from the East Wai‘oli ‘auwai (east flow after the po‘owai). Registrations and subsequent verifications in 1993 and 1994 determined that 13.5 mgd was being diverted at the time of registration (State DLNR-CWRM FIR, 2019).

In 2019, in response to the historic April 2018 floods, CWRM staff conducted a site visit to verify and record the present and historic stream diversions that supplied water to the Hui. Staff conducted a stream diversion works verification, measured the amount of water diverted during the site visit, and quantified the amount of water upstream in the main stream channel. CWRM staff measured a total of 21.14 mgd in Wai‘oli Stream’s main channel above the mānowai and 10.07 mgd at the historic po‘owai, which mathematically left 11.07 mgd in Wai‘oli Stream on that specific day (State DLNR-CWRM FIR, 2019). CWRM staff had planned to take other miscellaneous measurements in 2021, but two site visits were cancelled due to flooding in Halele‘a and Wai‘oli in particular. A consultant for the Hui who was on Kaua‘i was able to take additional measurements that were shared with CWRM.

Generally, for kalo cultivation, USGS’s 2007 peer-reviewed study documented an average inflow of 260,000 gad for lo‘i complexes, acknowledging that the actual volume of water is location specific and dependent on a host of factors. Some of these unique factors include elevation, soil type, percent shade, growth stage of the plant, variety of kalo cultivated, how the kalo will be consumed, whether it is an individual lo‘i or part of a lo‘i complex, and where along the ‘auwai an individual lo‘i is situated. This water duty includes both the amount needed for actual consumption by the kalo plant, and the amount required to flow through the lo‘i to keep the kalo cool and prevent crop failure. Both amounts are necessary to farm kalo successfully and to calculate any realistic measure of kalo water duty (Reppun, 2007).

Water use and needs in Wai‘oli vary by season and year, but are likely in the range of the Hui’s historic use of roughly 13.5 mgd of throughflow over the Hui’s 84-acre lo‘i complex. After centuries of living on and with this ‘āina and stream, the Hui is mindful of the balance between the kalo’s needs and those of the stream and surrounding community. As part of the water lease process, the Hui will decide on the specific lo‘i that are able to be replanted as part of the flood recovery effort.

5.3.5. Water Quality

Water quality is a measure of its suitability for a particular use based on physical, chemical, and biological characteristics. To make this determination, samples are gathered and then analyzed based on various characteristics (e.g., temperature, dissolved mineral content, and number of bacteria). Results are then compared to numeric standards and guidelines to determine if the water is suitable for a particular use (USGS, 2001).

The federal Clean Water Act (“CWA”) section 303(d) requires the Hawai‘i Department of Health (“DOH”) to report on the State’s water quality in April of every even numbered year. To fulfill this requirement, the State of Hawai‘i publishes a biennial Water Quality Monitoring and Assessment Report, known as the Integrated Report (“IR”). This report informs the public about the status of marine and inland waters, including water quality conditions across the archipelago. The IR both identifies areas in need of restoration, and also serves as a baseline to validate the State’s efforts to improve water quality and eventually de-list impaired waters that have been rehabilitated. The data included in the 2018 IR was collected between November 1, 2015 to October 31, 2017. Similarly, the data for the 2020 IR data was collected between November 1, 2017 to October 31, 2019. Hawai‘i Administrative Rules Title 11 Chapter 54 (HAR 11-54) also requires monitoring for all State waters.

With approximately 3,326 miles of rivers and streams, Hawai‘i’s Water Quality Standards (“WQSs”) play a central role in the successful implementation of Hawai‘i’s surface water pollution control programs. CWA section 303(d) requires states to submit a list of waters that fail applicable WQSs, plus a priority ranking of impaired waters for Total Maximum Daily Load (“TMDL”) development based on the severity of pollution and the designated uses of those waters. Impaired waters – waters that do not meet WQSs – in the IR may be targeted for further monitoring activities to develop TMDLs. The TMDL process is a roadmap for restoration that identifies sources of pollution within a watershed and determines pollutant load reductions required for a water to once again meet water quality standards. One challenge for TMDL development in Hawai‘i is that much of the pollutant “loading” is caused by non-point sources (such as runoff from conservation land or cesspools), as opposed to point sources (such as pipes) that can be more easily regulated or reduced. Relevant water quality standards and norms for Wai‘oil Stream include:

Table 3: HAR § 11-54-5.2(b): Water Quality Standards – Stream Criteria.

Parameter	Geometric mean not to exceed the given value	Not to exceed the given value more than 10% of the time	Not to exceed the given value more than 2% of the time
Total Nitrogen (ug N/L)	250.0* 180.0**	520.0* 380.0**	800.0* 600.0**
Nitrate + Nitrate Nitrogen (ug [NO ₃ + NO ₂] –N/L)	70.0* 30.0**	180.0* 90.0**	300.0* 170.0**
Total Phosphorus (ug P/L)	50.0* 30.0**	100.0* 60.0**	150.0* 80.0**
Total Suspended Solids (mg/L)	20.0* 10.0**	50.0* 30.0**	80.0* 55.0**

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Turbidity (N.T.U.)	5.0* 2.0**	15.0* 5.5**	25.0* 10.0**
*Wet season – November 1 through April 30			
** Dry season – May 1 through October 31			
L = Liter			

Specific criteria for **stream** standards are:

N.T.U. = Nephelometric Turbidity Units. A comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. The higher the intensity of scattered light, the higher the turbidity.
ug = microgram or 0.000001 grams
pH units – shall not deviate more than 0.5 units from ambient conditions and shall not be lower than 5.5 nor higher than 8.0.
Dissolved Oxygen – Not less than eighty per cent saturation, determined as a function of ambient water temperature.
Temperature – shall not vary more than one degree Celsius from ambient conditions.
Specific Conductance – not more than three hundred micromhos/centimeter.

In contemplating minimum flow levels for Wai‘oli Stream in anticipation of a long-term water lease, CWRM noted that “the primary constituents, sediment and temperature, are directly impacted by the amount of water in a stream” (State DLNR – CWRM, 2021). Streams with flow reductions often have higher water temperatures, while streams with healthy flows have lower temperatures and the ability to quickly dilute contamination events (State DLNR – CWRM, 2021). Fortunately, Wai‘oli has continuous ma uka to ma kai flow year round. Water temperature is one of the most important environmental factors because it directly affects all forms of aquatic life. Surface water temperature in Hawai‘i may fluctuate depending on the season by only a few degrees Celsius because the streams here are relatively short (State DLNR – CWRM, 2021). Temperature fluctuations, however, may be higher in altered streams, including concrete-lined channels due to vertical solar contact (State DLNR – CWRM, 2021). For a healthy and productive wetland kalo crop, cool water must flow over the corm and roots (Gingerich, 2). There must be enough “throughflow” – water flowing through the lo‘i – since factors such as evaporation and percolation through the lo‘i must also be considered (Gingerich, 2). Throughout the kalo life cycle, water must be cold enough to support healthy and productive crops (Gingerich, 2). Various studies suggest that lo‘i temperatures should be kept at about 25 degrees Celsius (77 degrees Fahrenheit), or lower (Gingerich, 2). Water temperature management in lo‘i kalo is a priority, and the most critical physical factor in kalo cultivation (Gingerich, 2). In general, higher irrigation rates should curb water heating and provide lower irrigation outflow temperatures (Gingerich, 2). It is important that the Hui receive adequate amounts of water for their lo‘i because this will enhance both productivity of kalo crops and lower outflow temperatures when water returns to the stream.

Sources of pollutants and bacteria vary widely and include natural sources such as feces from aquatic and terrestrial wildlife, and anthropogenic sources such as cesspools, septic tanks, illegal sewage disposal from boats along the coastline, trash, and pet waste. Feral and domesticated animals and humans are implicated as sources of microbial pollutants (Tetra Tech - DOH, 2020). **Importantly,**

the Proposed Action does not include cesspool or septic systems, a major contributor to water quality findings in this area (State DLNR – CWRM, 2021). On the contrary, as detailed below, the Hui’s lo‘i kalo improve water quality in Wai‘oli.

Within the Wai‘oli subwatershed, two (2) monitoring stations are located along the Wai‘oli Stream (upper and lower) and one (1) in the Wai‘oli Estuary.

The 2018 and 2020 IR provides the most recent data on water quality in Wai‘oli. During the wet season, Wai‘oli Stream attained applicable water quality standards. In the 2020 IR, Wai‘oli Stream again attained water quality standards for all criteria except enterococci and turbidity during the dry season (State DOH, 2020). Notably, however, these impairments were considered low priorities for TMDL development in 2018 and 2020. Wai‘oli Stream was first listed on the 2018 IR for exceeding dry season water quality standards for turbidity and enterococci. The 2018 IR noted that “Wai‘oli Stream was previously assessed . . . and met the associated WQS” (State DOH, 2018). In 2008, during the wet season, a TDML was approved for turbidity and total suspended solids (“TSS”) in Wai‘oli Estuary (in Hanalei Bay), and enterococcus and nutrients were listed as low priorities for TMDL development.

Due to the COVID-19 global pandemic, access to Kaua‘i in general and Wai‘oli Valley in particular has been limited for consultants and others not located on that island or even in Wai‘oli. In addition to existing water quality data and DOH’s determinations in the IRs, a consultant for the Wai‘oli Taro Valley Hui flew to Kaua‘i in January of 2021, and collected water quality samples, after a relatively dry winter. Samples were taken at nine (9) sites in Wai‘oli: in Wai‘oli Stream ma uka of the mānowai; in the ‘auwai moving water from Wai‘oli Stream to the Hui’s lo‘i; and at seven (7) ho‘i returning water to Wai‘oli Stream or Hanalei River. The first ho‘i was not sampled because it is at the same location as the ‘auwai/po‘owai. Although additional sampling was planned while the consultant was on-island (through March 2021), obtaining those samples proved impossible due to torrential rains, ongoing flooding and related recovery efforts, and even a landslide on the Hanalei hill; the only access to Wai‘oli Valley, which completely cut off access to the area for some time (Voiland; 2021 and HNN, 2021).

Results of this additional water quality sampling confirmed that this area, like many others throughout Hawai‘i, has some issues with background loading of nutrients unrelated to the Proposed Action. It also established that the Hui’s kalo cultivation maintained water quality for some parameters; for example, nitrate levels were the same at the uppermost reach of Wai‘oli Stream sampled and at all the ho‘i returning water to both Wai‘oli Stream and Hanalei River. Importantly, the data also revealed that the Hui’s lo‘i kalo improved water quality by reducing recorded nutrient levels in phosphate, for example. Finally, the data confirmed that additional maintenance and repairs to the Hui’s Lo‘i Kalo Irrigation System is necessary to ensure the “throughfow” of water necessary to maintain ideal temperatures for wetland kalo to thrive. The data is provided in Table 4, and also explained in more detail by specific parameter.

Table 4: Wai‘oli Stream Water Samples – January 10, 2021.

Testing Site	Time	Temp (Celsius)	D.O %	D.O. mg/L	Salinity ppt	pH	Nitrate, NO ₄ mg/L	Phosphate, PO ₄ mg/L

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Wai‘oli Stream (at Mānowai)	10:13am	19.1	95.8	8.90	0.04	7.50	<0.01	0.01
‘Auwai (at Po‘owai; next to Ho‘i #1)	12:37pm	19.8	99.4	9.07	0.04	7.30	<0.01	0.11
Ho‘i #2	2:20pm	21.7	43.4	3.80	0.07	7.08	<0.01	<0.01
Ho‘i #3	2:57pm	25.6	56.8	4.54	0.09	7.30	<0.01	0.06
Ho‘i #4	3:28pm	24.1	104.0	8.83	0.04	7.47	<0.01	0.11
Ho‘i #5	3:56pm	23.0	93.0	7.90	0.04	7.40	<0.01	0.05
Ho‘i #6	4:05pm	23.6	65.2	5.51	0.19	7.32	<0.01	0.06
Ho‘i #7	4:38pm	25.5	43.9	3.56	0.10	7.26	<0.01	0.23
Ho‘i #8	5:02pm	24.0	63.7	5.35	0.09	7.28	<0.01	0.02

Generally, non-point source pollution in Hawai‘i primarily consists of cesspools, agricultural land use, urban land use, and feral ungulate activity in conservation lands (IR 2018, 3). In Wai‘oli, 93.2% of the land is designated as conservation, while 4.7% is designated agricultural, alongside the remaining 2.1% designated as urban (State DLNR – CWRM, 2021 and State - Office of Planning, 2015d). Because the Conservation district is located at the upper end of the Wai‘oli hydrologic unit, there is little to no human-influenced pollution that runs into the stream (State DLNR – CWRM, 2021). This raises concerns about background loading of nonpoint source pollution caused by feral ungulate activity and the decay of organic matter, given that 93.2% of the land in Wai‘oli is primarily zoned as Conservation (State DOH, 2018).

In the context of Wai‘oli’s lo‘i kalo cultivation, two nutrients relevant to water quality are nitrate and phosphate. These nutrients “are essential for plant and animal growth and nourishment, but the overabundance of certain nutrients in water can cause a number of adverse health and ecological effects” (USGS, 2021). Nutrient levels for nitrate in Wai‘oli Stream and Lo‘i Kalo Irrigation System were *below* requisite water quality standards. Notably, though phosphorus levels exceeded the relevant standard above the Lo‘i Kalo Irrigation System, water quality improves as it travels through the lo‘i kalo itself (with the exception of Ho‘i #7 near wastewater disposal systems that are not associated with the Proposed Action).

For Wai‘oli Stream, nitrate levels must be less than .05 mg/L. Data from January 2021 revealed that all samples for Wai‘oli Stream, ‘auwai, and all seven (7) ho‘i were less than .01 mg/L, meeting water quality standards. Phosphate, which is dissolved phosphorus in natural water, can be deposited into streams by the erosion of rocks, sediment, and soil (Mueller, 2). Feral ungulates, mainly wild pigs, disturb soil by uprooting vegetation and cause soil erosion and sediment runoff which contributes to higher levels of nutrient and fecal matter, such as phosphorus and *Enterococci* (State DOH, 2018). Phosphorus is a concerned nutrient in HAR 11-54, but, it is also vital to plant growth, as it is involved in key plant functions, such as photosynthesis and energy transfer (Munee et.al., 2009). Kalo planted in the wetland style constantly absorbs natural phosphorus from stream water, no matter how slight the absorption rate is. Research has shown that not only does kalo aid in removing phosphorus from the water, but it also reduced nitrogen and sediment loads (Bremer et.al., 2018). While the research

considers a boost in nitrogen exports in water, increases may also be attributed to fertilizer inputs (Bremer et.al., 2018).

For Wai‘oli Stream, phosphate levels must be less than .04 mg/L. Data from January 2021 revealed that the sample at the mānowai was .01 mg/L, which meets the standard. The sample of the ‘auwai at the po‘owai, however, was 0.11 mg/L, which exceeds the HAR 11-54-5.2(b) standard. This figure reflects background loading of phosphate as it is within the Conservation zone and ma uka of all known human activity, and well above the Hui’s kalo cultivation areas. Importantly, water quality for phosphate improves as water flows through the lo‘i. For example, the sample at Ho‘i #2 meets the water quality standard in HAR 11-54-5.2(b). While other samples may not meet water quality standards, they are all **below** the background loading level detected at the ‘auwai/po‘owai. This makes sense as water flowing through the lo‘i enables the kalo to absorb some of the phosphorus and remove it from the water, improving the water’s quality before returning it to the stream. One site, Ho‘i #7, had levels higher than the po‘owai, but it directly abuts the Hanalei Center with wastewater disposal systems not related to the Hui or this Proposed Action. This is also where the urban designated area begins, which likely affects water quality (State DLNR – CWRM, 2021).

5.3.6. Potential Impacts, Minimization and Mitigation Measures

Given the historic use of public trust resources, intergenerational kuleana, and existing infrastructure central to kalo cultivation in Wai‘oli, *no significant negative impacts* are anticipated as a result of the Proposed Action. While a few potential impacts are outlined below, the Proposed Action appropriately mitigates these potential effects and will have some *beneficial impacts* on water resources in the area; especially when considered against the No-Action Alternative.

With regard to threats to water quality in Wai‘oli Stream, feral ungulate activity is one of the biggest concerns. Feral pigs pose the greatest threat to wet forests because they reproduce quickly and forage by digging and upturning the soil to access roots and soil fauna (KWA, 2005). Other nonpoint source pollution – such as decomposing plant matter or erosion caused by flooding and invasive albizia – are also likely the majority contributors to decreased water quality and pose an ongoing threat to water quality in Wai‘oli. Ma kai of the Proposed Action, cesspools are a significant threat.

Both lo‘i preparation and planting (see **Section 3.2.2**) are known to cause some turbidity. The Hui relies on food-friendly soil amendments such as those listed with the Organic Materials Review Institute (OMRI) to maintain soil structure and health. The Hui is also aware that improper amendment use could have detrimental impacts on not just the water, but the Hui’s kalo as well. Therefore, the Hui complies with product recommendations and government regulated uses.

The **Proposed Action: Long-Term Water Lease** is a legal commitment to support and manage public trust resources that would enable kalo cultivation into the future and would have an overall *beneficial impact* on water resources in Wai‘oli. The anticipated *beneficial effects* are based upon the studies outlined above, implementation of the Hui’s Watershed Management Plan, and the Hui’s ongoing monitoring, maintenance, and stewardship of the Lo‘i Kalo Irrigation System .

For generations, the Hui has stewarded the Wai‘oli Watershed and seeks to continue this practice with no expansion or change in use. Using best practices to minimize potential negative impacts and

protect water resources during kalo cultivation, the **Proposed Action** would have numerous *beneficial effects* on water resources including:

- Water quality mitigation and improvement: Kalo – especially in wetland-style cultivation – has a *beneficial effect* on water quality by removing phosphorus and reducing nitrogen and sediment loads. Wetland-style cultivation systems also serve to trap and retain sediment and lower the nutrient load of surface waters, thereby reducing contamination of downstream aquatic, estuarian, and near-shore marine ecosystems (Bremer et al., 2018). Further, the Hui’s active monitoring and maintenance of the stream and surrounding infrastructure also contributes to improved water quality, especially in comparison to a reduced and/or absence of kalo cultivation altogether.
- Contribution to the hydrologic cycle: Traditional lo‘i kalo cultivation is an active participant in and contributor to the hydrologic cycle. The Proposed Action, by nature, contributes to transpiration, evaporation, and infiltration to support ground water recharge and subsurface water flow. In fact, very little water is lost in lo‘i kalo cultivation. CWRM supports this benefit highlighting that “water loss due to evaporation, seepage, and evapotranspiration [in lo‘i kalo] can be considered as negligible, due to the relatively small displacement in location and limited time frame” (CWRM, 2019).
- Ground water recharge: Along with directing throughflow water through the lo‘i kalo, the system and kalo itself captures rainfall and dew, which slows the flow of water to allow the gradual release of water into the ground. This promotes ground water recharge; and in turn, supports ground and surface water supplies.
- Flood mitigation: As a biocultural watershed resource, the Lo‘i Kalo Irrigation System is closely inter-twined with stream flow and the maintenance of surface water in its natural state (State OHA, 2019). Lo‘i kalo systems are also highly effective in mitigating flood impacts. (Ghazal et al., 2020). The Hui’s multi-generational knowledge and maintenance of this extensive Lo‘i Kalo Irrigation System also tempers and distributes overflow, thereby reducing the severity and impacts of floodwaters on Hanalei Town (Kīpuka Kuleana, 2020; He‘eia Report, 32).
- Long-term resource management: Consistent and planned resource management of water as a public trust resource will allow more opportunities for natural stream flow adjustments in response to extreme weather events and landslides. The Hui will have opportunity to steward the area into the long-term, as described in the Draft Hui Watershed Management Plan. Long-term management of invasive plant species and the planting and maintenance of Native riparian vegetation will also preserve and support the continuous flow of water, restoring and maintaining functional integrity to the stream and traditional Lo‘i Kalo Irrigation System.
- Management of ‘āina and wai: As a Native Hawaiian traditional and customary practice, lo‘i kalo cultivation has a mutually beneficial relationship for the stream, lo‘i, kalo crops, and natural habitats that have existed in balance for centuries. In addition, the Hui’s active management also provides opportunities for additional funding and resource allocation to Wai‘oli Stream and Watershed that could address many of the existing impacts into the future.

The Proposed Action will not impact DHHL homesteads or on future water demand for nearby sites. Due to the physical distance and elevation difference between Wai‘oli and the Hawaiian homestead communities of Anahola and Moloa‘a, DHHL staff recommended and the Hawaiian Homes

Commission voted in January 2021 to **not** seek a water reservation in relation to the Proposed Action, fulfilling the beneficiary consultation contemplated in the water lease process.

Alternative A: Shorter Lease Term Alternative, Alternative B: Annual Revocable Permit Alternative and Alternative C: No-Action Alternative, would have a *negligible to minor impact* on water resources. Without a long-term lease, the *beneficial effects* described above will be diminished or non-existent. In particular, the Hui would not be required to implement the important measures in the Hui's watershed management plan. Lack of a long-term commitment to protect lo'i kalo cultivation would make it significantly harder for Hui members to continue farming at the current level, something that might further reduce existing *beneficial effects* to the project area. The resulting impacts may include an increase of invasive grass and weeds that diminish ground water recharge, elimination of the potential for long-term resource management, and the diminishment or gradual elimination of a cultural use that has been documented as pre-contact (prior to 1778 A.D.). Research has proven that the ground water recharge rates of invasive species are significantly lower than that of Native species like kalo due to low throughflow and high evapotranspiration rates (Mair, 2009 and AWUDP, 2019).

Notably, however, a **No-Action Alternative** may have *significant negative effects* on water quality. Under this scenario, and without continued lo'i kalo cultivation in the project area, existing lo'i kalo would become overgrown, the Hui would not actively monitor the stream, or undertake ungulate control measures throughout the watershed. Kalo would no longer remove and/or regulate nutrients in the water or contribute to groundwater recharge at high rates if at all. Lack of maintenance in the Lo'i Kalo Irrigation System and Wai'oli Stream would increase risks of flooding and related detrimental impacts.

Minimization and Mitigation Measures

With respect to impacts on water resources, the Proposed Action will undertake a number of direct mitigation measures including implementing best practices to minimize runoff, turbidity, control nutrient losses, and improve water quality. Mitigation measures and best management practices are further detailed in the Draft Hui Watershed Management Plan jointly developed with DLNR.

With respect to water quality and given the recent IR and relevant impairments, the farmers' best management practices and small-scale farming methods seek to mitigate and minimize potential turbidity. As small family farmers, the Hui utilize basic farm equipment and machinery such as tillers (small tractor attachment and manual push tillers) and small tractors to maintain the lo'i prior to planting. The majority of kalo cultivation practices as outlined in **Section 3.2.2** are done by hand which significantly minimizes impacts to water turbidity.

To minimize runoff and turbidity, prevent sediment outflow, and to minimize impacts to water quality, the Hui's best management practices will be used when applying soil amendments. The outflow will be closed, and the amendment will be added to ensure the value of the amendment is maximized without waste or runoff. This also prevents sediment from flowing out of the lo'i bed itself. As part of the process, and in an effort to allow turbidity to settle and to ensure amendments have absorbed into the soil, the Hui allows the lo'i to rest for a period of time (one to two weeks). When amendments are applied to actively cultivated lo'i kalo, Hui farmers will continue to close their outflows to prevent release of nutrient-rich water. Applying amendments in amounts that

minimize the loss of nutrients through ground water leaching is key. Resting periods after fertilizer application, flooding lo‘i, and holding water before releasing it back into the system are effective ways to reduce pollution. In “Taro, Mauka to Makai,” the U.S. Army Corps of Engineers suggests additional steps to control nutrient losses; all of which the Hui undertakes:

- Place drainpipe intakes far enough above the bottom of the lo‘i to minimize the amount of soil leaving the lo‘i;
- Keep water in the lo‘i (no outflow) temporarily following a fertilizer application (but beware of allowing water temperature to rise);
- Block off inlets and outlets to the lo‘i during planting, harvesting, and weeding operations, which disturb the soil and send sediment and nutrients downstream; and
- Vegetate any areas of bare soil in the area surrounding the lo‘i system (above or below it) where water travels; grasses are especially good at trapping sediment and nutrients and preventing their entry into waterways.” (Evans, 2008, 79).

Considering the impacts of ungulates on water quality in Wai‘oli Watershed, the Kaua‘i Watershed Alliance’s (KWA’s) Management Plan offers strategies to mitigate feral ungulate activity including removing ungulates, and monitoring for increasing populations (KWA, 2005). The Hui’s active monitoring and commitment to regular ungulate control actualizes these strategies – including those outlined in the Hui’s Watershed Management Plan – and would have a positive impact on the water quality in Wai‘oli.

The Draft Hui Watershed Management Plan further outlines specific proactive goals to improve surface and ground water quality and the overall watershed health. Continuing best practices for traditional lo‘i kalo cultivation, the Draft Hui Watershed Management Plan also implements various recommended management practices outlined in the 2012 Hanalei Bay Watershed Management Plan. Relevant priorities and mitigation measures include:

- Monitoring and collecting data for stream health: Monitoring and collecting baseline data for Wai‘oli Stream and Watershed (e.g., water quality data, flora and fauna, and additional forest threats including fires, predators, and plant diseases). By collecting baseline data (e.g., dissolved O₂ study, water turbidity, flow velocity, species population studies, hydrologic assessment(s), LIDAR or topographic stream assessment(s), video/picture documentation, fish surveys, environmental DNA biosampling, etc.) and beginning to establish an ongoing monitoring plan for Wai‘oli Stream and the larger watershed. Ultimately, the data will be critical in developing a management regime, which could become a model for other Hawai‘i streams. Establishment of baseline data will allow the Hui to better evaluate both the overall health of Wai‘oli Stream, as well as the effectiveness of this plan and their actions and refine mitigation measures. In addition to these studies, the Hui farmers have intimate knowledge of this particular stream and watershed that has been passed down over generations, and as a result are acutely aware of the present ecological context.
- Stream cleaning and invasive species removal: Cleaning and restoring Wai‘oli Stream to decrease hazards of future flood events. Actions include cleaning silt and debris after heavy rains/floods, performing arboreal maintenance, clearing invasive plants (e.g., hau, albizia, trumpet tree, guinea grass), and planting native/non-invasive species for erosion control and improved throughflow. This work takes place along segments of Wai‘oli Stream where the ‘auwai, mānowai, po‘owai, and ho‘i are located. The Hui’s approach involves strategically

clearing instream invasive species on “islands” to improve natural flow, so water is able to flush and “self-clean” during storm events. Specifically, for ‘auwai maintenance, members hand-clear plant debris and roots to clear silt and ‘ili‘ili. In total, the Hui actively and collectively manages over 5.5 miles of ‘auwai. Additional tasks include repairing the mānowai after heavy rains, cleaning pebble traps, adjusting spillway boards, and maintaining the drain system immediately downstream of the lo‘i. Performing cleaning in tandem with restoration and in phases allows Hui members to systematically address a section of the stream in a feasible manner and ensures that they are not creating an area more prone to erosion, sedimentation, and downstream turbidity. The Hui also hopes to partner with DOFAW on cooperative weed control projects. Ultimately, the removal of invasive species mitigates flood and fire risks, supports continuous stream flow, prevents debris accumulation, reduces sediment, and opens up the tree canopy to return direct sunlight to the stream bed. Facilitating flood resilience reduces hazardous debris from accumulating, such as downed trees, rocks, and large boulders.

- Community outreach and education: Community outreach and education to facilitate citizen-based watershed protection and ahupua‘a-level resource management such as water resources. The Hui aims to educate more community members about Wai‘oli Stream and its cultural significance. This will empower others in the community to develop a sense of kuleana to care for these resources in perpetuity. In addition, the HBWMP highlights that “community engagement, education, and volunteer programs . . . are an integral part of a comprehensive solution to reduce NPS pollutants.” Educational curriculum will cover a range of topics including wai, watersheds, lo‘i kalo, invasive species, cultural context, and practices specific to Wai‘oli. The Hui will continue to collaborate with community organizations including: Waipā Foundation, Kawaikini Public Charter School, Huliauapa‘a Wahi Kūpuna Internship Program, University of Hawai‘i at Mānoa’s Natural Resource Management Program, the William S. Richardson School of Law’s Ka Huli Ao Center for Excellence in Native Hawaiian Law, and Mālama Kaua‘i. Ultimately, the outreach education will instill a sense of kuleana in community members and foster long-lasting sustainable management practices grounded in traditional Native Hawaiian biocultural knowledge. The benefits of educational outreach inspire a better understanding and support for water resource management.

The amount of Conservation land in Wai‘oli suggests that to reduce background loading of nutrients and bacteria in Wai‘oli Stream above the Agricultural and Urban land areas, additional resources and funding must be allocated to maintain spaces and practices such as this Lo‘i Kalo Irrigation System. Inadequate resources will continue to allow nonpoint source pollution that the Hui cannot combat on their own, and, Wai‘oli Stream may continue to be impaired due to nonpoint source pollution (IR 2018, 3). Since the 2018 flood, however, the Hui has applied for and received funding to clean Wai‘oli Stream. That grant totals \$399,000 and provides important resources to clear key infrastructure in Wai‘oli Lo‘i Kalo Irrigation System. Future grants and efforts could collect baseline data (including additional water quality sampling) and develop a plan to clean additional portions of Wai‘oli Stream.

Finally, with regard to water resources, and water quality in particular, restoring lo‘i to full cultivation would directly improve water quality. The Waipā Foundation’s multi-year study of its neighboring stream confirmed “a marked improvement in the ecological health of the Stream from

mountain-to-sea” over a multi-year study period and a substantial decrease in fecal indicator bacteria or enterococcus levels for the Wai‘oli Estuary (Waipā Foundation, 2020). This was attributed to feral ungulate removal, implementing best management practices, and effects of the 2018 flood that opened up the riparian canopy allowing increased sunlight to the stream channel (Waipā Foundation, 2020). To this end, note that during the January 2021 testing, cultivation in Wai‘oli was dramatically reduced due to significant and ongoing damage to the Hui’s water supply. More specifically, several years after the 2018 floods, the County of Kaua‘i completed repairs to the mānowai in August 2020, but those efforts were negated when the māno was destroyed again by flooding in November of 2020 and throughout the Spring of 2021. Ultimately, the Hui hopes not only to ensure the long-term health of Wai‘oli Watershed, but also to embrace the community’s sense of kuleana as a means of fostering long-lasting sustainable management practices grounded in traditional Native Hawaiian biocultural knowledge.

5.4. Natural Hazards

5.4.1. Climate Change

Rapid anthropogenic global warming is well-established and documented within the scientific community. Studies show that ocean and island ecosystems are particularly vulnerable, experiencing warming air and ocean temperatures, shifting rainfall patterns, changing frequencies and intensities of storms and drought, decreasing base flow in streams, rising sea levels, and changing ocean chemistry (Marra & Kruk, 2017). As a “critical driver of freshwater ecosystems” the water cycle has also been “fundamentally altered” by climate change and will have an impact on Native species (Clilverd, et. al, 2018).

Over the last century, air temperatures in Hawai‘i have increased between one-half and one one degree Fahrenheit (US-EPA, 2016). Overall, the daily temperature range in Hawai‘i is increasing, resulting in a warmer environment, especially at higher elevations and at night. Generally, the average ambient temperature (at sea level) is projected to increase by about 4.1°F by 2100 (IPCC, 2007). Historically, temperature has been rising over the last 100 years with the greatest increase after 1975 (Giambelluca et al., 2008). The rate of increase at low elevation (0.16°F per decade) is below the observed global temperature rise of 0.32°F per decade (IPCC, 2007). At high elevations however, the rate of increase (0.48°F per decade) greatly exceeds the global rate.

Precipitation data in Hawai‘i shows a steady and significant decline of about 15% over the last 15 to 20 years (Diaz et al., 2005; Chu and Chen, 2005). The data is supported by a documented decline in stream flow beginning in the early 1940s (Oki, 2004).

A 2013 study by a UH team of researchers predicted that tropical regions will experience drastically warmer climates by the year 2047. In addition to rising temperatures, sea level rise is a notable concern for coastal communities. Sea level rise has historically driven shoreline changes throughout the Hawaiian Islands. The global annual sea level rise averaged over the last century was roughly two millimeters, with recent studies indicating that this rate is now approaching three millimeters and may accelerate in the coming decades (UH News, 2013).

According to the 2017 Hawai‘i Sea Level Rise Vulnerability and Adaptation Report, sea level in Hawai‘i has increased at a rate of 0.6 inches or more each decade over the last century. Although

predicting future sea level rise is challenging, research shows that global mean sea level may rise by approximately one (1) foot by mid-century and 2.5 to 3.2 feet by 2100, with some studies showing a possible rise of up to six (6) feet. According to recommendations provided in the report, an appropriate planning target to use in the design of future projects within the exposure area would be 3.2 feet (Hawai‘i Climate Change, 2017).

Under conditions of higher sea levels in Hawai‘i, other potential impacts may include hurricanes making direct landfall; reduced precipitation adversely affecting freshwater supplies, changing frequency and intensity of storms, and altered distribution of Native species to name a few (Hawai‘i Climate Change, 2017).

The State of Environmental Conditions in Hawai‘i and the U.S. Affiliated Pacific Islands under a Changing Climate report indicated that the individual geography and topography of each island will determine how impacts to water resources are felt and translated across the landscape (Marra & Kruk, 2017). “Hawai‘i is experiencing global warming impacts in unique ways. It will be increasingly important to focus on the localized impacts of global warming and sea level rise to adequately understand and prepare for the changes to come” (UH-Sea Grant, 2014).

According to an analysis by Mair, it will be extremely important to reforest the areas with Native plants that are already adapted to this climate and remove those invasive species that are detrimental to their success. Research has proven that the ground water recharge rates of invasive species are significantly lower than that of Native species due to the invasive low throughfall and high evapotranspiration rates (Mair, 2009). Similarly, kalo and the lo‘i system it relies on enhances environmental sustainability by maintaining watershed, aquatic, and riparian habitat as well as the integrity of the hydrologic cycle (including coastal discharge, stormflow dissipation, and ground water recharge), instream flow for other water uses, and the integrity of Native Hawaiian culture (Penn, 1980).

Due to climate change, weather events are likely to become more frequent and destructive. As demonstrated during the 2018 floods, extreme weather events and flooding are the highest priority threat to the health of Wai‘oli Watershed. These events pose multiple threats, including increased sedimentation, invasive vegetation growth, bank erosion, channel incision, increased debris, blocked stream corridors, landslides, and constriction of the natural waterways, affecting the natural and ongoing flow of water from ma uka to ma kai in innumerable ways. Specific threats to Native flora and fauna, which are vital to reinforce the stream embankment, include total destruction or decimation due to poor water quality caused by severe flooding, and predation by feral ungulates. These changes to the forested upland can negatively affect downstream users such as the kalo farmers.

5.4.2. Floods

The Federal Emergency Management Agency (“FEMA”) creates the Flood Insurance Rate Map (“FIRM”) that delineate flood hazard areas. The FEMA FIRM flood zone designations for the Project Area include:

- Zones X: Areas determined to be outside the 500-year floodplain
- Zone A: Areas of 100-year flood, base flood elevations not determined

- Zone AE: Areas of 100-year flood, base flood elevation determined
- Zone AE Floodway (“AEF”): Floodway area

Wai‘oli Stream channel is designated as Zone AEF, which is the floodway or channel of the stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1%-annual-chance flood can be carried without increasing the Base Flood Elevation.

The land area immediately surrounding the upper portion of Wai‘oli Stream is designated as Zone X. Zone X corresponds to areas of moderate flood hazard.

The land area nearest the Lo‘i Kalo Irrigation System is designated as Zone A and AE. Zone A corresponds to the 1% annual chance floodplains. Zone AE corresponds to the 1% annual chance of flooding with no base flood elevations shown. Zone AE is the base floodplain where base flood elevations are provided. **See Figure 30, Flood Hazard Map.**

The land area ma kai of the lo‘i and ho‘i is designed as Zone VE. Zone VE corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves.

5.4.3. Hurricanes and Tropical Storms

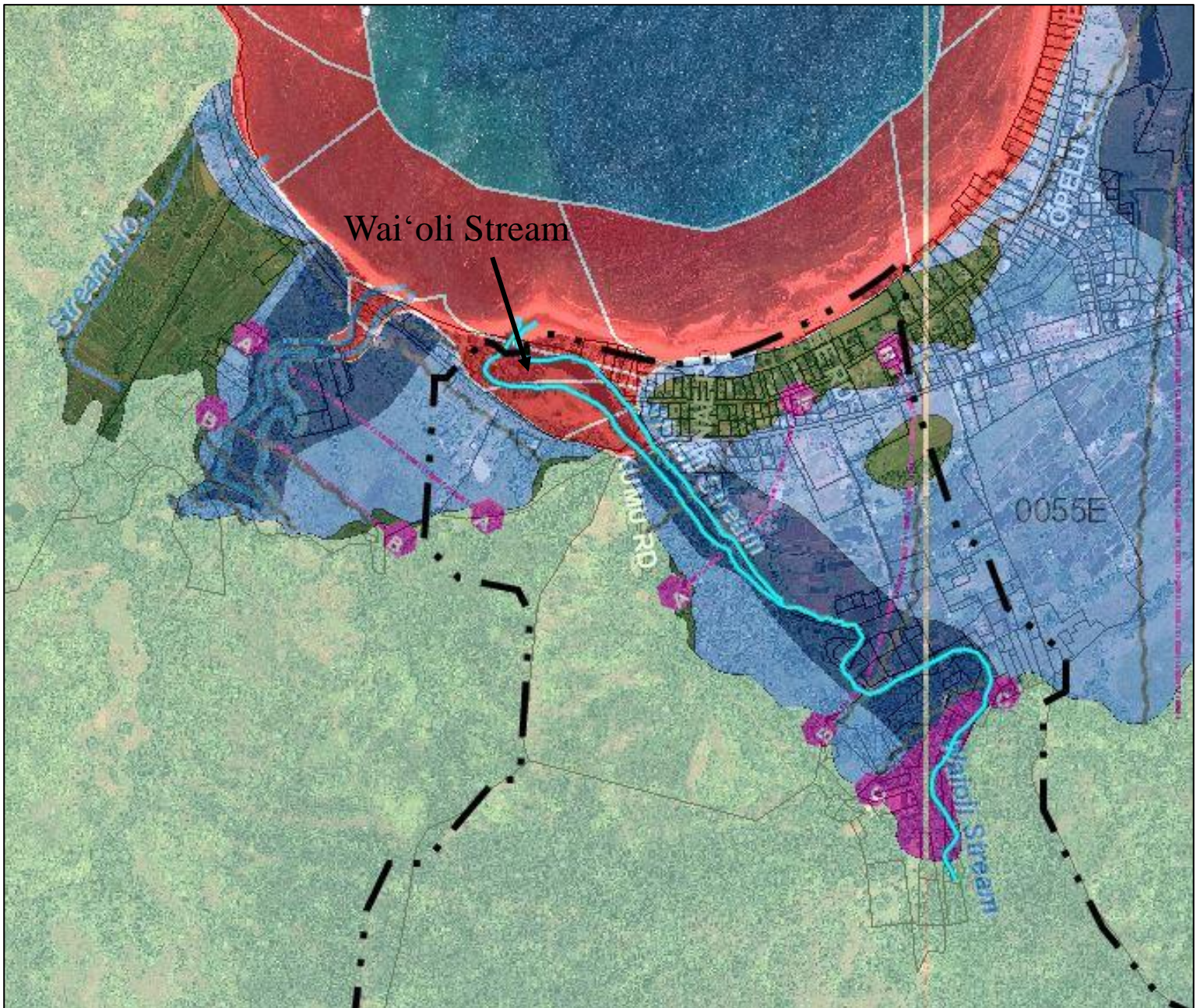
Hurricanes and tropical storms are both categorized as tropical cyclones, which are warm-core storms that originate over tropical waters with well-defined centers of closed surface wind circulation. A hurricane is a tropical cyclone that sustains surface winds of 64 knots (74 mph) or more. Tropical storms are defined as an organized system of strong thunderstorms with defined circulation and maximum sustained winds of 34 to 63 knots (39 to 73 mph). Hurricanes are considered relatively rare events in the Hawaiian Islands and records show that strong windstorms strike all of the Hawaiian Islands.

The first hurricane the National Oceanic and Atmospheric Administration (“NOAA”) documented in Hawaiian waters was Hurricane Hiki in August 1950. Since that time, five hurricanes have caused serious damage in Hawai‘i: Nina (1957), Dot (1959), ‘Iwa (1982), Estelle (1986), and ‘Iniki (1992) (Businger, 1998).

Two main elements have historically protected Hawai‘i from hurricanes: (1) Location: The islands are just south of cold waters too cold for storms and just north is warmer water; and (2) Vertical Wind Shear: The dramatic altitudes essentially stop hurricane wind speed and force as the hurricane approaches the islands, breaking them apart (Honore, 2018). However, climate change brings warmer waters, allowing hurricanes to move farther north toward Hawai‘i. As a result, Hawai‘i and the Project Area may likely experience a higher incidence of tropical storm and hurricane events.

5.4.4 Potential Impacts, Minimization and Mitigation Measures

No significant impacts pertaining to natural hazards are anticipated as a result of the Proposed Action. Natural hazards, however, immediately and directly affect the Proposed Action. Working within the water cycle, lo‘i kalo cultivation works in coordination with the natural environment, and most specifically surface water. Generally, streams in Hawai‘i pose a danger because of their flashy nature; a stream’s stage, or water level, can rise several feet in less than an hour during periods of



Map Legend	
Effective DFIRM	
	Zone XS (X shaded)
	Zone A
	Zone AE
	Zone AEF
	Zone AH
	Zone AO
	Zone D
	Zone VE
	Zone X
	Zone X Protected by Levee

KAUAI
Based on March 2010 USACE report, the **Hanapepe** and **Waimea** levees do not meet levee certification requirements set forth in 44CFR65.10.

MAUI
On November 4, 2015, the **Kaunakakai Levee** will be deaccredited and the FIRM map will be revised to reflect the flood risk.

In August 2015, an **Iao Stream** levee certification has been submitted to FEMA for review.

OAHU
The **Kawainui Marsh** Levee has been certified.

FEMA's Levee Resource Library

Figure 30: Flood Hazard Map

intense rainfall. Streams in Hawai‘i are flashy because rainfall is intense, drainage basins are small, basins and streams are steep, and channel storage is limited (Oki, 2003).

Lo‘i kalo cultivation generally, and the Proposed Action in particular, mitigates any negative effects on the environment as a result of natural hazards. Because natural hazards and related major weather events are typically accompanied by heavy rainfall, the Hui and the Lo‘i Kalo Irrigation System serve as a severe weather buffer, mitigating floodwaters and providing shelter for some Native species during severe weather events. The Hui, as a community group and with generational knowledge of the specific ‘āina, provides a unified and collective effort to mitigate the issues that intensify flood destruction. Studies show that flooding in the area can be reduced by expanding existing areas of lo‘i kalo cultivation and maintaining appropriate flood control measures (Hollyer et al., 1990). Heavy rains can send sediment crashing down the upland hillsides, but the ‘auwai and lo‘i, slow it down, so the pollutants can settle and exit the water column. Lo‘i kalo is best described as a “reciprocal relationship, not extractive, [and] not exploitative” (Mishan, 2019). In other words, Wai‘oli’s Lo‘i Kalo Irrigation System, when maintained, tempers and distributes overflow reducing the severity and impacts of floodwaters on Hanalei Town (Kīpuka Kuleana, 2020).

Local leaders, experts, and community members also agree about the importance of lo‘i kalo cultivation and its accompanying practices. After the 2018 flooding, a key finding from local study was the importance of maintaining streams and waterways, as well as clearing them of invasive plants, to prevent future flooding. The team, from UH Mānoa’s Department of Natural Resources and Environmental Management and UH Sea Grant, interviewed over seventy (70) community members, government representatives, first responders and non-profit leaders about lessons emerging from the floods. The study highlighted that debris from invasive species created dams in waterways and caused much of the damage in Halele‘a by re-directing floodwaters to homes, farms, and in Wai‘oli, to Hanalei School and surrounding areas (Huliauapa‘a, 2020). The 2018 floods created a buildup of mud and silt that was deposited within some lo‘i with up to a foot of sticky mud and silt comprised of red dirt from ma uka. Although nutrient rich, the mud cannot be used immediately, but must be left to dry before the Hui is able to work with it.

In order to utilize this nutrient rich soil the rain must stop, the intake and outflow need to be closed, and the soil needs to dry out to a point that there is no standing water. In many cases, because the area is so wet, the mud and silt is left to incorporate into the existing soil until it is dry enough to work with. The Hui also uses the mud to manually build up individual lo‘i and ‘auwai banks and fill holes in the gravel and dirt access roads. As the mud and silt dry, cover crops may naturally grow or be incorporated into the fallow lo‘i, assisting in the process to break down, decompose and nourish the new soil. The lo‘i is tilled, using traditional farm equipment to further assist in the decomposition process and improve the soils physical properties to support future kalo growth. **See Section 2.3.2., Lo‘i Restoration and Section 3.2.2., Kalo Cultivation in Wai‘oli.**

Unfortunately, the frequency and severity of storms may, at some point, require the Hui to determine if changes in the climate, or increased intensity of natural hazards require abandoning or relocating individual lo‘i. For example, near the most ma kai ho‘i, the Hui has noticed within the last few years, visible standing water during high tide in some spots of land where water typically would not occur (Hui, 2020). Because the area is in the estuary where brackish water is present, the adjacent plants

have not been affected; yet, the presence of standing water is a new observation that is likely attributed to climate change.

The **Proposed Action: Long-Term Water Lease** and **Alternative A: Shorter Lease Term Alternative** would have a *beneficial impact* on the environment as it pertains to natural hazards because the Hui will continue active management and maintenance of the Project Area (e.g., stream cleaning, invasive species removal, ungulate control, etc.) into the future. This maintenance will minimize the effects and impacts of natural hazards; and flooding in particular. Further, the Proposed Action will aid in limiting the spread of invasive species, decreasing debris load, and supporting Native flora and fauna habitats; all of which provide degrees of support to minimize the impacts of climate change.

Alternative B: Annual Revocable Permit Alternative and **Alternative C: No-Action Alternative** would have a *neutral impact* on natural hazards. Without the long-term commitment of a water lease, the beneficial impact of the Hui and the Lo‘i Kalo Irrigation System for flood mitigation and long-term stewardship to clean and restore Wai‘oli Stream in response to natural hazards diminishes.

Minimization and Mitigations Measures

Natural hazards from a project perspective cannot be entirely minimized and mitigated; however, there are opportunities to mitigate its impact as outlined above. Although the future threat of natural hazards cannot be calculated, science has proven that the frequency of threats due to climate change will increase on land and in water. As they have for generations, the Hui has been and is committed to long-term stewardship to clean and restore Wai‘oli Stream that would reduce the impact of natural resources to the immediate area and areas downstream. Actions include cleaning silt and debris after heavy rains/floods, performing arboreal maintenance, clearing invasive plants (e.g., hau, albizia, trumpet tree), and planting Native/non-invasive species for erosion control and improved throughflow. Performing cleaning in tandem with restoration and in phases allows Hui members to systematically address a section of the stream in a feasible manner and ensures that they are not creating an area more prone to erosion, sedimentation, and downstream turbidity. Ultimately, the removal of invasive species mitigates flood and fire risks, supports continuous stream flow, prevents debris accumulation, reduces sediment, and opens up the tree canopy to return direct sunlight to the stream bed. Facilitating flood resilience reduces hazardous debris from accumulating, such as downed trees, rocks, and large boulders due to natural hazards and severe weather conditions.

5.5. Biological Resources

“Ahupua‘a residents once accessed the forest for resources such as timber for canoes and homes, medicinal plants, freshwater springs, farmlands, reef areas, and nearshore waters for fishing and gathering seaweed within established palena (boundaries). While these palena sometimes corresponded with the boundaries of an ahupua‘a, they were often smaller or larger, adapted to ecological conditions that shaped the productivity and availability of resources....[whereas modern] new systems of property ownership ignored historical boundaries of land use and the communities formed within them. Though new ownership models were foreign and conflicted with native concepts of relationship to land, Hawaiians adapted by applying these models in ways that perpetuated kuleana” (Vaughn, 2018, 90).

Based upon existing studies and findings, *no significant negative impacts* are anticipated for biological resources. To the contrary, the Proposed Action has *beneficial effects* and plays a vital role in maintaining biological resources in Wai‘oli. This Proposed Action, the Lo‘i Kalo Irrigation System, is both culturally and biologically important, playing a vital role in the preservation of Native habitats, many of which are found nowhere else in the world.

5.5.1. Native and Non-Native Flora Species

Kalo: Usage and Relation to Project Area

The Project Area supports, protects, and nurtures kalo. In ancient Hawai‘i, kalo (taro, *Colocasia esculenta*) and ‘uala (sweet potato, *Convolvulaceae*) were viewed as the most important food crops. They furnished not only the carbohydrate base of the Kānaka Maoli diet, providing high-quality vitamins and minerals. Kalo’s cultural importance is found in the large number of varieties that were developed and the even larger number of names that were applied to them. In the 1930s, 342 names for kalo varieties was gathered (Abbott, 1992). Based on reference to previously cited lists of varieties compiled by MacCaughey and Emerson, ancient Hawai‘i is estimated to have recognized 150 to 175 distinguishable forms of kalo with ample evidence that many varieties have become extinct or at least do not exist in present collections or cultivated areas (Whitney et al., 2007).

Kalo is considered by some to be the world’s oldest cultivated crop. It was mentioned in Chinese books as early as 100 B.C., and evidently thriving in Egypt at the beginning of the Christian era (Whitney et al., 2007). Kalo belongs to the genus *Colocasia* as kalo was first known in Egypt under the name *culcas*. Kalo was initially introduced by Polynesians migrating to Hawai‘i, with many horticultural varieties having been introduced by humans in recent times (Handy et al., 1991). “Lagenfoged, et. al. (2009) estimated that 190 square kilometers (46,950 acres or 19,000 hectares) were cultivated using irrigated agriculture in pre-contact Hawai‘i. Based on the 19,000 hectares used for kalo production and kalo irrigation’s legal requirement, total statewide water demand was approximated at 1.4 billion gallons per day” (AWUDP, 2019, 169).

There are two types of kalo cultures in Hawai‘i, dryland (unsubmerged) culture, where kalo are grown in māla and wetland (submerged) culture, where kalo are grown in lo‘i like those in Wai‘oli. Kalo is a semi-aquatic plant, which in the era of its introduction was presumably planted and grew wild along streams, beside springs, and in semi-marshy areas. Kalo does not flourish in stagnant water. Kalo is a unique plant with distinctive character, that was brought by Kānaka Maoli planters to a higher state of cultivation more than anywhere in the world. Kalo was cultivated so intensively and skillfully in the Hawaiian Islands, that there were hundreds of varieties adapted for different needs (Handy et al., 1991). Some kalo has been grown for lū‘au (leaf), others for kalo pa‘a (cooked unmashed taro), whereas varieties were favored for poi, the staple food of Kānaka Maoli. Kānaka Maoli developed kalo classifications based on characteristics such as: the color of the corm, the petiole, the base (kumu), the margin (lihi), the color of the blade (lau), pronounced markings on certain surfaces, differences in lobbing, the veins, and differences in color of ‘i‘owere used to differentiate the varieties of kalo (Abbott, 1992). In Hawai‘i, cultivation of kalo created a greater number of varieties adaptable to varying conditions of locale, soil, and water - more so than anywhere else in Polynesia and perhaps the world. Today, an estimated 85 to 90 Hawaiian cultivars remain of the hundreds of cultivars selected by Kānaka Maoli (Teves, 2017).

Wetland kalo came to occupy much of the flat, arable land in each valley in Hawai‘i (Abbott, 1992). The Hanalei Bay Watershed was famous for the Lehua and Lehua Maoli varieties. According to Whitney et al., the Lehua is distinguished by light green, spreading petioles, very smooth, sagittate leaf blades, and lilac-purple corms. There are four varieties, all of which make red poi of excellent quality. Lehua is known as royal kalo and were formerly grown for, and eaten only by the chiefs. Lehua maoli is a Native variety and commonly known as “lehua.”

Today, the Hui grows many Native and rare kalo varieties, including:

- ‘Ele‘ele Mākoko, ‘Ele‘ele Naioea,
- ‘Elepaio Hāuliuli,
- Kāi ‘Ala, Kāi Kea, Kāi Uliuli,
- Lualoa ‘Ele‘ele-‘ōma‘o, Lualoa Palakea-‘ele‘ele, Lualoa Palakea-papamū,
- Lehua Maoli (Kaua‘i Lehua), Lehua Maui, Lehua Pala‘i‘i,
- Lihilihi mōlina,
- Mana Lualoa, Mana ‘Ulu,
- Manini Kea, Manini‘ōwali, Manini Uliuli,
- Moi,
- Nihopu‘u,
- Pa‘akai,
- Piko Ke‘oke‘o,
- Poni,
- Uahiapele.

Kalo varies in size from two (2) to five (5) feet with size dependent on soil richness or health. A summary provided by Kamehameha Schools compared varieties, explaining that colors and patterns vary greatly by variety. For example, a Lehua variety may have plain green leaves, some may have variegated green and white patterns, or purple and green patterns like the ‘uahi-a-pele. Stem color varies as well; ranging from white, pink, red, green, black or black with green stripes. The leaf shape also varies between cultivars, all have a general heart shape, but some have deeper cleavage than others (piko varieties) and some are cupped shaped (‘apuwai) (Kamehameha Schools, 2020).

Although the entire plant can be eaten, the most popular source of food is the ‘i‘o, which is the starch-filled base of the stem growing underground, functioning as a root in soil and water. During harvesting time, the corm is pulled and the huli is cut and retained for replanting, creating the next generation of kalo.

Other Native and Non-Native Flora Found or Utilized in Project Area

While this EA is focused on kalo and the Lo‘i Kalo Irrigation System that supports its cultivation, other plant species are present around the lo‘i.

Native plants found in the vicinity of Wai‘oli Stream and the Lo‘i Kalo Irrigation System include:

- Hala (*Pandanus tectorius*, Indigenous)
- Naupaka (*Scaevola gaudichaudiana*, endemic)
- ‘Ōhi‘a (*Metrosideros polymorpha*, endemic)

Non-Native and/or Polynesian-introduced flora found around Project Area, Wai‘oli Stream, and Lo‘i Kalo Irrigation System include:

- Milo (*Thespesia populnea*)
- Kukui (*Aleurites moluccana*)
- Lā‘ī, Kī (ti leaf, *Cordyline fructosa*)
- Mai‘a (banana, *Musa paradisiaca*)
- Noni (*Morinda citrifolia*)
- Hau (*Hibiscus tiliaceus*)

Many of these plants are complementary to kalo processing and consumption, and also support the Hui’s medicinal and nutritional needs, some may also be used to fabricate tools or products used in traditional Hawaiian practices.

For example, noni has a wide variety of traditional and contemporary medicinal uses. Some Hui members still gather and use the juice for various ailments. Mai‘a – another staple food with a good source of potassium, vitamin A, and other carotenoids which protect against diseases – complements kalo production and is gathered by the Hui for consumption or to give away.

Many of these Native plants have a legacy in Wai‘oli. The kukui, a tree with an oily nut that provided light and food, and whose wood was once used to carve small canoes for nearshore waters grew in the famous grove of Kālema, an ‘ili (smaller section within the ahupua‘a) of Wai‘oli that was used as a gathering place (Ka Nonanona 15 March 1842). Kukui continues to be collected from this area for medicinal purposes. In the deeper forest ma uka, maile (*Alyxia stellata*, indigenous) and mokihana (*Melicope anisata*, endemic) were found in recent history and has been gathered by some Hui members for lei.

Problematic, invasive flora found around Project Area, Wai‘oli Stream, and Lo‘i Kalo Irrigation System include:

- Buffalo grass (California Grass, *Brachiaria mutica*)
- Trumpet Tree (*Cecropia* or *Cecropiaceae*)
- Albizia (*Falcataria moluccana*)
- Lantana (*Lantana camara*)
- Strawberry Guava (*Psidium cattleianum*)
- African Tulip (*Spathodea campanulata*)
- Soap Bush (*Clidemia hirta*)

5.5.2. Native and Non-Native Fauna Species

Lo‘i kalo cultivation has been practiced in the Hawaiian Islands since before Western arrival. Not only was it a primary source of food for Kānaka Maoli, the system also provided invaluable habitat for waterbird species for centuries. In modern times, Hawaiian wetlands have severely reduced in size due to extensive draining and filling for commercial agricultural and urban development. Less than 10% of Hawai‘i’s former wetlands are estimated to remain today. This habitat reduction has been a major cause in the decline of several of Hawai‘i’s Native waterbirds to the point of extinction (UH-DURP, 2002).

The Wai‘oli Lo‘i Kalo Irrigation System offers a shallow-water habitat that supports threatened and endangered, endemic waterbirds. The specific conditions of the natural environment that appeal to waterbirds and aquatic species vary, but are not limited to, seasonal preferences, water depth, plant growth, and farming operations. Studies have found that lo‘i post-harvest, in its wet fallow stage, are heavily used by threatened and endangered waterbirds, in part because this stage generates substantial invertebrate biomass and the shallow flooded sediments are easily accessed by wildlife with potential predators clearly visible (US-FWS, 2020). **See Figures 31a and 31b, Native Habitats within the Wai‘oli Lo‘i Kalo Irrigation System.**

Less than a mile east of the Project Area is the 917 acre Hanalei National Wildlife Refuge (“NWR”). The NWR was established to conserve five (5) endangered waterbirds that rely on the area for nesting and feeding habitat. These endangered waterbirds also rely on the Wai‘oli Lo‘i Kalo Irrigation System as an informal extension of the habitat and flight range for these endangered waterbirds and the estimated 45 other species of birds that utilize the NWR habitat throughout the year (US-FWS NWR, 2020).

In 2020, the Hui conducted a survey to confirm the observed frequency of the five (5) endangered waterbirds in and around the Wai‘oli Lo‘i Kalo Irrigation System. A brief description of the species is provided below, which can be found on the 2020 U.S. Fish and Wildlife Service (“USFWS”) Pacific Islands Birds Webpages (US-FWS Pacific, 2020).

Koloa maoli (Hawaiian duck, *Anas wyvilliana*) – Endangered, Hawai‘i Endemic:

The koloa maoli is a mottled brown duck with a green to blue speculum (the patch of often-iridescent color on the secondary feathers of most duck species). Both sexes have orange legs and feet. Koloa maoli can be found in lowland wetlands, river valleys, and mountain streams. Koloa maoli nest in low-elevation wetland areas as well as near mountain streams, river mouths, and lo‘i (Harrington, 2008). In and around the Wai‘oli Lo‘i Kalo Irrigation System, koloa maoli are abundant and are seen daily by Hui members.

The population size of koloa maoli is roughly 2,200 birds, including 2,000 collectively on Kaua‘i and Ni‘ihau and 200 on Hawai‘i Island. Current population estimates, however, are unreliable because detection rates and montane habitats were not included in calculations. Today, hybridization (mating with feral mallards) and disease (avian botulism) are two of the biggest threats to the species. The largest number of pure koloa remaining are on Kaua‘i.

‘Alae ke‘oke‘o (Hawaiian coot, *Fulica alai*) – Endangered, Hawai‘i Endemic:

The ‘alae ke‘oke‘o is dark slate-gray with a white bill and a large frontal shield (patch on top of head). The frontal shield is usually white but can vary from bluish-white to yellow. They have white under tail feathers that are seen when swimming or during courtship displays. This endemic bird is smaller than its mainland relatives, measuring 15 inches in length. ‘Alae ke‘oke‘o are found in fresh and brackish-water marshes and ponds, building floating nests in aquatic vegetation in which four (4) to ten (10) eggs are laid. They are known to nest in wetlands and lo‘i, using sedges, kalo stems, and other aquatic plants to construct nests that can rise and fall with changing water levels (Harrington, 2018). The statewide population is estimated to range between 2,000 and 4,000 birds. From 2010 to 2015, monthly population



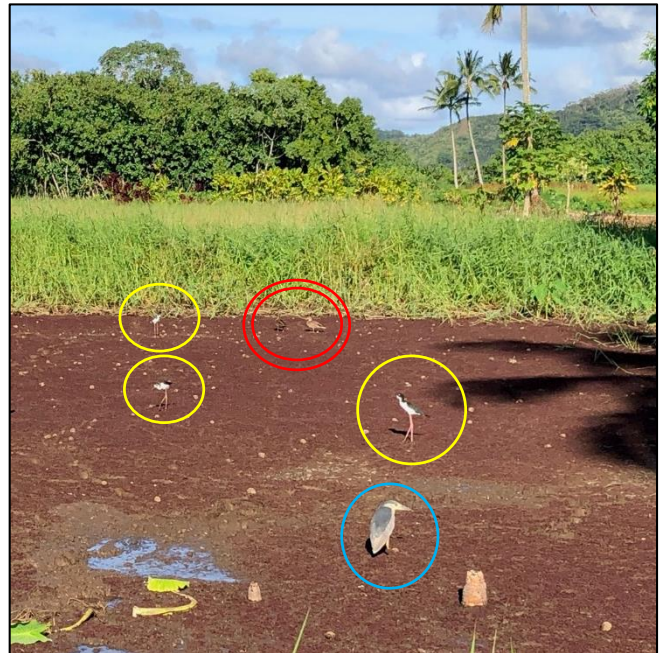
Ae'o nesting in the lo'i. July 2020



Three (3) ae'o eggs – June 2020



Two (2) baby ae'o. July 2020



Three (3) ae'o, one (1) 'auku'u, and (2) koloa feeding in a recently drained lo'i – October 2020



Six (6) ae'o. November 2019

Source: Wai'oli Valley Taro Hui

Figure 31a: Native Habitats within the Wai'oli Lo'i Kalo Irrigation System



Two (2) nēnē fly over the lo'i. October 2020



Nēnē standing next to Wai'oli Stream. October 2020



Nēnē in Lo'i – Late Afternoon. October 2020

Source: Wai'oli Valley Taro Hui



Nēnē foraging on Kalo. September 2019

Figure 31b: Native Habitats within the Wai'oli Lo'i Kalo Irrigation System

monitoring at the NWR counted an average of 254 'alae ke'oke'o. 'Alae ke'oke'o are frequently seen by the Hui, but are very shy and quick to run away (WVTH, 2020).

'Alae 'ula (Hawaiian common moorhen, *Gallinula galeata sandvicensis*) – Endangered, Hawai'i Endemic:

'Alae 'ula are dark gray birds with a black head and neck, and white feathers on their flanks and under tail. They measure about 13 inches in length and have a very distinctive red frontal shield. 'Alae 'ula are Native waterbirds found in lowland freshwater marshes and streams, kalo complexes, 'auwai, reservoirs, and wet pastures. They favor dense emergent vegetation near open water, floating or barely emergent mats of vegetation, water depths of less than three (3) feet, and fresh water over saline or brackish water. Alae 'ula are generally shy, inhabiting freshwater marshes such as loi as they are adept to walking across floating vegetation to feed on insects and aquatic plants such as the tops of kalo shoots (Harrington, 2008). They are known to nest in kalo fields.

No historical population estimates are available for the endemic 'alae 'ula because they are such elusive birds. Today, 'alae 'ula can be found on O'ahu and Kaua'i only with a population believed to be around 2,000 individuals. A sizable population is found at the NWR with over 400 individuals counted in the biannual waterbird survey for the NWR in January 2018. The primary causes of the decline of this Native waterbird are the loss and degradation of wetland habitat and introduced predators. 'Alae 'ula are seen daily by the Hui in the lo'i kalo enabled by this Proposed Action

Ae'o (Hawaiian stilt, *Himantopus mexicanus knudseni*) – Endangered, Hawai'i Endemic:

The ae'o is a slender wading bird that grows up to fifteen inches in length. It has a black back and white forehead, and is white below. It has long pink legs and a long black bill. Ae'o use a variety of aquatic habitats, but water depths of five (5) inches are required for optimal foraging. Nesting sites are adjacent to or on low islands within bodies of fresh, brackish, or salt water. Ae'o are known to nest in wetlands, lo'i, and 'auwai, building its nest in a shallow depression in a small mound, often on the banks of lo'i or in low-lying vegetation near water (Harrington, 2008). Ae'o frequently nest in the Wai'oli lo'i and are seen daily by the Hui.

The primary threats to this Native waterbird are introduced predators (e.g., rats, dogs, cats, and pigs) and loss and degradation of wetland habitat resulting from altered hydrology, encroachment, alien plants, introduced fish, bullfrogs, disease, and sometimes environmental contaminants.

Nēnē (Hawaiian Goose, *Branta sandvicensis*) - Threatened (effective January 21, 2020)
Hawai'i Endemic:

The nēnē's face, cap, and hindneck are black with buff-colored cheeks. The front and sides of the neck appear to have black and white stripes. This is caused by diagonal rows of white feathers with black skin showing through. The nēnē ranges in size from approximately 21 to 26 inches in length. In and around the Wai'oli Lo'i Kalo Irrigation System, nēnē are abundant and are seen daily by the Hui.

In 2017, the USFWS estimated the statewide population of wild nēnē to be 3,252 individuals with 1,482 (46%) on Kaua‘i. From 2010 to 2015, the NWS monthly population monitoring counted an average 115 nēnē. On January 21, 2020, the USFWS reclassified nēnē from endangered to threatened status because the species’ status had improved such that it was not currently in danger of extinction throughout all or a significant portion of its range (84 FR 69918).

Other Native and Non-Native Fauna Found in Project Area

Problematic, invasive fauna found around Project Area, Wai‘oli Stream, and Lo‘i Kalo Irrigation System include:

- Apple Snail (*Pomacea canaliculata*, *Pomacea bridgesi*, *Pomacea paludosa*, *Pila conica*)
- Wild Pigs
- Feral Cats
- Chameleons
- Wild parakeets
- Rodents
- Wild chickens
- Pheasants

5.5.3. Native Aquatic Species

The Hawaiian Archipelago’s isolation in the Pacific Ocean helps to explain the limited number of Native stream animals. There are five (5) Native species of fishes or ‘o‘opu (four (4) endemic and one (1) indigenous); two (2) species of crustaceans or ‘ōpae (all endemic); and, three (3) species of mollusks (all endemic) (State DAR, 2020).

All five (5) of the Native ‘o‘opu (freshwater goby) species are found in the Hanalei Bay Watershed (Hanalei Watershed Hui, 2012). ‘O‘opu consist of two (2) closely related families, Gobiidae and Eleotridae, collectively referred to as ‘o‘opu. These fish are small, nearly scale-less bottom dwellers as adults. Fused pelvic fins are adapted to the rocky, steep, flashy-flow nature of Hawaiian streams. These highly muscular fins are used for maintaining position in areas of high flow, but more impressively used for climbing waterfalls (State DAR, 2020).

‘O‘opu (freshwater goby)

Hawai‘i’s Native ‘o‘opu share a unique life cycle pattern called amphidromy. This is a specialized pattern where the animals live in two different environments (diadromy) during different life stages. Adults live in streams as adults. The gobies lay their eggs in the stream, and upon hatching, the larvae migrate downstream and are swept out to sea. After living in the ocean plankton community for a time, the post larvae, called hinana, return to the adults’ habitat by migrating upstream, often climbing numerous waterfalls.

In 1989, Wai‘oli Stream research conducted by the Center for Conservation Research & Training - UH Mānoa and DAR in November 1989 found that Native stream species are adapted to periodic flooding, including intense events. Based on observations of ‘o‘opu nākea and site conditions discussed in this section, the researchers found proof that ‘o‘opu populations will persist in the stream continuum (i.e., from mountain-to-sea) after major

flood events. Absent any major biophysical disturbances to the Wai‘oli Watershed or significant plantation-style water diversion from the stream system in the interim, Native stream animal populations are likely to remain viable in Wai‘oli Stream today (Kido et al., 2019).

Between 2003 and 2019, Waipā Foundation conducted Fish Surveys in Waipā Stream. With close proximity to Wai‘oli Stream, the findings from the Waipā Stream surveys⁶⁰ are a good indicator of the presence of similar species in Wai‘oli Stream. To compare pre- and post-2018 flood, researchers compared the 2016 and 2019 fish survey datasets. The comparison found a 76% increase (between the 2016 and 2019 surveys) in the total numbers of fish and macroinvertebrates observed, with increased numbers of Native ‘o‘opu at all study sites. Also, the increase in ‘o‘opu numbers seen at the lower survey site (within the stream restoration area) was almost 400% greater than in 2016 with habitat and biological integrity scores increasing from “Poor” to “Fair” and “Good,” respectively. The findings in the Waipā Stream are likely to be a result of the cleansing effect of floodwaters coupled with a major stream cleaning and maintenance project that began in 2011. In Wai‘oli, the 2020 survey of the Hui’s observation of aquatic species also confirmed that currently, the Hui frequently observe ‘o‘opu in the Wai‘oli Stream and Lo‘i Kalo Irrigation System.

The following Native ‘o‘opu species are observed in Wai‘oli Stream or the nearby Waipā Stream, a good indicator of the presence of species likely found in Wai‘oli Stream. The descriptions are partially derived from the DLNR DAR webpage, which was accessed in September 2020 and May 2021 (State DAR, 2020).

‘O‘opu nōpili (*Sicyopterus stimpsoni*) – Hawai‘i Endemic

The physical traits of ‘O‘opu nōpili are highly variable juveniles and females are usually mottled brown or gray, while males are slate gray-blue with striped or variegated markings, or black with white stripes and a pronounced dorsal fin (male in photo). ‘O‘opu nōpili feed on algae growing on rocks, are usually found in the middle stream reaches, preferring fast-flowing water, and can grow up to about seven (7) inches. ‘O‘opu nōpili are found in the lower and middle reaches of Wai‘oli Stream (State DAR, 2008).

‘O‘opu nākea (*Awaous guamensis*) – Indigenous

‘O‘opu nākea appear mottled brown and black with a white underside (nākea means “whitish,” probably referring to the ‘o‘opu’s white underside). Vertical dark and light bands are visible on the dorsal and caudal fins, and there is a dark patch on the caudal peduncle. It grows to about fourteen (14) inches and is usually found in the lower to middle stream reaches. Native Hawaiians favored this goby as a food fish probably because of its large size. ‘O‘opu nākea feed mostly on filamentous green algae, crustaceans, worms, snails, and aquatic insects. ‘O‘opu nākea are found in the middle, lower, and estuary reaches of Wai‘oli Stream (State DAR, 2008).

The 1989 research documented ‘o‘opu nākea spawning in a roughly 75-meter stretch of lower Wai‘oli Stream (Kido et al., 2019). Using underwater visual census (“UVC”), the research

⁶⁰ Note that Waipā completed major stream cleaning efforts in 2011.

team observed 20+ egg masses laid in nests within the basalt substrate. The nests were being guarded by single male or female individuals, indicating that eggs were fertilized and about to hatch. The highest nest densities were recorded nearer the stream mouth. The researchers observed an old coral reef underlying the streambed, yet the egg masses were only laid on stream rocks and not the coral. The observation indicates that at that time there was a reproductively viable population of ‘o‘opu nākea in Wai‘oli Stream (Kido et al., 2019). Researchers, however, also observed a tilapia in the study site, which was of concern since this invasive species may prey upon and compete with Native ‘o‘opu for food resources. The researchers also acknowledged that the observation was made following a flood event that closed the Hanalei Bridge. This occurred a few days prior to the spawning observations, providing proof that ‘o‘opu populations will persist in the stream continuum (i.e., from mountain-to-sea) after major flood events. The research is consistent with the oral histories and surveys of Hui members who historically and currently gather Native stream animals as a part of their traditional and customary Native Hawaiian practices (Leu Cordy & Merrin, 2020).

‘Ōpae (crustaceans)

The ‘ōpae (endemic crustaceans) are represented by two (2) species: (1) ‘ōpae kuahiwi, or mountain ‘ōpae, which prefers the higher sections of the streams where there is abundant cool, clear and fast-flowing water; and, (2) ‘ōpae ‘oeha‘a, which is most commonly found in the lowest stream section in slow-flowing water. The Hui’s 2020 survey confirmed that it has observed ‘ōpae in the Wai‘oli Stream and upper portions of the ‘auwai.

The following ‘ōpae species are observed in Wai‘oli Stream. The descriptions are derived from the DLNR, DAR webpage, which was accessed in September 2020 and May 2021.

‘Ōpae kala‘ole or ‘ōpae kuahiwi (*Atyoida bisulcata*) – Hawai‘i Endemic

‘Ōpae kala‘ole are golden brown, dark green to black in coloration. ‘Ōpae kala‘ole are usually found in the upper stream reaches in fast flowing water and feed on microscopic plant and animal matter. They reach a length of two (2) inches and demonstrate the greatest climbing ability as they are observed above waterfalls over 100 feet in height. ‘Ōpae kala‘ole are found in the middle and lower reaches of Wai‘oli Stream (State DAR, 2008).

‘Ōpae ‘oeha‘a (*Macrobrachium grandimanus*) – Hawaiian Endemic

‘Ōpae ‘oeha‘a are light to dark brown with striped pincers. One (1) pincher is noticeably larger than the other. The ‘ōpae ‘oeha‘a feeds on both plant and animal matter and are typically found in estuary and lower stream reaches. ‘Ōpae ‘oeha‘a are found in the middle and lower reaches of Wai‘oli Stream (State DAR, 2008).

Additional aquatic species are observed in Wai‘oli Stream. The descriptions are partially derived from the DLNR, DAR webpage, which was accessed in September 2020 and May 2021.

Hīhīwai or Wī (*Neritina granosa*) – Hawai‘i Endemic

The hīhīwai, also known as wī, is a freshwater snail with a black shell that can be rough or smooth. The underside of the shell is orange. Shell shape and texture is variable and dependent on its habitat. Its shell grows up to two (2) inches. Hīhīwai are typically active at

night and found in the lower and middle stream reaches, feeding on algae growing on rock surfaces. Unlike the other species that are frequently observed by the Hui, the Hui reports not seeing hīhīwai in the stream as often as other Native stream animals.

‘Aanae and ‘Ama‘ama (Mullet, *Mugil cephalus*) – Endemic

The average size of striped mullet is around 50 cm and is known to penetrate low gradient streams, but is more common in protected habitats, especially in estuaries (muliwai). They reach sexual maturity at 28 cm or three (3) years old and migrate offshore during the winter months to spawn. The pre-juveniles averaging 20 mm appear at intertidal estuaries 30-45 days after hatching at sea. Pre-juveniles averaging 17-35 mm are very common in the shallow intertidal habitats in the spring but disappear by the end of June (Nishimoto, 2007, 143-44).

‘Aanae are full-sized ‘ama‘ama, or mullet (Pukui & Elbert). Mullet was one of the most important fish species in traditional Hawaiian culture. Young fish were caught in nets along the shoreline, then raised in the many fishponds throughout the islands. After being fattened in the fishponds they could then be easily caught for consumption (Nishimoto et al., 2007; State DAR, 2014). Farmers frequently see ‘aanae in the lower part near the muliwai and they are also prevalent in Halulu fishpond in the neighboring Waipā Ahupua‘a which is fed by the Wai‘oli Muliwai.

Āholehole (*Kuhlia sp.*) and Zebra-head Flagtail (*Kuhlia sandvicensis*) – Indigenous

Āholehole is common in all Hawaiian waters and can be found both in streams and the ocean, but prefer higher salinity and is, therefore, typically found in the ocean (Bishop Museum, 2010). Āholehole reach about nine (9) inches in length. They range much higher inland in the stream and common in estuary areas, and the lower sections of streams, and can be found well inland to well above the first major riffle area of stream. Āholehole prefer very fast water runs and riffles, but also can be found in pools. Within a stream, āholehole are found in estuarine areas to the upper reaches of the stream, feeding on a wide ranging diet of insects, crustaceans, algae, spiders, annelid and polychaete worms (Bishop Museum, 2010). The Hui’s 2020 survey confirmed that āholehole is seen frequently in Wai‘oli Stream near the ho‘i.

The recent long-term fish population survey conducted by Waipā Foundation in nearby Waipā Stream found an increased observation of (Native) āholehole and a sharp drop in the numbers of (non-Native) Swordtails, which are the most common exotic fish found in Waipā Stream above the estuary reach. Based on these findings, its researchers hypothesize that the 2018 flood event probably swept most of the non-Native Swordtails out to the Bay, while the Native ‘o‘opu fared much better due to their higher level of adaptation to the flashy hydrology of Hawaiian stream systems (Rosener, 2020). Based on the proximity to Wai‘oli Stream and similarities as tidal estuaries, it is reasonable to assume similar findings in Wai‘oli Stream.

5.5.4 Potential Impacts, Minimization and Mitigation Measures

Based on the compiled studies and Hui observations, *no significant impacts* are anticipated as a result of the Proposed Action. On the contrary, the action will have *beneficial effects* on biological resources.

Research documents lo‘i kalo’s instrumental role in conservation efforts to promote, protect, and perpetuate Native species because these species have adapted to these ancient systems and depend on lo‘i kalo for food, shelter, and reproduction (USDA, 2009). Lo‘i kalo play a vital role in the preserving endemic and Indigenous species, many of which are found nowhere else in the world.

The Proposed Action: Long-Term Water Lease and Alternative A: Shorter Lease Term Alternative would have a *beneficial impact* on biological resources because the long-term water lease would commit water for instream, in-watershed kalo cultivation and support existing and future flora, fauna, and aquatic species in the area. A long term water lease would also allow the Hui to continue sustainable management practices grounded in place-based Native Hawaiian biocultural knowledge and stewardship.

The long-term lease would support the continuity of the Wai‘oli Lo‘i Kalo Irrigation System that provides habitat for endemic waterbird species, offering a more expansive area for food, water, nesting, and shelter. The Hui’s mission and implementation of the Draft Hui Watershed Management Plan as required for a long-term water lease seeks in part to protect Native waterbirds through its commitment to maintain the ongoing throughflow water use and lo‘i kalo cultivation. A forthcoming study indicates that restoring lo‘i “could increase [A‘]eo habitat by 171% — even after accounting for losses due to sea level rise” (Star Advertiser, 2021). In addition to highlighting Indigenous relationship to Ae‘o, the study evaluates the impacts of climate change on Native birds like the ‘Alae ‘Ula and ‘Alae Ke‘oke‘o and underscores the importance of expanding well-maintained wetland kalo much like the Hui’s practices.

The Hui also supports the overall concept discussed in the USFWS’2002 Recovery Plan for Hawaiian Waterbirds which acknowledges that the key to the success of the general recovery and protection of waterbirds is the “formation of productive partnerships among Federal, State, and local agencies, private organizations, and individuals...Such partnerships also result in greater community support to ensure long-term wetland and waterbird protection.” Establishing and maintaining these relationships creates a greater emphasis on collaborations between community groups, organizations, and kalo farmers who encounter Native species on a daily basis (UH-DURP, 2002).

For native aquatic species, DLNR’s Division of Aquatic Resources (“DAR”) notes that, “maintaining the natural patterns of water flow in streams is the single most important requirement for protection of native Hawaiian stream animals.” Without it, the impacts of “reduced flows on habitat quality pose added stresses to [N]ative species that are already threatened by urbanization, pollutants, changes in land use, and invasive species” (Clilverd, et. al, 2018). For centuries now, Hui members and their ancestors have directed about half of Wai‘oli Stream to their lo‘i kalo, which maintains robust flow throughout the stream’s reaches and also creates additional habitat for native stream animals in Hui members’ ‘auwai and lo‘i kalo. Importantly, the amended IIFS and the Hui’s maintenance of the larger Wai‘oli Stream and Watershed ensures ma uka to ma kai stream flow, and nearly all of the water used in the system is returned to the stream. As noted by DAR, “These natural

flows will provide the gateway for our precious native stream animals to complete their life cycle. Hawaiian native stream life, like the native Hawaiian people who depended on the streams, embody the connection of mauka to makai that defines the Hawaiian ecosystem” (State DAR, 2020). This system also expands available habitat for native stream animals within the Hui’s lo‘i kalo and ‘auwai, which safeguards those animals as they are not available to be gathered in public reaches of the stream. The Hui will continue to observe and work with the State if any native species population changes are noted.

Under **Alternative B: Annual Revocable Permit Alternative** and **Alternative C: No-Action Alternative** there would be no commitment to support, protect, or proliferate biological resources in and along the Wai‘oli Lo‘i Kalo Irrigation System and would have a *minor or moderate impact* on biological resources. A No-Action Alternative, however, may likely have *significant negative impact* on biological resources in Wai‘oli. Without a long-term commitment from the State, undertaking proactive efforts to protect biological resources would be a significant challenge for the Hui. The Hui may not be able to commit to the efforts currently outlined in the Draft Hui Watershed Management Plan. This may diminish the quality of Native habitats, waterbirds, Native flora, and overall stream health that affects Native aquatic species in the area. The 2020 NWR report stated that without maintenance, the Lo‘i Kalo Irrigation System, specifically the ‘auwai, became overgrown within months, limiting the value of the habitat and ability to manage wetlands, especially to properly drain and aerate units [lo‘i] (US-FWS Pacific, 2020). The report found that ongoing maintenance of ‘auwai would facilitate water level management within kalo farms and provide minor to intermediate habitat benefits (US-FWS Pacific, 2020).

Minimization and Mitigation Measures

Given the *beneficial effects* of lo‘i kalo cultivation on biological resources in Wai‘oli, minimization and mitigation measures are not necessarily required. As a part of their regular work, however, the Hui’s efforts contribute to proactive measures and best management practices that prevent the overall degradation of the biological resources in the area.

As an ideal habitat for many biological resources, the farmers inevitably encounter nesting cycles within the lo‘i itself. In order to protect and minimize any potential impact, farmers make visual observation of any nests and/or eggs during the growing cycle and make necessary adjustments if/when it is time to harvest. If the farmer determines that it is close to hatching, they wait to harvest kalo. If, however, the farmer determines that the nest and/or eggs are new, they harvest kalo around the area and leave a buffer area to allow continued and safe growth.

The Hui’s work effectively maintains this ‘āina as a resource for Native flora, fauna, and aquatic species that already exist in the area. These efforts are articulated in the Draft Hui Watershed Management Plan and support the stewardship of the biocultural watershed resources that are intertwined with stream flow. This pilina enables a successful ancient system that has been vital to Wai‘oli for centuries. The Hui’s work, and the Hui’s Watershed Management Plan include:

- Cleaning and restoring Wai‘oli Stream – the removal of invasive species mitigates flood and fire risks, supports continuous stream flow, prevents debris accumulation, reduces sediment, and opens up the tree canopy to return direct sunlight to the stream bed. Facilitating flood

- resilience reduces hazardous debris from accumulating and can better protect and mitigate damage to Native species habitats.
- Removal and control of non-Native hooved animals – the Hui will continue to control the ingress of ungulates and remove them through coordinated hunting and setting traps in the watershed and existing Lo‘i Kalo Irrigation System. This maintains and helps restore the biological integrity of the Wai‘oli Watershed by preventing soil erosion, limiting the spread of invasive species, and protecting Native species by removing non-Native predators (Tep & Gaines, 2003).
 - Community outreach and education – The Hui aims to educate more community members about the Wai‘oli Stream to facilitate citizen-based watershed protection and ahupua‘a-level resource management. This will empower volunteers within the community to develop a sense of kuleana to care for these resources in perpetuity. Ultimately, the outreach education will instill a sense of kuleana in community members and foster long-lasting sustainable management practices grounded in traditional Native Hawaiian biocultural knowledge.
 - Continuing best practices – for traditional lo‘i kalo farming. The Hui will implement the HBWMP’s “recommended management practices” in their lo‘i to maintain and improve surface and ground water quality, which supports Native species health. Ultimately, the proposed actions discussed in the Draft Hui Watershed Management Plan aim to reduce sediment, bacteria, and nutrient loads from surface and ground waters to receiving waters (i.e., Hanalei Bay). This should decrease the generation and transport of any non-point source pollutants that may reach the ocean and affect Native species habitats. The Hui will collectively undertake these efforts year-around.
 - Passive and active maintenance – Each farmer in the Hui spends about seventeen hours per month on passive and active maintenance (including invasive species removal) within the Lo‘i Kalo Irrigation System. Community work days include individual volunteers from the community. The activities range from cleaning the ‘auwai system of overgrowth and debris, clearing and maintaining the intake by cutting back vegetation, removing debris, shoring up ditch banks, shoveling dirt and ‘ili‘ili, manually moving rocks out of intake and ditch, and placing rocks to support the breakaway rock dam.

5.6. Cultural Resources

Article XII, section 7 of Hawai‘i’s State Constitution mandates the preservation and protection of all Native Hawaiian traditional and customary practices. The Hui commissioned a Cultural Impact Assessment (“CIA”) to record and assess the practices perpetuated within Wai‘oli. The CIA, *I Mano ka Wai‘oli*, includes a complete literature review of cultural and historic resources, a review of previous archaeological work at and near the project area, as well as community consultation, and interviews. The CIA can be found in **Appendix C, CIA: I Mano ka Wai‘oli**.

5.6.1. Cultural Practices, Worldviews, and Traditional Uses

“From a Hawaiian worldview, the environment is not merely an entity to be prioritized because of the ecosystem services it provides for man, but it articulates instead a familial and genealogical relationship between ‘āina (land), akua (gods), and kānaka (people).” (Beamer et al., 2021, 4).

Given the extensive cultural resources, worldviews, and traditional uses encapsulated in lo‘i kalo cultivation generally, and in Wai‘oli specifically, the 2020 CIA of the Wai‘oli Lo‘i Kalo Irrigation System, *I Mano ka Wai‘oli*, comprehensively surveys cultural beliefs, practices, and resources in the Project Area. See **Appendix C, CIA: I Mano ka Wai‘oli**. It also evaluates potential impacts on these resources and provides historical context for the Wai‘oli Lo‘i Kalo Irrigation System. The Hui’s traditional use of water and kalo farming is a cultural practice informed by Kānaka Maoli worldviews. The Proposed Action supports this traditional and customary cultural practice of kalo farming in a traditional manner.

Kānaka Maoli not only stewarded natural resources as a means for survival, but Kānaka Maoli life was governed by its pono usage. “Given the critical role that water played in Hawaiian society, traditional Hawaiian law, or kānāwai, developed around the management and use of fresh water. In fact, the word ‘kānāwai’ can be literally translated as ‘relating to water.’” (Native Hawaiian Law Treatise, 2015). Wai also denotes wealth, as exemplified in the duplication of the word: waiwai.⁶¹ (Sproat, 2009).

For Kānaka Maoli, the practice of aloha ‘āina is embodied in the traditional and customary cultural practice of kalo cultivation. Aloha ‘āina is love for the land, but this value goes beyond mere feelings; it articulates humans’ genealogical relationship to land and embodies ideals of patriotism or nationalism. In each of these views, ‘āina is at the center. Aloha ‘āina as a practice not only operationalizes humans’ kuleana to care for ‘āina as a means for survival, but importantly, actualizes one’s familial relationship and kuleana to Kānaka Maoli’s elder sibling, kalo. In Hawaiian cosmology, kalo is revered as the elder brother of Kānaka Maoli and establishes humans’ familial relationship with ‘āina. The first kalo plant sprouted from the grave of Hāloanaka, the first child of Wākea⁶² and Ho‘ohōkūkalanī.⁶³ As a fundamental cultural practice, the Hui engages in and shoulders the kuleana of kalo cultivation.

In addition to kalo itself, wai that flows through and feeds the lo‘i kalo is held in highest esteem. For Hawai‘i’s people, culture, and resources, ola i ka wai. Spiritually, water is revered as a kinolau of Kāne, one of the principal akua in the Kānaka Maoli pantheon (Sproat, 2009). Kāne was the “embodiment of male procreative energy in freshwater, flowing on or under the earth in springs, in streams and rivers, and falling as rain (and also as sunshine), which gives life to plants” (Handy et al., 1991, 64).

Kānaka Maoli also articulate the importance of one’s pilina with ‘āina, the interdependence, and the lessons that come with it: “I am certain that the intricacies within...lo‘i...ground us in who we are as servants to this land and will manifest as the answers we need to thrive if indeed we look to these sources” (Oliveira & Wright, 2016, 143). Recognizing these practices as “an integral part of the ancient Hawaiian civilization,” and deserving protection into present-day, the Hawai‘i State Constitution, Article XII, section 7 imposes a constitutional mandate to preserve and protect traditional kalo cultivation, a Native Hawaiian traditional and customary practice (Forman & Serrano, 2012, 10). The Hui’s continued use of water from Wai‘oli Stream is grounded in both

⁶¹ Wealth.

⁶² Sky father.

⁶³ Daughter of Papa, earth mother.

traditional and customary Native Hawaiian, riparian, and appurtenant rights, which have the highest protection under that law, as well as historic and contemporary instream and in-watershed use (Leu Cordy & Merrin, 2020)

The vast extent and interconnectedness of the Wai‘oli Lo‘i Kalo Irrigation System throughout history is well documented. Kalo cultivation in Wai‘oli Valley is captured during the 1848 Māhele and the Wai‘oli Lo‘i Kalo Irrigation System is dated back to the 1500s. Maps and written testimony indicate that the Wai‘oli Lo‘i Kalo Irrigation System has been in ongoing use, in kalo – including requisite throughflow – for at least the last 170 years. Present-day research found at minimum, 34.57 acres of the Wai‘oli Lo‘i Kalo Irrigation System was in lo‘i between 1830 to 1860 with all the rights and access to water necessary to irrigate those fields. The documentation provided in the CIA is contemporaneous with the use of lo‘i on these various parcels today. Historic maps establish that the ‘auwai system was partly surveyed and depicted 147 years ago, then in greater detail 20 years later. Using ESRI ArcGIS software to georeference old maps to their real world geospatial locations, the CIA clearly established that the ‘auwai system has changed little over the last 127 years. The early depictions confirm the existence of the mānowai and po‘owai per the extent of the ‘auwai system. When coupled with Māhele claims, the attempt to quantify appurtenant rights to a sample acreage, the CIA indicates that (the system and Project Area) is a reasonable estimate based on its near-exhaustive survey of Māhele and other data.

Participants also “detail[ed] important resources and cultural (e.g., subsistence) practices reliant upon them in the Project Area. The most prevalent subsistence practices in Wai‘oli mentioned during the interviews include 1) fishing, 2) hunting, and 3) gathering. Note that while religious or spiritual practices were not a focus of [that] study, they persevere. For example, some gather fresh water for ho‘okupu (offering) and others mentioned the importance of pule (prayer). Apart from established traditional and customary Native Hawaiian practices, because many endemic and endangered manu (birds) are also dependent on the Wai‘oli Lo‘i Kalo Irrigation System, participants also shared their manu interactions” (Leu Cordy & Merrin, 2020).

5.6.2. Archaeological and Historical Resources

The Lo‘i Kalo Irrigation System is not only a modern-day operating traditional system, but an archaeological and historical resource itself. In a 2019 report, “The Indigenous Origin of the Native Hawaiian Irrigation System that Feeds the Lo‘i Kalo in Wai‘oli, Kaua‘i,” OHA Land, Culture, and History Research Analyst, Natashja Tong, confirmed that this Lo‘i Kalo Irrigation System existed prior to western contact. The report details Māhele records pertaining to the Project Area and the ‘auwai in particular.⁶⁴ By referencing the Native Register of Kuleana⁶⁵ Claimants and its respective

⁶⁴ The Māhele occurred between the years 1848-1860 and transitioned Hawai‘i into a hybridized system of private land ownership. OHA Testimony, 2021.

⁶⁵ Kuleana are a type of Land Commission Award (LCA) given to native tenants during the Māhele. Native tenants who were seeking a Kuleana award would submit a Native Register (NR) – a statement that explained the extent of their land claim – to the Land Commission, the Board tasked with confirming title during this process. Typically, the Native Register included information on how many ‘apana (land parcels) the applicant was claiming and what was being cultivated at the time. The Native Register also detailed from whom the applicant derived their interest (i.e., who gave the claimant the right to cultivate those lands), which was usually a konohiki or ali‘i, and/or the year or time period that ali‘i was in power typically in the form of “I ke au iā” or “during the time of” followed by the name of the ali‘i. OHA Testimony, 2021.

documentation, Tong established a timeframe in which the Lo'i Kalo Irrigation System was in place. (OHA Testimony, 2021).

OHA's research and historical documentation demonstrates that the Wai'oli Lo'i Kalo Irrigation System existed since time immemorial, to support an agricultural complex of no less than 41 separate kuleana 'apana containing lo'i kalo at the time of the Māhele. Of those 'apana, no less than 12 referred to this particular 'auwai as part of their metes and bounds description. (OHA Testimony, 2021). The Lo'i Kalo Irrigation System, as a whole, has been preserved, utilized, and maintained as a archaeological resource since time immemorial.

Within the irrigated fields of the Wai'oli Lo'i Kalo Irrigation System itself, no archaeological studies have been conducted. This is likely because of the ongoing and historical use of the area for cultivation as lo'i kalo. Archaeological work has, however, been conducted along Kūhiō Highway, in the coastal sand areas ma kai of the Wai'oli Lo'i Kalo Irrigation System. The archaeological reports in the coastal sand areas have recorded iwi kūpuna (ancestral remains) along the coastal dunes, which is consistent with where people would have lived and buried their 'ohana (family members). This corresponds with the pā hale, per Māhele claims, which were the dominant land use in the sand dunes seaward of the Project Area and Kūhiō Highway (Leu Cordy & Merrin, 2020). Along the same lines, it is unlikely that there are iwi kūpuna or other archaeological resources within the Wai'oli Lo'i Kalo Irrigation System itself given the documented historical use of the land.

Because of the lack of archaeological studies specific to Wai'oli, the CIA surveyed manuscripts and reports beyond Wai'oli Valley, in neighboring Hanalei as well as other traditional irrigation systems similar in scale, production, and geographic setting to Wai'oli in order to estimate when irrigated lo'i kalo cultivation developed in Wai'oli. Though the cultural landscape in Wai'oli and greater Halele'a would have taken time to establish after early settlement, it is fair to assume that the Wai'oli area would have been an optimal early settlement area and that most of the coastal wetlands of Wai'oli were in lo'i with water coming from canals by AD 1200s-1400s (if not earlier) (Leu Cordy & Merrin, 2020).

Below is a summary of the researched and documented relevant archaeological and historical resources and context from *I Mano ka Wai'oli* unless otherwise cited:

- An ideal environment for early settlement: Hanalei Bay is likely to have been an early settlement area on Kaua'i based on the following description, "As with windward O'ahu, the windward coast of Kaua'i would have been a favorable environment to early settling parties, and future work in this region will likely turn up additional indications of lengthy occupation" (Kirch, 1985). Early Kānaka Maoli arriving at Hanalei Bay would have found an optimal environment - high rainfall for rain-dependent crops, wetlands for kalo, and sandy beaches and calm seas for easy access to marine resources. After landing on shore, arriving peoples would have most likely started to establish their "transported landscapes," (Kirch, 1989) immediately tending to the animals and plants they had brought with them on the canoe. Kalo would have been one of these important early plants, but would not have been planted in large, irrigated field systems at that time, which would come later.
- Kalo Cultivation: In early settlements, housing along with tree crops and likely rainfall-dependent crops would have been placed along the Bay, with kalo in the adjacent wetlands of

Hanalei and Wai‘oli, or nearer to the base of the mountains if the seaward-most part of the coastal plain was too wet (Gay, 1873).

- **Crop Cultivation (mid-1800):** One of the first articles pertaining to Wai‘oli was in Ke Kumu Hawai‘i entitled, No ke Emi Ana o Na Kanaka, in which a Kaua‘i Island census taken in 1835 showed the decline in population. This article was submitted by the mission to address possible mitigating action to deal with the decline. This article was written by W. P. Alexander, a missionary who founded the Wai‘oli Mission in 1834, fourteen (14) years after the arrival of missionaries in the islands in 1820. From the founding of the mission in 1834, letters, reports, and nūpepa articles continued to document the agricultural wonders of the Wai‘oli community. In the early years of the mission, Alexander connected his property to the main stream through an ‘auwai system to water the crops on his homestead. Moreover, crops were so abundant, that they were sold commercially and shared with other missions.
- **Rice Cultivation (mid- to late-1800):** Following western contact, “the rice era followed various failed agricultural attempts, including crops of mulberry for silkworms, [cotton,] coffee, tobacco and sugarcane, as well as attempts to raise cattle. [Much of the sugarcane rotted in the lower fields (pp.75)]. By 1870 rice had become a significant product throughout the Islands (Mokulē‘ia and Waikīkī on O‘ahu were the largest rice-producing areas) and would soon dominate the Hanalei landscape....by 1882 sugarcane had all but disappeared in Hanalei’s lower valley in favor of rice...Other nearby valleys, and virtually all suitable land along Hanalei’s coastal plain, had also been planted with the crop....In 1895 Eric Knudsend wrote: “Rice field and taro patches covered the flat bottom land as far as the eye could see” (Harrington, 2008, 94). Rice eventually faded away as California rice producers began to dominate the industry. After the decline of the rice industry in the early 1900s, after nearly three (3) decades, significant kalo farming began again in earnest (Harrington, 2008). By 1997, fifty acres of kalo in Wai‘oli Valley was documented (Harrington, 2008, 136).

5.6.3. Potential Impacts, Minimization and Mitigation Measures

Unlike typical projects evaluated for environmental impacts, this Proposed Action directly supports cultural resources and has *significant beneficial impacts* on Native Hawaiian traditional and customary practices and existing archaeological resources in the Lo‘i Kalo Irrigation System. Extensive documentation and subsequent research reveals that these continued practices have enabled and preserved the archaeological and historical resources in the area.

Central to wetland kalo cultivation, continuous flowing water is integral to the Wai‘oli Lo‘i Kalo Irrigation System and its cultural resources. According to the CIA, participants shared that “...this system is an intimately interconnected one, and because of this, has changed very little over the last several centuries. The Hui consistently restores the mānowai, clears the stream of debris, and fixes the ‘auwai. This monitoring and maintenance is a vital part of their cultural practice; it is when families gather and share time, food, and fellowship” (Leu Cordy & Merrin, 2020, 71).

Interview participants, however, expressed concerns about “sufficient water availability in the future, including the potential effects of not having any or enough water and of others tampering with the current water system. Because kalo farming is a communal system, tampering or removing water has the potential to harm everyone farming within the [lo‘i kalo] system, leaving folks without enough water, losing crops, and leaving the entire community without a food source. They also

worried about their ability to continue kalo farming in Wai‘oli without the water lease. Last, many participants shared concerns about the rapidly changing landscape in Hanalei, including stresses due to tourism and overdevelopment” (Leu Cordy & Merrin, 2020, 72).

The **Proposed Action: Long-Term Water Lease and Alternative A: Shorter Lease Term Alternative** would have *significant beneficial impacts* on cultural and archaeological resources in the area. The long-term commitment to support water for lo‘i kalo cultivation will continue to perpetuate the Hui’s legacy and cultural connections to place. The Proposed Action not only maintains the Lo‘i Kalo Irrigation System as an archaeological resource itself, but it also creates living opportunities for ‘āina-based youth and community engagement, education, and action to preserve the cultural heritage of Hawai‘i and a cultural practice that has been occurring since Kānaka Maoli arrival, pre-Western contact. The Proposed Action protects the connection to and knowledge of place; restores community identity and resilience; perpetuates cultural practices; and sustains Native species that depend on the Lo‘i Kalo Irrigation System.

The long-term lease would affirm the cultural, historic, and future value of traditional kalo cultivation by committing cool, fresh water flowing through the lo‘i from Wai‘oli Stream for the purpose of instream, in-watershed, kalo cultivation. The IFS is the “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 year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses” (HAR 174C-3). Therefore, compliance with the IFS would have beneficial impacts to the streams and cultural resources compared to current conditions, supporting ‘āina-based education, protecting the connection to and knowledge of place, and perpetuating cultural practices that care for Native flora, waterbirds, and aquatic species.

Further, the water lease would enable Hui members to continue providing for the larger community through kalo farming, ‘ai pono, would restore the health of the stream and watershed, and perpetuate vital cultural practices, passing them on to future generations. The Proposed Action will enable connection to ‘āina and directly benefit future generations through the perpetuation of active kalo cultivation and other cultural practices – a lifeway for the Wai‘oli community. For the Hui, “Kuleana extends to caring for the natural resources that sustain you” (Vaughan, 2018).

Under **Alternative B: Annual Revocable Permit Alternative** and **Alternative C: No-Action Alternative**, there would be no long-term commitment to support, protect, or proliferate the traditional cultural practice of kalo cultivation and *moderate to neutral impacts* are anticipated.

The CIA found that there is *no* viable alternative to Wai‘oli Stream water, and the continuous flow of fresh water is necessary for the cultivation of kalo. The No-Action Alternative likely violates the State’s duties under Article XI, section 7 to “assur[e] appurtenant rights and existing correlative and riparian uses” as well as under Article XII, section 7 to “protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of Native Hawaiians who inhabited the Hawaiian Islands prior to 1778” (HAW. CONST. ART. XII, § 7).

Participants interviewed in the CIA are concerned that any reduction in water for kalo cultivation would significantly diminish – and perhaps wholly prevent – the constitutionally protected practice

of kalo cultivation. Other concerns that may be detrimental to cultural resources and practices include:

Minimization and Mitigation Measures

Given the *beneficial effects* of lo‘i kalo cultivation on cultural resources in Wai‘oli, minimization and mitigation measures are not required. Mitigation measures and best management practices to minimize potential impacts to cultural resources include Nohopapa Hawai‘i’s recommendation that, “a long-term water lease would enable Hui members to continue providing for the larger community through kalo farming, restoring the health of the stream and watershed, and perpetuating vital cultural practices, passing them on to future generations” (Leu Cordy & Merrin, 2020, 74).

While the CIA confirms that it is unlikely that archaeological remains will be found within the Wai‘oli Lo‘i Kalo Irrigation System since no new construction will occur, if iwi kūpuna, burials, or other artifacts are identified, all activities in the area will stop, the area will be closed off, and the State of Hawai‘i Historic Preservation Division (“SHPD”) and local law enforcement will be notified pursuant to HAR section 13-300-40.

5.7. Agricultural Resources

“It is only a little more than 150 years since the first American missionaries visited the Hanalei [district, whereas] Hawaiians had been using its land and water resources for a thousand years; in the evolution of Hawaiian culture from the time of the island’s discovery and settlement, the valleys have become productive agricultural areas. Throughout the Islands, native Hawaiians cultivated kalo and produced other nutritious crops. Their irrigation systems, which transformed valley marsh lands, are among some of the largest recorded anywhere in Polynesian, and the well-watered lo‘i of the Hanalei and Wai‘oli ahupua‘a were among the most extensive in the Hawai‘i...Long before Captain James Cook arrived on Kaua‘i, the valley lo‘i formed a distinctive cultural landscape” (Riznik, 1987, 1).

Kānaka Maoli have developed, refined, and mastered lo‘i kalo cultivation throughout Hawai‘i. Wai‘oli Ahupua‘a is a shining example of this success and is one of but a few remaining historic sites of, and for the prolific production of agriculture. On Kaua‘i, the Hawai‘i Baseline Agricultural Study reported that only 21,494 acres of land on the island are being used for agriculture (out of approximately 136,908 acres within the State Land Use agricultural district). Less than 1,000 acres of the lands in production are used to grow food crops, not including coffee.

In 2011, the Hawai‘i Department of Agriculture found that the State’s staple starches are at highest risk of food insecurity. However, as one of Hawai‘i’s highest yielding staple starch food crops, kalo produces between 10,000 to 30,000 pounds per acre, per annum, under current wetland cultivation practices (State Senate, 2015). “Numerous scientific investigations have indicated the superiority of [kalo] over other starchy crops (particularly polished rice) which are staple foods in the Pacific regions” (Whitney et al., 2007, 5). Hawai‘i consumes approximately 6.5 million pounds of kalo annually, 180% more than it produces (Mishan, 2019). Thus, imported kalo contributes to the State’s 88.4% reliance on total available food sourced through importing (Loke, 2013). A forthcoming study also found that “[I]ndigenous agriculture has the potential to play a major role in feeding Hawai‘i

in the years to come. . . .research found that traditional agriculture is resilient and capable of remaining viable even under the most severe future climate scenarios.” (Star Advertiser, 2021)

For Hawai‘i, kalo continues to be the most culturally significant food plant, playing a critical role in food security for the State. The North Shore of Kaua‘i is the center of kalo production for Hawai‘i. Although production is primarily in Hanalei Ahupua‘a, the statistics provide a perspective on kalo as the primary agricultural resource in the district. According to the National Agricultural Statistics Service, the 2017 Census of Agriculture reported that 495 acres of kalo were harvested statewide, producing 3.6 million pounds of fresh and processed kalo (NASS, 2017). Of the statewide harvest, Kaua‘i County accounted for 32 to 56% of the State’s kalo acreage and produced between 43 and 75% of the State’s total production (NASS, 2017a). Yet, from 2000 to 2017, kalo production in Hawai‘i decreased from 7 million pounds to 3.6 million pounds, and average yields per acre fell from about 15,000 pounds per acre to 10,530 pounds per acre (NASS, 2017).

Today, the Hui consists of 14 farms and 16 kalo farmers in Wai‘oli Valley. These families operate small-scale farms that range from half (1/2) an acre to eight (8) acres in size with a majority on the smaller size. At most, the Hui identifies approximately 84 acres of lo‘i kalo within its collective complex with an additional 45 acres of both leased and privately-owned lands include lo‘i banks, access roads, and pathways. In addition, these lands host a variety of other plants gathered and utilized by the Hui (e.g., hala, kukui, kī, mai‘a, hau, etc.).

Scholarly research advocates for the restoration of these Indigenous agricultural systems because they support high levels of biodiversity, increase local food production, and play a role in the conservation of increasingly threatened Native species. However, the restoration of Indigenous food systems goes far beyond food security, providing opportunities for strengthening identity, social ties, knowledge transmission, and well-being, which are all inseparable from Indigenous food (Kurashima et al., 2019).

The 2010 and 2014 Taro Task Force Report to the Legislature recommended greater protections for lo‘i, including their structural elements, such as terraces, kuāuna or paepae pōhaku (stone walls), and ‘auwai within the boundaries of the State’s public conservation districts to help increase food security and support community and cultural resilience in the face of the rising costs of imported food for local families. More kalo grown means more kalo pa‘a (unmashed cooked taro), poi, and other kalo products to feed the local community. The Task Force, established under Act 211 Session Laws of Hawai‘i 2008, directed kalo farmers, agencies, and University of Hawai‘i representatives to seek solutions to challenges facing kalo, kalo farmers and kalo markets. Access to water and the long-term water lease in particular in one such challenge.

5.7.1. Potential Impacts, Minimization and Mitigation Measures

The Proposed Action would have *significant beneficial impacts* to agricultural resources in the project area. In ancient Hawai‘i, kalo was the primary and preferred source of starchy foods; it is rich in fiber and nutrients contributing to individual nutritional health and well-being. Today, kalo plays a critical role in its food security; prior to the 2018 flood, Hanalei and Wai‘oli farmers produced 85% of the taro in the State of Hawai‘i (Nakamura, 2020). As a crop that once covered an estimated

35,000 acres in Hawai‘i, today, only 495 acres are cultivated and harvested, which is about 1.4% of the potential historic production levels.

Environmentally, cultivating kalo in Hawai‘i significantly reduces the threat of new pests and disease introductions that occur through raw kalo imports. Kalo demand is also expected to grow as the State moves towards greater local food self-sufficiency (Senate, 2015). This highlights the urgent and critical need to support kalo cultivation, fulfill throughflow water needs, and inspire the next generation of kalo farmers through ‘āina-based education and hands-on learning experiences, precisely as the Wai‘oli Valley Taro Hui does.

Unfortunately, the devastating 2018 flood destroyed crops and equipment, damaged lo‘i, interrupted water flow, and diminished throughflow within the Lo‘i Kalo Irrigation System. The cost and time to start anew has been enormous, and is something that the Hui, and generations of farmers before them, have not seen in recent history. The Proposed Action provides an important assurance and some semblance of hope that the Hui will be able to persevere into the future and maintain the legacy of kalo cultivation, its land and water, for their children and future generations. As Hui member Chris Kobayashi explained: “our Hui is part of this tradition, this kalo growing lineage that has been going on in Wai‘oli for hundreds of years. We carry on this tradition, this legacy, and we want this traditional culture to continue for generations to come” (Kobayashi, 2021).

The **Proposed Action: Long-Term Water Lease** and **Alternative A: Shorter Lease Term Alternative** would have a *substantial beneficial impact* on agricultural resources. By cultivating kalo in Wai‘oli, the Hui creates greater diversity in Hawai‘i’s agricultural and food systems, contributing to an increase in local food security and community resilience. Increased food security is a necessary step for improving biosecurity control measures and reducing the high costs associated with these control efforts (Senate, 2015). Particularly for Kaua‘i, the high (and increasing) operational and transportation cost increases the demand for community grown food, countering the State’s dependence on import foods and reducing reliance on fossil fuels to transport and distribute food. More kalo grown means more poi and kalo based food projects that sustain the local community.

Alternative B: Annual Revocable Permit Alternative and **Alternative C: No-Action Alternative** would have a *significant beneficial impact* on agricultural resources. Without a long-term lease, the future of throughflow water that kalo cultivation depends on would be unknown and could cease. Any reduction or alteration of throughflow water would diminish or destroy the existing and future potential of meaningful kalo cultivation. The diminished quality and quantity of kalo would require the Hui to determine useable lo‘i that includes altering the ongoing traditional practices and methods of kalo cultivation to adjust to reduced or removed throughflow that could possibly end with the demise of the Hui’s kalo cultivation activities. The Hanalei area is well known for both its kalo, producing 71% of Hawai‘i’s kalo (HWH, 2012; County of Kaua‘i, 2000). The reduction or termination of the Hui’s kalo production would affect the State’s supply of local kalo and diminish the State’s efforts to improve food security.

Minimization and Mitigations Measures

Under the long-term water lease, the Hui is committed to conducting ongoing maintenance of the Wai‘oli Lo‘i Kalo Irrigation System to sustain kalo as an agricultural resource. Given the *beneficial effects* of lo‘i kalo cultivation in Wai‘oli, minimization and mitigation measures are not necessarily

required. Best management practices seek to maintain agricultural resources are articulated in the Draft Hui Watershed Management Plan and include:

- Removing and control of non-Native hooved animals (i.e., pigs) – The Hui will continue to control the ingress of ungulates and remove them through coordinated hunting and setting traps in the watershed and existing Wai‘oli Lo‘i Kalo Irrigation System. Continued control and removal of ungulates maintains and helps to limit the spread of invasive species, and prevents unnecessary destruction to kalo and surrounding agriculture.
- Community outreach and education to facilitate ahupua‘a-level resource management – The Hui aims to educate more community members about the Wai‘oli Stream and its agricultural significance including traditional kalo cultivation. This will empower volunteers within the community to develop a sense of kuleana to care for these resources in perpetuity. Educational curriculum will cover a range of topics including wai, watersheds, lo‘i kalo, invasive species, cultural context, and practices specific to Wai‘oli.
- Continuing best practices for traditional lo‘i kalo farming – The Hui will implement the HBWMP’s “recommended management practices” in their lo‘i to maintain and improve surface and ground water quality, which in turn supports agricultural resources. Ultimately, the proposed actions discussed in the Draft Hui Watershed Management Plan aim to reduce sediment, bacteria, and nutrient loads from surface and ground waters to receiving waters (i.e., Hanalei Bay). This should decrease the generation and transport of non-point source pollutants that may reach the ocean and further support the health of the Lo‘i Kalo Irrigation System and Wai‘oli Watershed.
- Data collection and monitoring – This information will help to ensure the health of Wai‘oli Watershed and agricultural resource. The Hui will track and monitor progress, using both qualitative (comparing water quality to baseline tests, developing a sense of kuleana, etc.) and quantitative data (number of volunteers, individuals served through outreach, flora and fauna counts, etc.).

5.8. Socio-Economic Characteristics

5.8.1. Population and Demographics

According to Harrington, from 1835 to 1860, the population of the Hanalei district decreased by half even as the non-Native population increased. Harrington’s research found that less than forty thousand Native Hawaiians remained in the Hawaiian Islands by 1890, down from a Native population at the time of Western contact estimated to have been more than a quarter million, and possibly more than three times that number. “Each new epidemic, each new wave of foreign influences, furthered the unraveling of an ancient cultural fabric, the rich and complex culture of a self-sufficient people living on the planet’s most isolated archipelago for more than one thousand years before Western contact” (Harrington, 2008).

The Wai‘oli Lo‘i Kalo Irrigation System is located in the Hanalei Census Designated Place (“CDP”) that extends from Hanalei River to Waipā Stream. In 2010 the total permanent resident population of Hanalei CDP was 450 people, which is nearly 6% less than it was in 2000. The total population of Kaua‘i was 67,091, which is an increase of 14.8% over the 2000 census.

The Hanalei Census County Division (“CCD”) 90540 is a subdivision of Kaua‘i County that includes the Hanalei CDP and more broadly, Moloa‘a to the east and the Nā Pali Coast State Wilderness Park to the west. Within this larger Census area, the estimated population is 6,232 with a median household income of \$73,438, poverty rate of 12.3%, and median age of 45.6 years. The population of the CCD is 8.6% of Kaua‘i’s total population (72,293) (U.S. Census Bureau, 2019).

With the exception of Hanalei Town, the environment surrounding the Wai‘oli Stream and Wai‘oli Lo‘i Kalo Irrigation System is rural, undeveloped, and open agricultural land; nearly 90% of the Hanalei Bay Watershed covered in shrubs and evergreen forest (Tetra Tech-DOH, 2011).

The visitor population contributes to the area resource demands. For example, in 2019, 30 to 50% of all visitors to Kaua‘i visited its North Shore. Islandwide, Hanalei Bay is also one of Hawai‘i’s most productive fisheries, a gathering place for canoe racing, and location of many cultural events throughout the year.

5.8.2. Social Characteristics

“Relationships with the coast of North Kaua‘i lead to close connections and familial identities shaped not by islands, moku (districts), or even entire ahupua‘a, but by specific places and their characteristics. These connections grow by eating from and sustaining one’s family from a particular place over time.” (Vaughan, 2018, 22).

The Wai‘oli community identity is grounded in a subsistence lifestyle supported by kalo cultivation and a connection to ‘āina. For many of the Hui members, their ‘ohana have shaped and been shaped by Wai‘oli Valley for generations. This leadership and involvement is central to and reflects the identity of the larger North Shore community. The lo‘i are a kīpuka, a variation or change in form in the landscape. These kīpuka provide a safe and nurturing environment, where individuals can express kuleana through teaching, learning, working, maintaining ancestral ties, and building new pilina with ‘āina and one another. As kīpuka, these lo‘i provide a “place to build community and enact kuleana by regularly gathering to care for their home together” and maintain the essential “character of surrounding areas” (Vaughan, 2018, 120-123).

In addition to the practice of kalo cultivation, the Wai‘oli community’s identity is deeply intertwined with various cultural practices dependent on the surrounding resources. It is an avenue through which the kuleana to mālama ‘āina and to elder brother is expressed. “Relationships to land are inseparable from the exercise of kuleana” (Vaughan, 2018, 124). Mehana Vaughan, kama‘āina of Halele‘a moku and Associate Professor at UH Mānoa, articulates the importance of community identity and pilina:

“Together, ancestral language and contemporary actions illuminate kuleana that come with sustained connection to land: continuing genealogical ties, maintain presence, perpetuating in-depth knowledge, caretaking, eating, and feeding. While community actions do not negate ongoing loss and injustice, these stories do offer possibilities: to restore lost connections, grow new ones, and build models that emphasize responsibility and caretaking of lands and resources, rather than ownership” (88).

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Interviews from the CIA participants reflected similar perspectives and all participants highlighted that they take pride in feeding the larger community and supporting ‘ai pono, either through sharing kalo with other ‘ohana or providing kalo to small community-based non-profit organizations” (Leu Cordy & Merrin, 2020).

The Proposed Action reflects aloha ‘āina; as explained by Trask (1993), Goodyear-Ka‘ōpua (2013b), and Oliveira (2014), “aloha ‘āina not only as a feeling of aloha, or love, for the land but also the relationship in aloha ‘āina is familial and practice based, extending back to time immemorial.” (Oliveira & Wright, 2016, 101).

“This epistemological belief and understanding comes with a great kuleana (responsibility) to make a contribution to the larger good, to the broader community of Kanaka Maoli and to our islands, and the Earth...As Kanaka [Maoli] we have a shared [I]ndigenous connection to the Hawaiian archipelago. For some we follow in the footsteps of our ancestors or devote our lives to specific practices such as activism, education,...taro cultivation,...and in the multitude of ways that we thrive in these modern times. Within these practices and beyond, guidance happens both physically and metaphysically” (Wilson-Hokowhitu, 2019, 121).

The social characteristics of Hanalei and Wai‘oli have steadily and significantly shifted over the last century. “While many rural areas in Hawai‘i continue to lose its history as competing demands on agricultural and conservation lands have intensified, Hanalei [district] still encompasses the resources of taro farming, ranching, and Native Hawaiian, Western, Chinese, Japanese and Filipino life” (Riznik, 1987, 82). Wilson-Hokowhitu describes, “Between April 2010 and July 1, 2016, Kaua‘i experienced a net in-migration of nearly three thousand people, an average annual growth of half of 1 percent, bringing the island population to just over 72,000. On average, one new person moves to Kaua‘i every day.” (Vaughan, 2018, 78).

Subsistence and rural lifestyles in Wai‘oli continue despite changing population and demographics. Eleanor Akiona Chun, Reverend Akiona’s daughter and her cousin Ezra Kanoho, fondly recall rural life in Wai‘oli and its traditional culture where people continued to live close to the natural world and ‘āina – from taro and rice farming, fishing, gardening and all the associated activities; “we all shared more than we had” (Riznik, 1987, 80). This was the ethics of the community in and around Wai‘oli, during the early 1900s, when Hawai‘i’s land ownership and demographics were going through immense changes.

The cost of land and subsequent property tax has forced families to relocate, resulting in a demographic shift of residents and lifestyle changes. The social character has shifted from the largely subsistence and trade of skills and resources, to individual wealth focused on the idyllic lifestyle that now includes well developed residential properties, gates, and walls, altering the social characteristics of the rural community. Some members of the Hui no longer live in Wai‘oli. Rather, they live in DHHL Homesteads in Anahola or in areas east of Princeville that are more affordable. Through the Hui’s commitment to kalo cultivation and through their unwavering perseverance, the Hui has maintained a deep connection to the ‘āina they have worked on for generations and continue to sustain the very core identity of the small Wai‘oli community:

“The immaculate lo ‘i, neatly mowed and weed-whacked, with its flourishing kalo, provides tangible visible evidence of the community’s ability to work hard, work together, and effectively take care, thus positively influence other collaborations that devolve management authority from the state.” (Vaughan, 2018, 120).

5.8.3. Economic Characteristics

“A highly complex and sophisticated society emerged in Hawai‘i that centered around an abundant agricultural economy, without a market and the need for surplus production... [the] economy of traditional Hawai‘i was dependent on the balanced use of products from land and sea, accounting for an ingenious land division system... Mary Kawena Pukui identifies ‘ohana, or extended families, as the core economic unit in Hawaiian society. ‘It was the ‘ohana that constituted the community within which the economic life moved.’” (Beamer et al., 2021).

In Hawaiian cosmology, as the elder brother of Kānaka Maoli, the distribution of kalo in old Hawai‘i was appropriately situated around the values of ‘ohana and ‘āina. In Halele‘a, Kaua‘i, communities measured their wealth in ho‘olako – having enough to share with others. Historically, “economic industries in Hawai[‘]i grounded in aloha ‘āina led to generations of productivity, abundance, and growth” (Beamer et al., 2021). Today, the Hui continues to promote these important values while also adapting to create a sustainable practice in modern Hawai‘i. As a traditional practice, in order to survive, necessitates a certain degree of commercial aspect(s).

As an agricultural staple, the distribution of kalo across the islands has undoubtedly shifted over centuries broadly related to transitions in government and new economic systems. Factors such as colonization, rapid dwindling of the Native Hawaiian population, changes in modes of living, and an increase in immigrant populations all contributed to the necessary shift to western economic systems. “In the latter part of the last century, profound change took place in the growing and processing of taro. Soon after the heavy influx of immigrants, poi was soon commercialized and, not long thereafter, many immigrants took up the growing of kalo to a large extent...” There remain, however, small taro patches tended by the old Hawaiians” (Whitney et al., 2007, 7).

For small family famers across Hawai‘i, kalo cultivation represents the connection of people and ‘āina and focuses on sharing food with a grower’s larger community. This is especially true for the Hui members, all of whom are pillars in the small town community of North Shore Kaua‘i. Socioeconomic changes and community dynamics across the pae ‘āina have impacted how kalo not only is harvested, but distributed throughout this island community. Kalo farming has gone from being cultivated in over 20,000 acres across the islands, to less than one thousand acres. (Jung, *CivilBeat*, 2021). Further, “[b]ecause large-scale commercialization of taro production is somewhat unrealistic [financially]. . . family labor continues to be an important aspect of taro production in Hawai‘i” (Evans, 2008, 139). This is certainly the case for the Hui. Yet, over time, the value of ho‘olako and the Hui’s commitment to kalo cultivation as a connection to ‘āina remains unchanged.

Economically, the Hui members participate in small-scale, partially-subsistence or non-monetary kalo cultivation; most members are either retired or have other full-time employment, which for some farmers, has been impacted by the COVID-19 pandemic. Generally, the Hui utilizes funds

generated from kalo sales to cover operating expenses, including property taxes, farming equipment (e.g., gas, tabis, buckets, etc.), and supply costs. With the exception of some growers who maintain their farms as a cultural practice or family tradition, Hui members on average historically sell between fifteen (15) to thirty (30) large bags of kalo a month to various poi mills either locally or on Maui and O‘ahu.

In addition, the Hui commonly trades with and/or gifts kalo to members within their community. The Hui also distributes kalo at cost or at a discounted rate. A large portion of the kalo grown in Wai‘oli goes directly to Waipā Foundation for below cost. Waipā Foundation processes the kalo into poi in its certified kitchen with volunteer labor, and provides the poi to the local community, below cost and often free to kūpuna. Waipā hosts many community events such as: poi day every Thursday, when volunteers clean kalo and hand mill it into poi; farmers market; celebrations; and community meetings. Community members that exchange with the Hui share goods and/or services, and the Hui distribute their harvest to various organizations and community members as gifts or at discounted prices. **See Section 3.2.2.**

The Hui’s total production – including its commercial yield – is based on environmental and economic factors that vary by farmer and by year. It is difficult to estimate the specific yield of any lo‘i until the kalo is harvested. For example, in addition to the 2018 floods, the recent February and March 2021 rain events completely submerged lo‘i with kalo at various growth stages. This exacerbates rot, loliloli,⁶⁶ and other complications that affect kalo yield. Sometimes, after waiting for a year or more, a farmer may begin to harvest only to realize that the entire crop must be plowed under (WVTH, 2021). Flooding over the last five (5) years has become so persistent that it is unlikely that the Hui can return to historic levels of cultivation, and Hui members estimate that farming in Wai‘oli’s new climate change reality will be less than what was grown when the farmers declared their water uses with the Water Commission in the 1980s.

5.8.4. Project Cost

The existing Wai‘oli Lo‘i Kalo Irrigation System does not require new infrastructure, facilities, or a generated power source to operate. Rather, the Proposed Action seeks a long-term water lease to continue the practice of kalo cultivation and maintain the Lo‘i Kalo Irrigation System that was built centuries ago. Intrinsically tied to the life and cultural identity of Wai‘oli and Hawai‘i, the Proposed Action is atypical for HRS chapter 343 process as it does not propose physical improvements that could potentially adversely impact existing environments. Rather, the Proposed Action is a traditional, ongoing use, cultivating the most culturally significant food plant in Hawaiian culture that has also become vital to the naturally occurring environment. Permitting is now occurring because the disaster recovery efforts after the 2018 floods revealed that portions of the Wai‘oli Lo‘i Kalo Irrigation System is on State Conservation District land and a water lease is vital to secure long-term access to the life-giving water necessary for kalo cultivation.

The project cost includes the ongoing cost to maintain the Lo‘i Kalo Irrigation System and watershed including the specific projects listed in detail within the Draft Hui Watershed Management Plan. The Hui continues to pursue State and County funding and approvals to further support maintenance

⁶⁶ Soft, water soaked.

projects and complete baseline studies to better understand the watershed and related resources and infrastructure. The Draft Hui Watershed Management Plan outlines the estimated expenditures and in-kind services for (1) ‘auwai and lo‘i maintenance; (2) animal control; (3) data collection and monitoring; and (4) community outreach and administrative expenses.

5.8.5. Potential Impacts, Minimization and Mitigation Measures

Project Action would have *neutral impacts* on socioeconomic conditions and a *beneficial impact* on social and environmental characteristics in particular. The most pressing concern for the community is the shift in the socio-economic characteristics over the last century. “Recently, many local residents have grown concerned about the rapidly increasing development of North Shore lands and the consequent loss of public access to beaches and mountain areas. The large increase in the number of vacation rentals on the North Shore of Kaua‘i has led to a severe shortage of affordable housing and long-term rentals for local residents” while local homeowners continue to see dramatic increases in property taxes, driving long-term residents out of the community to more affordable areas on island (Harrington, 2008). The Proposed Action does not contribute to the modern-day pressures; rather, the Proposed Action is a stronghold of Native Hawaiian culture and practices.

The **Proposed Action: Long-Term Water Lease** is anticipated to have a *neutral impact* on population and economic characteristics, and a *beneficial impact* on social and environmental characteristics. Maintaining the distinctive characteristics of Wai‘oli and the Hanalei Bay Watershed, the Proposed Action itself defines the socio-economic characteristics of this community. The Hui’s commitment to mālama ‘āina through kalo cultivation, sharing Native food, and perpetuating traditional practices through daily actions and the long-term Draft Hui Watershed Management Plan is the lifeblood of Native Hawaiian culture and identity.

In addition, the Proposed Action increases diversified economic opportunities for area residents and perpetuates Hawai‘i’s agrarian economy, grounded in values and history that represent Hawai‘i, and is a model for other communities struggling to maintain the distinct rural character of their homelands. Although small-scale, the presence of kalo cultivation in Wai‘oli creates long-term economic benefits that contribute to local agriculture and the heritage of the community that is the fundamentally driver of Kaua‘i’s economic attraction and a distinctive way of life.

The **Alternative A: Shorter Lease Term Alternative** would also have a *neutral impact* and economic characteristics, and a *beneficial impact* on social and environmental characteristics, but would not secure the long-term benefits outlined above.

Alternative B: Annual Revocable Permit Alternative and **Alternative C: No-Action Alternative** have a *significant negative impact* on the socio-economic characteristics of Wai‘oli and the surrounding area. Without a long-term lease, the future of throughflow water that the kalo depend on to grow, mature, and thrive would be unknown, diminished or possibly, permanently destroyed. Thus, the decline of Wai‘oli kalo cultivation would result in the permanent loss of cultural connection to place, and the social and community vibrancy that surrounds kalo cultivation and consumption. The loss also includes both formal and informal opportunities for ‘āina-based experiential learning that has the power to reshape perceptions, attitudes, and behaviors towards vital environmental and cultural resources such as watershed, ecosystem, and traditional practices.

Minimization and Mitigation Measures

Under the Proposed Action, the Hui is committed to continue the perpetuation of Native Hawaiian traditional and customary practices, supporting the stewardship of biocultural watershed resources and the local food supply. Lo‘i kalo cultivation will continue to create opportunities for community-based cultural and agricultural education while providing vital environmental benefits, such as flood mitigation, ground water recharge, and preserving Native habitats. Specifically, the Draft Hui Watershed Management Plan identifies community outreach and education as a means to enhance the socio-economic characteristics:

- The Hui aims to educate more community members about the Wai‘oli Stream and its cultural significance. This will empower volunteers within the community to develop a sense of kuleana to care for these resources in perpetuity. In addition, the HBWMP highlights that “community engagement, education, and volunteer programs . . . are an integral part of a comprehensive solution to reduce NPS pollutants.” Educational curriculum will cover a range of topics including wai, watersheds, lo‘i kalo, invasive species, and cultural resources and practices specific to Wai‘oli. The Hui will continue to collaborate with community organizations including: Waipā Foundation, Kawaikini Public Charter School, Huliauapa‘a Wahi Kūpuna Internship Program, University of Hawai‘i at Mānoa’s Natural Resource Management Program, the William S. Richardson School of Law’s Ka Huli Ao Center for Excellence in Native Hawaiian Law, and Mālama Kaua‘i. Ultimately, the outreach education will instill a sense of kuleana in community members and foster long-lasting sustainable management practices grounded in traditional Native Hawaiian biocultural knowledge.

5.9. Visual Resources

The iconic panoramic views from the lookouts leading into Hanalei are famed and are often representative of the larger Hawai‘i. The expansive view of lo‘i kalo provide stunning views of the valley floor with broad sweeping views from the mountain to the sea. In the distance is Wai‘oli Valley and its steep mountain cliffs. The Wai‘oli Lo‘i Kalo Irrigation System has been a part of the visual and aesthetic resources that make this area so notable since the earliest documentation of this resource.



Figure 32: Visual Resources – Hanalei Valley Lookout

Kaua‘i Belt Road (North Shore section) is a ten-mile stretch of the Highway between Princeville and Hā‘ena. It is registered with the National Register of Historic Places, contributing thirteen (13) historic bridges and culverts, including the Wai‘oli Stream Bridge, a concrete, cast-in-place, multi-span structure with pointed cap railings (Harrington, 2008). The North Shore Section retains “the greatest historic integrity and character” among all sections of the Kaua‘i Belt Road (NPS, 2003).

The visual resource in Wai‘oli Valley are also central to the North Shore of Kaua‘i’s characteristic and is also famed throughout Hawai‘i pae ‘āina and the world.



Figure 33: Visual Resources – Wai‘oli Valley

5.9.1. Potential Impacts, Minimization and Mitigation Measures

The **Proposed Action: Long-Term Water Lease** is anticipated to have a *neutral beneficial impact* on the visual resources of the area. The Proposed Action supports the ongoing practice of traditional kalo cultivation, thereby preserving a major component and focal point of the scenic vistas and view planes within this district and island.

The **Alternative A: Shorter Lease Term Alternative** would also have a *neutral beneficial impact* on the visual resources of the area, but would not provide long-term stability and protection of visual resources that the Proposed Action secures.

Alternative B: Annual Revocable Permit Alternative and **Alternative C: No-Action Alternative** would have a *negative impact* on the visual resources of the area. Without a long-term commitment to water, kalo cultivation in Wai‘oli Valley would be significantly reduced and/or may not continue. Without a long-term lease, consistent throughflow for kalo cultivation is uncertain. Any reduction or alteration of throughflow water would diminish or destroy the existing and future potential of kalo cultivation as described, diminishing the iconic scenic vista of expansive lo‘i kalo. This potential outcome would thereby affect the totality of the visual resource.

Minimization and Mitigation Measures

The Proposed Action directly supports visual resources. Given the *beneficial effects* of lo‘i kalo cultivation on the visual resources in and around Wai‘oli, minimization and mitigation measures are not necessarily required. Active kalo cultivation is its own minimization and mitigation measure to protect and preserve visual resources of the expansive Lo‘i Kalo Irrigation System.

5.10. Hazardous Materials

No National Priority Superfund sites or hazardous waste treatment, storage, or disposal facilities exist within the vicinity of the Project Area (Accessed September 1, 2020).

5.10.1. Potential Impacts, Minimization and Mitigation Measures

The **Proposed Action: Long-Term Water Lease** will have *no (neutral) Impact* on hazardous materials.

Alternative A: Shorter Lease Term Alternative, Alternative B: Annual Revocable Permit Alternative and Alternative C: No-Action Alternative will have *no (neutral) impact* on hazardous materials.

Minimization and Mitigations Measures

No minimization and mitigation measures are proposed or anticipated.

5.11. Traffic Conditions

The County General Plan (2010) describes Kūhiō Highway as the only arterial road connecting the North Shore with the rest of Kaua‘i, providing circulation between Hā‘ena State Park and Līhu‘e. Throughout the North Shore, Kūhiō Highway is an east-west, two-way, two-lane, undivided arterial roadway.

The Project Area is generally inaccessible to vehicular traffic. The Hui utilizes private paved, gravel, and dirt roads to access the lo‘i and transport people, tools, and kalo. The stream is mainly accessed by private road, and areas within the State Conservation Land Use District are not accessible to the general public. Hui members, however, have access because of their adjoining properties, and the approval of the DLNR easement to maintain the Wai‘oli Lo‘i Kalo Irrigation System. The Proposed Action does not require changes or expansion in traffic use.

5.11.1. Potential Impacts, Minimization and Mitigation Measures

The **Proposed Action: Long-Term Water Lease** and the **Alternative A: Shorter Lease Term Alternative** will have *no (neutral) impact* on traffic conditions, as ongoing access to water in Wai‘oli Stream does not require alterations or expansion in traffic use.

Alternative C: No-Action Alternative has an *unknown impacts* on traffic conditions since a potential decline in kalo cultivation may introduce other non-traditional activities. As is, the

Alternative B: Annual Revocable Permit Alternative will have *no (neutral) effect* on noise conditions but may have an *unknown impact* on noise since a potential decline in kalo cultivation may introduce other non-traditional activities.

Minimization and Mitigation Measures

No minimization and mitigation measures are proposed or anticipated.

5.12. Noise

Noise is defined as unwanted sound and is one of the most common environmental issues of concern to the public. Since the human ear does not perceive all pitches or frequencies equally, noise levels are adjusted, or weighted to correspond to human hearing. In a rural area with no major roads nearby, noise levels would average around 50 decibels, whereas an urban area near a major arterial roadway would average around 70 decibels.

There are no adjacent noise producers to the Project Area, which promotes a very quiet environment. Noise in the area is limited to the sound of the river, wind blowing through the trees, Native waterbirds, and other fauna. Noise from the current kalo cultivation operations is minimal and limited to farm equipment, people working, and children playing. The majority of kalo cultivation relies on manual techniques to cultivate and harvest kalo rather than noise-generating equipment. The Proposed Action does not include any construction.

5.12.1. Potential Impacts, Minimization and Mitigation Measures

The **Proposed Action: Long-Term Water Lease** and the **Alternative A: Shorter Lease Term Alternative** will have *no (neutral) impact* on noise as it seeks to maintain ongoing kalo cultivation, and does not involve new construction or expansion.

Alternative C: No-Action Alternative has an *unknown impact* on noise since a potential decline in kalo cultivation may introduce other non-traditional activities. As is, the **Alternative B: Annual Revocable Permit Alternative** will have *no (neutral) effect* on noise conditions, but may have an *unknown impact* on noise since a potential decline in kalo cultivation may introduce other non-traditional activities.

Minimization and Mitigation Measures

Any noise generated by farm equipment is minimized by only conducting work during daylight hours.

5.13. Cumulative and Secondary Impacts

Cumulative impacts are the result of incremental effects of an activity when combined with other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Minor but collectively significant actions over a period of time can result in cumulative impacts to a place. Secondary impacts are associated with an activity but do not result directly from the activity.

Cumulative Impacts

The Proposed Action offers an extraordinary opportunity for the support of a critical traditional and customary practice that has grounded the Wai‘oli community since time immemorial. The Proposed Action would have significant long-term benefits to Hawaiian biocultural resources and the public as a whole. The long-term cumulative benefits to coastal ecosystems and the State’s responsibility to manage its natural resources, as set forth in Article XI of the Hawai‘i State Constitution, far outweigh any possible short-term negligible impacts.

The Hui is uniquely positioned to lead the stewardship of this ‘āina; formalizing its commitment to care for the Wai‘oli Lo‘i Kalo Irrigation System and the throughflow waters within this legal framework. As a collective, the Hui undertakes the kuleana to care for the ‘āina throughout Wai‘oli; including State Conservation District lands. The Action ensures important traditional and customary rights are protected and perpetuated. The Action is not focused on just the survival of these customary rights but is focused on a way that legally allows them and the kalo to thrive and subsequently, the environments and habitats that are connected to lo‘i kalo. Active watershed management specific to Wai‘oli will benefit Native habitats; assist with replenishing ground water resources; and reduce erosion by maintaining the stream and Lo‘i Kalo Irrigation System. The kalo harvested will be a continued source of food for the community, contributing to food security, community nutrition, and the cultural legacy of the area.

In partnership with DLNR, the Hui will seek approval for its Draft Hui Watershed Management Plan. Because the Wai‘oli Watershed faces many of the same threats that endanger the larger Hanalei Bay Watershed, the plan has been informed by the two-volume HBWMP. Successful implementation of the Hui’s Watershed Management Plan will establish baseline conditions to better assess threats and vulnerabilities into the future; further identify best management practices to enhance watershed health; facilitate and monitor restorative work in the forested uplands; and maintain and improve surface and ground water quality. Ultimately, the Hui hopes not only to ensure the long-term health of Wai‘oli Watershed but also embrace the community’s sense of kuleana as a means to foster long-lasting sustainable management practices grounded in traditional Native Hawaiian biocultural knowledge.

Secondary Impacts

The secondary impacts of the Proposed Action include flood mitigation by tempering and distributing overflow impacts across the Wai‘oli Lo‘i Kalo Irrigation System. The legal effort unifies the Hui, community organizations, and government agencies creating greater opportunities for partnerships and co-management of natural and cultural terrestrial resources. From a community perspective, the long-term right to use water for kalo cultivation celebrates and perpetuates Wai‘oli’s history and cultural and Indigenous traditions, while discouraging unlawful activity, helping to promote pono⁶⁷ practices that align with the Hui’s overall vision, demonstrating that Wai‘oli is special and cared for.

The Hui’s mission to engage “the larger Kaua‘i communities through educational outreach programs and initiatives related to kalo farming and community-based stewardship of water resources”

⁶⁷ Just, moral, correct or proper.

supports the continuity of cultural knowledge, traditional agricultural practices, and improves long-term watershed management through a community-based approach that perpetuates an Indigenous lifeway that is fundamentally representative of Hawai‘i.

Native Hawaiians have a long history of scientific and mathematical exploration in connection with environmental sustainability (Kanahele, 1986). As an ongoing Indigenous practice, kalo cultivation continues to contribute to modern-day scientific understanding of ancient, traditional knowledge and practices, and has the ability to contribute to place-based science education, functioning as a living classroom. When academic knowledge and skills are framed within a cultural context relevant to students, learning is more meaningful, students maintain higher interest levels and show improved academic achievement (Gay, 2010).

Review of the place-based science education literature reveals that when the teaching and learning of science are imbedded in the students’ place, this results in increased student engagement, sense of empowerment and improved academic achievement particularly for students from Indigenous and historically marginalized communities (Polynesian Voyaging Society, 2016). Specific to Wai‘oli and described by former Hanalei School Principal Beck, “Being outdoors enhances the learning that goes on inside. The world beyond walls is real and alive....some of the students live on operating taro farms...stalking [kalo] knee deep through a kalo patch together has helped our students learn as much about each other as about the wildlife they may observe” (Hanalei School, 1982).

5.14. Irretrievable and Irreversible Commitment of Resources

The **Proposed Action: Long-Term Water Lease** is a long-term water lease utilizing throughflow to operationalize appurtenant and riparian rights, support Native food production, and enable an ancient system that works in conjunction with the natural environment. The Proposed Action does not require irretrievable and irreversible commitments of resources including unavoidable impact or use of non-renewable resources. In fact, the success of kalo cultivation in Wai‘oli depends upon and promotes the health of Wai‘oli’s natural and cultural resources.

Given the ongoing nature of this traditional use and the significant benefits from an environmental, cultural, and social perspective, the Proposed Action complements natural and cultural resources with no irretrievable and irreversible commitment of the water resource.

6. Relationship to State and County Land Use Plans and Policies

6.1. Hawai‘i State Plan

The Hawai‘i State Plan (1986) establishes a statewide planning system that outlines State goals, objectives, and policies. The Plan also details the State’s priority directions and concerns, which are discussed as they relate to the project.

Under the Hawai‘i State Planning Act (HRS chapter 226), the State’s goals include achieving:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai‘i present and future generations.

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- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai‘i, that nourishes a sense of community responsibility, of caring, and of participation in community life (HRS section 226-4).

Specific objectives and policies of the State Plan that pertain to the Proposed Action include:

- Section 226-6(b)(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai‘i’s small scale producers, manufacturers, and distributors.
- Section 226-7(b)(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.
- Section 226-7(b)(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.
- Section 226-7(b)(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko i‘a, māla, and irrigated lo‘i, and growth of traditional Hawaiian crops, such as kalo, ‘uala, and ‘ulu.
- Section 226-11(a)(1) Prudent use of Hawai‘i’s land-based, shoreline, and marine resources.
- Section 226-11(a)(2) Effective protection of Hawai‘i’s unique and fragile environmental resources.
- Section 226-11(b)(1) Exercise an overall conservation ethic in the use of Hawai‘i’s natural resources.
- Section 226(11)(b)(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
- Section 226(11)(b)(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- Section 226(11)(b)(6) Encourage the protection of rare or endangered plant and animal species and habitats Native to Hawai‘i.
- Section 226-12(b)(1) Promote the preservation and restoration of significant natural and historic resources.
- Section 226-12(b)(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai‘i’s ethnic and cultural heritage.
- Section 226-13(a)(1) Maintenance and pursuit of improved quality in Hawai‘i’s land, air, and water resources.
- Section 226-13(b)(1) Foster educational activities that promote a better understanding of Hawai‘i’s limited environmental resources.
- Section 226-13(b)(2) Promote the proper management of Hawai‘i’s land and water resources.
- Section 226-13(b)(3) Promote effective measures to achieve desired quality in Hawai‘i’s surface, ground, and coastal waters.
- Section 226-21(b)(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.
- Section 226-21(b)(4) Promote educational programs which enhance understanding of Hawai‘i’s cultural heritage.
- Section 226-25(b)(1) Foster increased knowledge and understanding of Hawai‘i’s ethnic and cultural heritages and the history of Hawai‘i.

- Section 226-25(b)(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai‘i’s people and which are sensitive and responsive to family and community needs.

Discussion: The Proposed Action embodies the mission of the Hawai‘i State Plan and furthers many goals of the Plan. The Hui consists of small-scale family farmers using traditional Hawaiian farming practices and systems, also while engaging future generations through education. The Proposed Action seeks to maintain an ongoing and historic use of water to support kalo cultivation as has been done for centuries. The Wai‘oli Lo‘i Kalo Irrigation System supports agricultural, socio-economic, and visual resources, Native habitats, ground water recharge, and agricultural, socio-economic, and visual resources—all while perpetuating Wai‘oli’s rich history and cultural heritage.

6.2. State of Hawai‘i’s Environmental Policy (HRS § 344-3)

The State prioritizes projects that have positive environmental and community impacts. The State’s environmental policy is to (1) conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State’s unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai‘i. Section (2)(c) and (d) implores the State to enhance the quality of life by establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and establishing a commitment on the part of each person to protect and enhance Hawai‘i’s environment and reduce the drain on nonrenewable resources.

Discussion: Granting a long-term water lease to the Hui would align with the State’s environmental policy. In addition to being a traditional and customary practice, the Hui views kalo farming as a way of life that intentionally cultivates community through its practice and perpetuation. Many members of the Hui trace their genealogy back to Wai‘oli Valley. Members have decades of experience farming within Wai‘oli and are turning their farming into a multigenerational practice. The Proposed Action incorporates both traditional Hawaiian customs and modern adaptation to kalo cultivation. Kalo farming not only perpetuates a natural, sustainable environment for the Wai‘oli community, but prioritizes integral components of Native Hawaiian culture, and the Hui recognizes both the environmental and cultural impact that their practice provides for their local community. Additionally, harvesting kalo and sharing it with the community allows the Hui to contribute to the social and aesthetic fabric of Wai‘oli and other northern Kaua‘i communities. The Hui has and will continue to work in collaboration with the broader community to coordinate work days, clean up days, and educational experiences for the community. Above all, these traditional kalo practices represent a commitment by the Hui to continue to protect and enhance Hawai‘i’s environment and prevent the drain of nonrenewable resources.

6.3. Hawai‘i 2050 Sustainability Plan

The Hawai‘i 2050 Sustainability Plan’s main objectives include: respect for culture, character, beauty, and history of the State’s island communities; balance among economic, community, and environmental priorities; and meet the needs of the present while ensuring the ability to meet the needs of future generations as well.

The 2050 Plan outlines five overarching goals that “reflect a deeply held sense of where Hawai‘i should be headed[:]”

- Goal One. A Way of Life - Living sustainably is part of our daily practice in Hawai‘i.
- Goal Two. The Economy - Our diversified and globally competitive economy enables us to meaningfully live, work and play in Hawai‘i.
- Goal Three. Environment and Natural Resources - Our natural resources are responsibly and respectfully used, replenished and preserved for future generations.
- Goal Four. Community and Social Well-Being - Our community is strong, healthy, vibrant and nurturing, providing safety nets for those in need.
- Goal Five. Kānaka Maoli and Island Values - Our Kanaka Maoli and island cultures and values are thriving and perpetuated.

The Plan also includes strategic actions for the implementation of these goals and indicators to measure success.

In accordance with the plan, priority actions (intermediate steps) for the year 2020 pertinent to the Hui and this Project include:

- Strengthen public education
- Reduce reliance on fossil (carbon-based) fuels
- Develop a more diverse and resilient economy
- Create a sustainability ethic
- Increase production and consumption of local foods and products, particularly agriculture; and
- Preserve and perpetuate our Kānaka Maoli and island cultural values.

Discussion: The Proposed Action promotes the goals of the Hawai‘i 2050 Sustainability Plan and aligns with the identified strategic actions identified above. The Hui’s kalo cultivation, coupled with the goals and objectives described in the Draft Hui Watershed Management Plan, will foster understanding and awareness of cultural traditions and practices, local food sources, watershed management, and Hawai‘i’s rich history. The Lo‘i Kalo Irrigation System perpetuates a cultural subsistence practice and way of life that has traditionally fed Hawai‘i’s people. The production of kalo creates greater diversity in Hawai‘i’s agricultural and food systems, countering the State’s dependence on import foods and reducing reliance on fossil fuels. The continuation of kalo cultivation, the maintenance of the Lo‘i Kalo Irrigation System, and the development of a Wai‘oli-specific Watershed Management Plan all work toward long-term, sustainable resource management.

6.4. Hawai‘i State and County Land Use Laws

The State Land Use Commission, pursuant to its authority granted in HRS chapter 205, regulates land use through classification of State lands into four districts: Urban, Agriculture, Conservation, and Rural. The intent of the land classification is to accommodate growth and development while retaining the natural and agricultural resources of the State.

Within the Wai‘oli Watershed, 1,450 acres (92%) are in Conservation, 218 acres (6%) are in Agriculture, and 74 acres (2%) are in Urban Land Districts. Wai‘oli Stream and the Lo‘i Kalo Irrigation System are located in the Conservation and Agricultural Districts. The mānowai, po‘owai, and first ho‘i are located in the Conservation District, while the remaining stream and Lo‘i Kalo Irrigation System in the lower area are located in the Agricultural District. The mouth of the stream makai of Kūhiō Highway returns to the Conservation District. **See Figure 34, State Land Use District Map.**

Lands in the Conservation District are administered by DLNR’s Office of Conservation and Coastal Lands. The Conservation District has five subzones: Protective, Limited, Resource, General and Special. The first four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to least sensitive (General). Both portions of the stream located in the Conservation District are within the Resource subzone.

The regulations governing the Conservation District are set forth in HAR chapter 13. The overarching purpose of the chapter is “to regulate land-use in the conservation district for the purpose of conserving, protecting, and preserving the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare.” The objective of the Resource Subzone, as set forth in HAR section 13-5-13, is to “ensure, with proper management, the sustainable use of the natural resources of those areas.”

Under Kaua‘i County’s Zoning Ordinance, the Conservation District lands fall within the Open District. The Open District was established to maintain an adequate and functional amount of open land for recreational and aesthetic needs of the community, and for effective functioning of land, air, water, plant and animal systems or communities. Within Open District lands, the County seeks “to preserve, maintain or improve the essential characteristics of land and water areas that are . . . of significant value to the public as scenic or recreational resources;” “to preserve, maintain or improve the essential functions of physical and ecological ecosystems, forms or forces which significantly affect the general health, safety and welfare[;]” and “[t]o provide for other areas which . . . are determined to be of significant value to the public.”

Discussion: The Proposed Action aligns with the purposes of the State and County land use districts. The Proposed Action, a long-term water for throughflow water used for traditional kalo cultivation in Wai‘oli Valley is aligned with the State’s commitment to conserve, protect, and preserve Native Hawaiian traditions and customs through appropriate land management and use. The Proposed Action is also in line with the purpose of Kaua‘i’s Open District zoning as it preserves, maintains, and improves the essential characteristic of Wai‘oli’s ‘āina and people. The beneficial impacts, as

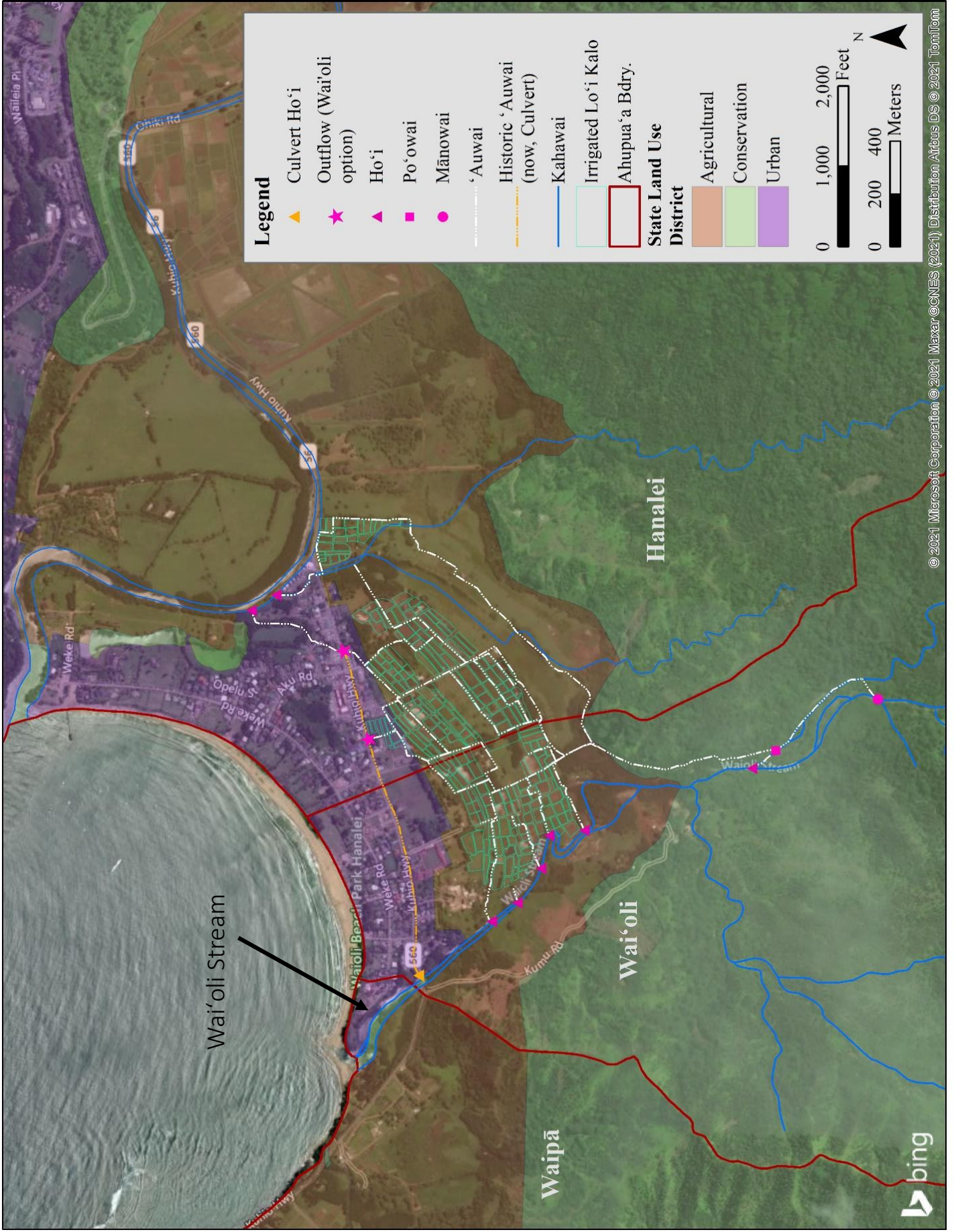


Figure 34: State Land Use District Map

described in Section 5, include the support of ‘āina-based education, protection of the connection to and knowledge of ‘āina, and perpetuation of cultural practices that steward Native habitats.

6.5. Hawai‘i Water Plan

The State Water Code, HRS chapter 174C, recognizes the need for a program of comprehensive water resources planning to address the supply and conservation of water. The Water Code establishes the Hawai‘i Water Plan as the guide for implementing this policy.

The Hawai‘i Water Plan consists of five constituent parts: (1) Water Resources Protection Plan (“WRPP”) (prepared by the CWRM), (2) Water Quality Plan (“WQP”) (prepared by DOH), (3) State Water Projects Plan (“SWPP”) (prepared by DLNR, Engineering Division), (4) Agricultural Water Use and Development Plan (“AWUDP”) (prepared by the State Department of Agriculture (“DOA”), and (5) Water Use and Development Plans (“WUDP”) (prepared by each separate county).

The WRPP and WQP provide the overall legal and policy framework that guide the development, conservation, and use of water resources. The AWUDP provides information on State and agricultural water needs and development plans, and the SWPP provides a framework for planning and implementation of water development programs for State projects. All four plans are integrated into the County WUDP, which sets forth the broad allocation of water use within each County. The table below, found in the SWPP (1-2), outlines the key objectives and elements of each plan.

Table 5: Key Objectives and Elements of Hawai‘i’s Water Plan Documents.

Hawai‘i Water Plan Document	Objectives	Elements	Status
Water Resource Protection Plan	To protect and sustain statewide ground/surface water resources, watersheds and natural stream environments.	<ul style="list-style-type: none"> • Designation of hydrologic units • Characterization & inventory of groundwater and surface water resources • In-stream uses • Programs to conserve, augment and protect such resources 	1 st Update completed in 2008 Revised in 2019
Water Quality Plan	To protect the public health and sensitive ecological systems by preserving, protecting, restoring and enhancing the quality of ground and surface water throughout the State of Hawai‘i.	<ul style="list-style-type: none"> • Water quality criteria and standards • Groundwater protection • Water quality problems • Existing water quality management programs and recommended policies and strategies 	1 st Update completed in 2019
State Water Projects Plan	Refer to Sections 1.2 and 1.3		
Agricultural Water Use and Development Plan	To assess State and private agricultural water use, supply and irrigation water systems through a long-range management plan.	<ul style="list-style-type: none"> • Master inventory of existing water systems • Existing statewide agricultural land uses, assessment of current and future water irrigation needs • Rehabilitation costs, prioritization and program for system repairs 	Completed in 2003 Revised in 2004 2 nd Update in Progress
Water Use and Development Plan	Maui	To ensure that the future water needs of the County are met and to provide guidance to the CWRM for decision- making on water uses and water reservation requests.	1 st Update in progress
	Kaua‘i		1 st Update in progress
	Hawai‘i		1 st Update completed in 2011 2 nd Partial Update in Progress
	O‘ahu		Update in progress

Source: Statewide Framework for Updating the Hawai‘i Water Plan, February 2000

Discussion: The WRPP was updated in 2019 to “develop a succinct, action-orientated plan to guide CWRM over the next five (5) years[.]” The WRPP provides water resource and management information and a near-term project list. Kalo is broadly included under the “Agriculture” use category, and kalo cultivation is discussed under the legal and practical framework of traditional and customary Native Hawaiian, riparian, and appurtenant rights. The Proposed Action is consistent with the updates to the WRPP.

The WQP, updated in 2019 to complement the WRPP, is a “living” plan that can be adjusted and adapted to provide information on water resources, reflecting the evolving regulations, standards, and management policies that affect water quality in Hawai‘i. The WQP acknowledges the need to collaborate with other agencies and partners to achieve beneficial results for the State’s water quality, detailing ongoing work and future plans to “provide a means to identify links that will allow for better coordination with work at other agencies” (State DOH, 2019). The Proposed Action includes the Draft Hui Watershed Management Plan, which works in conjunction with the existing HBWMP to implement best management practices in coordination and compliance with the policies discussed in the WQP.

The SWPP was updated in June 2020. The objective of the SWPP is to review current and future State water projects to ensure orderly authorization and development of the State’s water resources. The SWPP water development strategy includes existing and/or new State water sources/systems, existing master plans, existing County and private water agreements, and existing County water systems. DHHL’s SWPP is also addressed within the SWPP. All of these strategy options were prioritized and assigned to individual SWPP projects, providing potential options and recommended actions that are intended to meet forecasted water demands from State projects on an individual project basis. The Proposed Action would not be included in these plans. Generally, kalo cultivation is broadly included under the category “Other-Stream diversion; Other – Spring Sources” with only two (2) anticipated lo‘i kalo cultivation projects within DHHL areas.

The AWUPD does not specifically include traditional Lo‘i Kalo Irrigation Systems in its plans; rather, it is a review of sugar cane era irrigation systems. The nearest system discussed in the AWUPD is the Porter-Kalihiwai Irrigation system, approximately eight (8) miles east of the Project Area. The Plan does note that water demand for “aquaculture, taro, and other wet crops” is “dependent on crop and location[.]” acknowledging that a one-size-fits all approach should not be applied for agricultural endeavors (State DOA, 2019).

The Kaua‘i WUDP was approved in 1990 and primarily addresses water use related to the Board of Water Supply, irrigation of sugarcane fields, and private and industrial uses, since irrigated sugarcane utilized ninety-nine percent (99%) of all surface water on Kaua‘i in 1988. As a result, the 1990 plan does not specifically address traditional kalo cultivation uses but broadly discusses kalo under the category of “other diversified agricultural pursuits[.]” which also includes macadamia, fruits, vegetables, coffee, and melons (R.M. Towill Corporation, 1990).

6.6. Coastal Zone Management

The Coastal Zone Management Act of 1972 established a comprehensive nationwide program to guide the protection, development, and restoration of the nation’s coastal resources. In response to the federal coastal zone program, the State of Hawai‘i implemented the Hawai‘i Coastal Zone Management (“CZM”) Program, HRS chapter 205A. The objectives and policies of the CZM Program are to provide recreational resources; protect historic, scenic and open space resources, coastal ecosystems, and beaches; reduce coastal hazards; and manage the development of coastal resources.

Under the CZM Program, the Counties designate and administer Special Management Areas (“SMAs”). Any “development,” as defined by HRS chapter 205A-22, within an SMA requires a SMA Use Permit.

Discussion: As Wai‘oli Stream reaches the estuary and enters Hanalei Bay, a portion of the Proposed Action is located within the CZM area and SMA. The Proposed Action, however, does not require an SMA permit because the Action is not a “development,” as defined by HRS section 205A-22, and is exempt from the SMA permitting process as it qualifies as a “[u]se of any land for the purpose of cultivating, planting, growing, and harvesting plants, crops, trees, and other agricultural, horticultural, or forestry products or animal husbandry, or aquaculture or mariculture of plants or animals, or other agricultural purposes.” The Proposed Action is nevertheless an integral part of the protection and management of Hawai‘i’s coastal resources consistent with the objectives and policies of the CZM Program.

6.7. Department of Hawaiian Home Lands Planning Documents

DHHL’s mission is to manage the Hawaiian Home Lands trust and to develop and deliver lands to native Hawaiians (defined as having 50% or more Hawaiian blood). The Hawaiian Home Lands Program was established in 1921 with the passage of the Hawaiian Homes Commission Act.

Today, award recipients work with DHHL to make arrangements to finance home construction and renovations as well as agricultural/ranching activity on their awarded land. DHHL also manages land not currently used for homesteading and negotiates leases that generate income and license agreements for public uses such as utilities or for homestead organizations. On Kaua‘i, DHHL oversees 20,565 acres of land across seven (7) homesteads. As of 2003, DHHL received 1,479 applications for a residential award, 1,774 applications for an agriculture award, and 220 applications for a pastoral award on the island of Kaua‘i. (State DHHL, 2004)

The DHHL Statewide General Plan (2002) provides guiding principles for the development of DHHL lands statewide. With respect to the Kaua‘i, DHHL’s Kaua‘i Island Plan (“KIP”), published in 2004, outlines objectives for the next 20 years, including:

- Designate all Hawaiian home lands with one of the land use categories under the General Plan;
- Deliver at least 840 Residential homesteads, on an average of 42 per year;
- Provide space for and designate a mixture of appropriate land uses, economic opportunities and community services in a native Hawaiian-friendly environment;

Wai‘oli Valley Taro Hui Long-term Water Lease for Traditional Lo‘i Kalo Cultivation
Final Environmental Assessment, August 2021

- Direct urban growth to priority development areas based on infrastructure availability, feasible site conditions, beneficiary preference and job opportunities;
- Provide agriculture and pastoral homestead lots for subsistence and supplemental purposes;
- Provide general lease agriculture and pastoral lots of adequate size for commercial farming or ranching business purposes by native Hawaiians.

The DHHL homestead lands nearest the Proposed Action are Moloa‘a (316 acres) and Anahola (4,228 acres), which are approximately 13 and 18 miles from the Proposed Action, respectively. Moloa‘a is an agricultural community located north of Anahola. The KIP designates Moloa‘a for agriculture homesteads (200 acres), general agriculture (86 acres), and special district (30 acres). The nearby Anahola homestead is designated for residential (565 acres), subsistence agriculture (533 acres), pastoral (148 acres), general agriculture (1,018 acres), special district (1,419 acres), community use (127 acres), conservation (350 acres), and commercial (68 acres). **See Figure 35, DHHL’s Kaua‘i Lands.**

The Moloa‘a homestead lands remain undeveloped and are currently used for grazing (permit for pasture). According to the KIP, Moloa‘a will be developed as a small-lot agricultural community consistent with the surrounding agricultural uses. With wet conditions and intermittent stream flow, the 30-acres of special district designation would allow community groups to come together for kalo cultivation. The estimated development cost for Moloa‘a is \$8.3M to support agriculture infrastructure. Whereas Anahola, which is south of Moloa‘a and further from the proposed area, is DHHL’s third priority area on Kaua‘i targeting 1,218 residential homesteads and 54 acres of community use, the KIP recommends that Moloa‘a is not a priority development for DHHL lands on Kaua‘i.

The Proposed Action is also subject to the DHHL’s rights to reserve water sufficient to support current and future homestead needs, as provided by section 221 of the Hawaiian Homes Commission Act, which is also considered a public trust purpose. For all proposed State water leases, HRS section 171-58(g) provides:

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

As of September 2018, of the two homesteads, Anahola has a current water reservation of 1.470 mgd (State DLNR & DHHL, 2020). The Anahola Regional Plan (2010) reports that Anahola residents receive their water from ground water sources originating from Makaleha and Kalalea Mountains, completely distinct from Wai‘oli Valley’s water sources. In contrast, Wai‘oli Stream originates from the Nāmolokama Mountains, which are independent of any mountain ranges that feed any Hawaiian homestead lands on Kaua‘i. In addition, the elevation between Hanalei and Anahola is an approximate 150 to 550 foot difference and is significant enough to make any transfer of any water infeasible for the DOW. The County of Kaua‘i Department of Water (“DOW”) provides some water service to the Kawaihau service area, which includes Anahola, Moloa‘a and Kapa‘a-Wailua. (State DHHL, 2010).

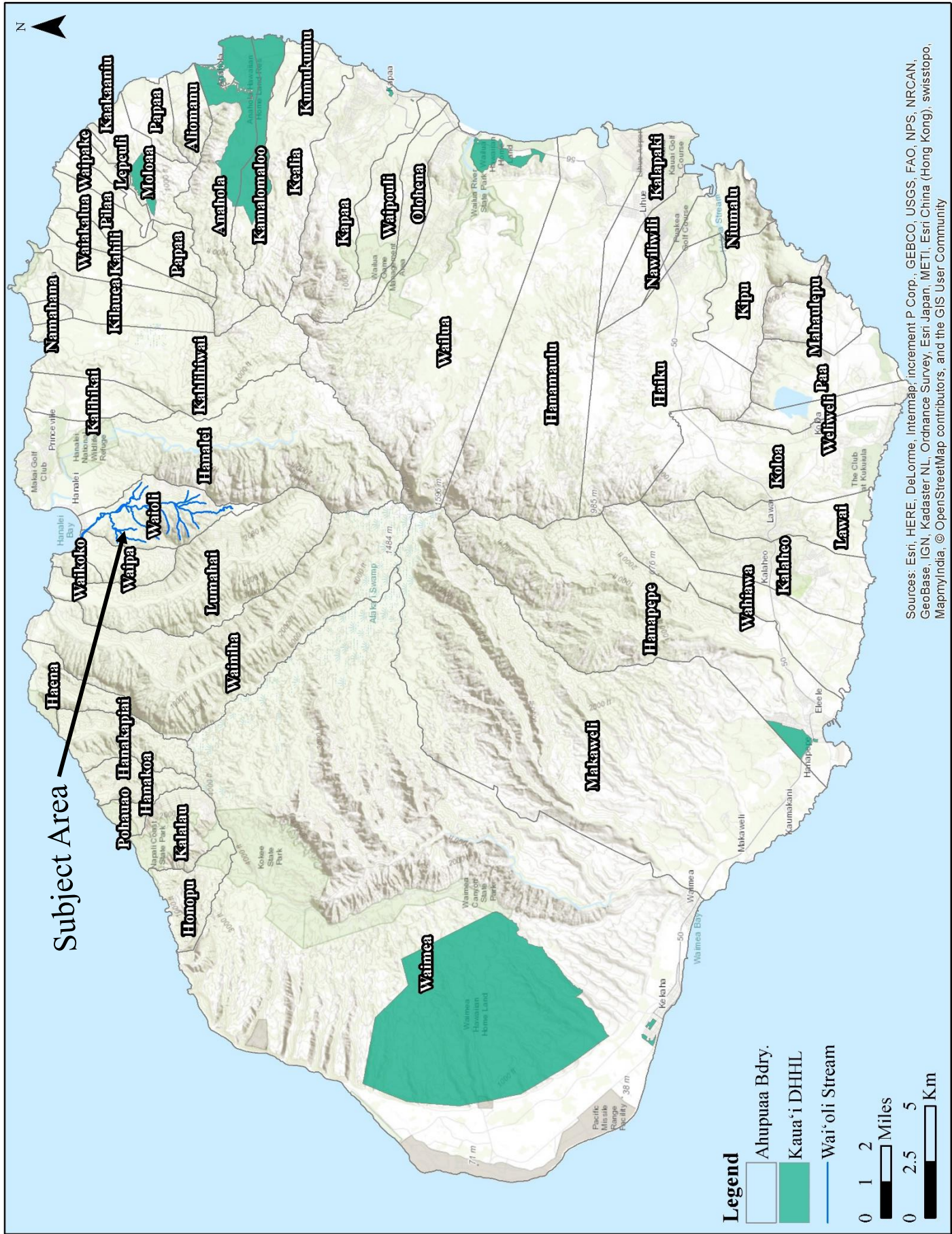


Figure 35: DHHL's Kaula i Lands

Discussion: Because the Proposed Action will have no impact on the homestead sites or on future water demand for those sites, the Proposed Plan is consistent with DHHL’s General Plan, the Kaua‘i Island Plan, and the Anahola Regional Plan.

In accordance with DHHL policies, staff held a Beneficiary Consultation on the Proposed Action in November 2020. The purpose of the Beneficiary Consultation was to: (1) share information on the request for the issuance of a water lease; (2) explain the BLNR’s water lease process; and (3) discuss the DHHL’s water needs in the relevant area. Because there are no DHHL lands in the vicinity of the Proposed Action and there will be no loss of access or availability of water to DHHL, staff indicated in October 2020 that they will not be seeking a water reservation in relation to the Proposed Action (State DHHL, 2020). The matter is expected to go back before the Hawaiian Homes Commission for approval after completion of the HRS chapter 343 review process. In January 2021, the Hawaiian Homes Commission unanimously approved the November 2020 beneficiary consultation report outlining the unanimous support by beneficiaries pertaining to the Hui’s long-term water lease.

6.8. Kaua‘i General Plan

First adopted in 1971, the Kaua‘i General Plan establishes the long range priorities for growth management and community development on Kaua‘i with the vision of ensuring Kaua‘i remains a “sustainable island, a unique and beautiful place, a healthy and resilient people, and an equitable place with opportunity for all.” The Plan was updated in 1984 and 2000, and in 2018 with the Kaua‘i County Council adopting the latest revised General Plan. “Kaua‘i Kākou,” the theme of the County’s General Plan, attests to Kaua‘i’s strength that comes from its diverse community and its ability to work together to create a better future. (County of Kaua‘i, 2018).

The General Plan provides specific objectives and policies for community planning in each region of the County. A primary goal for the North Shore community is to “retain and restore the historic character of Hanalei.” This objective is to be achieved through “protect[ing] Hanalei’s unique heritage resources” and “preserv[ing] the character and protect[ing] the kalo lo‘i of Hanalei.” Thus, the Proposed Action is perfectly aligned and consistent with the Plan’s North Shore objectives.

The Plan’s framework represents Kaua‘i’s approach to managing future growth. In addition, the Plan provides objectives and policies intended to guide and coordinate its land and resource management for present and future generations. This Proposed Action is consistent with the applicable objectives and policies of the current City and County of Kaua‘i General Plan as detailed below.

The Watershed, Critical Infrastructure, and Future Land Use.

Objective 1: To conserve the upper watershed and restore Native habitat and forested areas.

Objective 2: 1) To protect, restore, and enhance freshwater resources to support aquatic, environmental, and cultural resources; and, 2) to recognize and mitigate impacts from the built environment to the mid-watershed area.

- WA 2.D.1 Collaborate with community groups and stakeholders to better manage water resources in a cooperative fashion, avoiding adversarial fights that can divide the community.

Objective 4: To protect the flora and fauna unique to Kaua'i and Hawai'i and to mitigate the impact of invasive species.

Objective 19: To ensure water for Kaua'i's water needs under the Public Trust Doctrine and integrate traditional ahupua'a methods of preserving water for future generations -not taking more than is needed and leaving enough for everyone.

- CI 1.C.2(C)(2) Collaborate with community groups on cooperative approaches to water management.

Agriculture & Economy.

Objective 28: To ensure the long-term viability and productivity of agricultural lands.

Heritage Resources.

Objective 31: To recognize and protect the resources and places important to Kaua'i's history and people.

- HR 2.A.1 Preserve, restore, and maintain customary access to important archaeological and cultural sites.
- HR 2.A.5 Promote, encourage, and require the correct use of traditional place names.
- HR 2.A.8 Encourage the restoration, management, and use of Kaua'i's fishponds and lo'i kalo.
- HR 2.B.1 Inventory and acknowledge the importance of archaeological sites and wahi pana during community planning processes.
- HR 2.C.4 Achieve permanent preservation of highly significant cultural landscapes where multiple heritage and ecological values are located.
- HR 2.D.2 Promote County and community partnerships to preserve and raise awareness about traditional cultural places.
- HR 2.D.3 Increase community awareness and stewardship of Kaua'i's historic and cultural resources.
- HR 2.D.4 Enhance the Hawaiian sense of place by promoting understanding of moku and ahupua'a land divisions. Recognize and preserve the unique natural and cultural characteristics of each moku and ahupua'a.
- HR 2.D.5 Seek to create community managed subsistence areas, also known as kīpuka, in every ahupua'a, in the tradition of kīpuka at Kē'ē and Waipā.

Sustainability, Climate Change Mitigation, Public Safety, and Hazards Resiliency

Objective 33: To increase sustainability and maintain a resilient and cost-efficient energy system.

Objective 36: To ensure that Kaua'i is resilient to natural disasters and other emergencies.

Objective 37: To prepare for and adapt to the impacts of climate change on the natural and built environments.

Opportunity & Health for All

Objective 38: To recognize and address inequities in health and well-being among Kaua'i's diverse ethnic, racial, and income groups.

- OH 1.A.4. Mitigate impact to Native Hawaiian traditional and customary practices and the resources they rely on through district boundary amendments and zoning amendments.

Objective 39: To support educational programs that foster cultural knowledge, employability, and civic participation of local residents.

- OH 2.C.8 Support both public and private educational programs that emphasize the Hawaiian language and Native Hawaiian culture, science, and practices.

Objective 41: To actively protect, restore, and increase access to the places where recreational and subsistence activity occurs.

- OH 4.A.2 Protect and preserve mauka and makai access for traditional Hawaiian cultural practices.
- OH 4.A.3 Require identification and mitigation of potential impacts of subsistence activities and resources when reviewing development permits.
- OH 4.D.6 Increase opportunities for access to subsistence hunting, fishing, and gathering.
- OH 4.D.10 Promote access with kuleana through stewardship agreements, work days, jobs, and other means, to engage community members in caretaking.

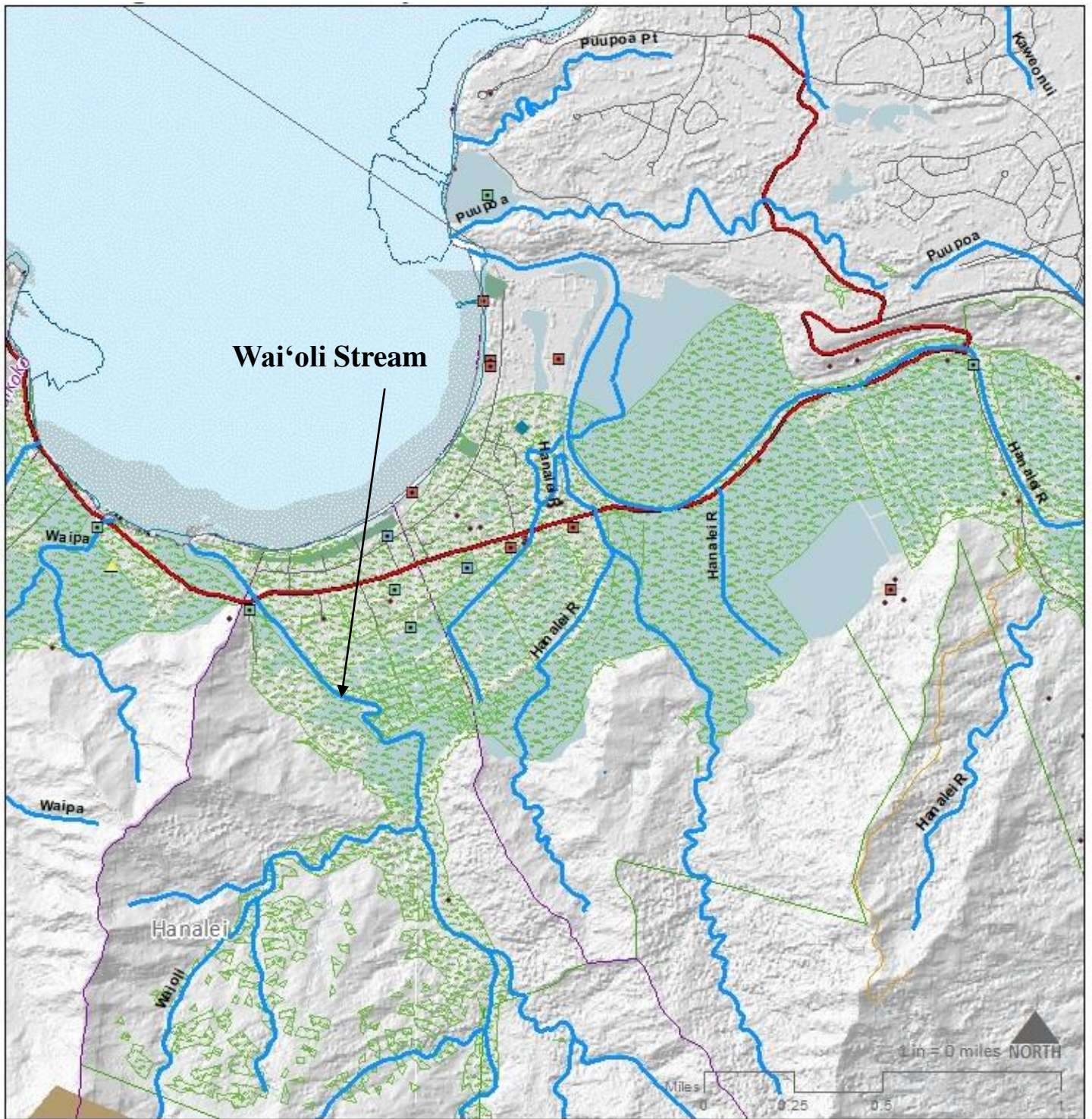
Discussion: The Proposed Action, a long-term water lease for lo'i kalo embodies the General Plan as the Hui is focused on perpetuating traditional kalo cultivation for present and future generations. Uniquely positioned, the Hui represents the Wai'oli kalo community, using a legal framework to formalize its commitment to steward the Lo'i Kalo Irrigation System and the throughflow waters from Wai'oli Stream.

Related to the specific sections of the General Plan:

The Watershed, Critical Infrastructure, and Future Land Use: The Proposed Action seeks to ensure that kalo and the biota connected to the Lo'i Kalo Irrigation System are given the opportunity to thrive. Active watershed maintenance described in the Draft Hui Watershed Management Plan will benefit Native habitats, assist with maintaining water resources, and reduce erosion. Similarly, the Hui will continue to eradicate invasive species and nurture Native plants.

Agriculture and Economy: The North Shore of Kaua'i is the center of kalo production for Hawai'i. More kalo grown provides more poi and other value-added kalo products to sustain the local community. The long-term commitment to support water for kalo cultivation will contribute to food security needs and enable community and cultural resilience in the face of the rising costs of imported food for local families.

Heritage Resources: The Heritage Resource map designates the area surrounding Wai'oli Stream for traditional cultivation. Today, the Hui continues to demonstrate its commitment and dedication to long-term activities that are beneficial to Wai'oli Watershed, kalo cultivation, food security, the Hanalei Bay community, and the island as a whole. **See Figure 36, County of Kaua'i, North Shore Heritage Resource Map.**



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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Registered Historic Sites</p> <ul style="list-style-type: none"> ■ State ■ National ■ State & National • Cultural Features ▲ Priority Public Access Points ◆ Fish Ponds — Streams & Waterbodies — Major Roads — Roads | <ul style="list-style-type: none"> — Historic Belt Road — Trails □ Planning District Boundary □ Ahupua'a Boundaries ■ Wetlands ■ Coral Reefs ■ Regulated Fishing Areas ■ State & County Parks ■ Preserves | <ul style="list-style-type: none"> ■ Reservoirs ■ Traditional Cultivation Areas ■ Sand Dunes ■ Open Space Acquisition Priorities ■ Critical Habitat Threatened & Endangered Species ■ High Density ■ Very High Density ■ Ocean |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 36: County of Kaua'i, North Shore Heritage Resource Map

Sustainability, Climate Change Mitigation, Public Safety, and Hazards Resiliency: The General Plan discusses the wide-ranging impacts of global warming on Kaua‘i’s environment, economy, and way of life. The Plan also acknowledges that understanding and incorporating the best available information on global warming is critical to planning effectively and taking proactive measures to adapt to climate-related changes. The Proposed Action supports the County’s policies and objectives, complementing its overarching and long-term goals of resilience and sustainability through the Draft Hui Watershed Management Plan.

Opportunity and Health for All: The Proposed Action perpetuates cultural connection to place, and the social and community vibrancy that surrounds kalo cultivation and consumption. The Proposed Action also provides formal and informal opportunities for ‘āina-based learning that has the power to reshape perceptions, attitudes, and behaviors towards vital environmental and cultural resources such as the watershed, ecosystem, and traditional practices.

6.9. Halele‘a Forest Reserve Plan

Halele‘a Forest Reserve lies within the ahupua‘a of Wai‘oli and Hanalei. The area is characterized by deep, wide valleys, abundant streams, and heavy rainfall. Created in 1905, Halele‘a is Kaua‘i’s first Forest Reserve, established for the purpose of forest and watershed protection. Today, the public lands of Halele‘a Forest Reserve contain a portion of Wai‘oli Stream. There are no public trails or major roadways located within the Wai‘oli Valley section of the Reserve.

The Halele‘a Forest Reserve Management Plan identifies the management priorities for the forest reserve. DLNR’s Division of Forestry and Wildlife’s (“DOFAW’s”) current management objectives for Halele‘a Forest Reserve include maintaining Okolehau Trail, monitoring invasive plants/animals, enhancement of Native rare plant resources, maintenance of Loulu (*Pritchardia*) enclosure(s), and management of pig hunting.

Thus, the Plan’s future recommendations include opportunities for enhancements to the Reserve such as the placement of an ungulate barrier fence at Nāmolokama, construction of enclosure fences for selected rare plants (especially *Pritchardia* spp.), and increased public access to Wai‘oli. The tactical goal for increasing public access is to identify the specific location for an easement and communicate with landowners during that coordinated work.

Discussion: The Proposed Action relies on the overall health of the watershed for its source of water. Similar to the Halele‘a Forest Reserve Management Plan, the Hui, through the Proposed Action seeks to protect and preserve environmental and cultural resources through appropriate management and use. In addition, the Draft Hui Watershed Management Plan aims to empower the community to care for the natural resources in perpetuity. Utilizing volunteer community workdays will create pilina to Wai‘oli Stream and, in doing so, will develop kuleana to this special place.

7. Findings and Conclusion

The approving agency will issue its determination of significance related to the 13 administrative criteria for significant impacts described in HAR chapter 11-200.1-13 in a notice of determination to the Office of Environmental Quality Control (“OEQC”). In accordance with the provisions of HRS chapter 343, this Draft EA concludes that the Proposed Action will not have adverse impacts on the environmental quality of the area. Rather, the long-term practice is beneficial to the overall environment and its affected natural and human communities.

7.1. Significance Criteria

The approving agency will issue its determination of significance related to the 13 administrative criteria for significant impacts described in HAR section 11-200.1-13 in a notice of determination letter to OEQC.

The Draft EA was made available in the State of Hawai‘i OEQC’s bi-monthly Environmental Notice publication on June 8, 2021. In accordance with HRS chapter 343, this EA concludes that the Proposed Action will not have significant adverse impacts on the environmental quality of the area. As discussed in the table below, based on the thirteen (13) “Significance Criteria” outlined in HAR section 11-200.1-13, the Proposed Action will improve the environmental quality of the area. Moreover, failing to approve the Proposed Action will have significant adverse impacts on the environmental and cultural resources of the area.

Table 6: Criteria for Acceptability.

Significance Criteria	Finding
1. Irrevocably commit a natural, cultural, or historic resource	The Proposed Action will not irrevocably commit a natural, cultural, or historic resource. Instead, it will perpetuate natural, cultural, and historic resources. Their work responsibly uses and stewards water resources and is a model for other communities to commit to maintain their ‘āina and the distinct rural character of their homelands through specific planning and actions. The Hui’s work also continues to support Hawai‘i’s agrarian economy, grounded in traditional and customary Native Hawaiian practices, values, and mo‘olelo.
2. Curtail the range of beneficial uses of the environment	The Proposed Action will not curtail the range of beneficial uses of the environment. Rather, the Proposed Action is itself an ongoing, beneficial use that contributes to regional cultural, agricultural, and visual resources. Within the immediate area, the Proposed Action supports biological resources by enhancing and

	<p>expanding Native habitats (i.e., for endangered water birds), mitigates the potential impact of major weather events and flooding, and supports climate and water resources through photosynthesis, evapotranspiration, and ground water recharge.</p>
<p>3. Conflict with the State’s environmental policies or long-term goals established by law</p>	<p>The Proposed Action is consistent and aligned with Hawai‘i’s Native Hawaiian and environmental laws and policies. It embodies the values that the State’s policies aim to protect - natural resources, environmental conservation, cultural identity, and the enhancement of the quality of life– and does not conflict with the State’s environmental policies or long-term goals established by law.</p> <p>The Hui’s proposed use of throughflow water from Wai‘oli Stream is grounded in and supported by both traditional and customary Native Hawaiian rights and appurtenant rights, which have the highest protection under the law. This includes the State’s constitutional mandate under Article XII, section 7 to preserve and protect traditional kalo cultivation, a Native Hawaiian traditional and customary practice that has persevered in this location since time immemorial. The Proposed Action therefore operationalizes the State’s environmental policies and long-term goals as established by law.</p>
<p>4. Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State</p>	<p>The Proposed Action will not have a substantial adverse effect on economic or social welfare nor cultural practices of the community and State. Rather, the Proposed Action will have a beneficial effect on economic and social welfare, and cultural practices of the community and State. The Proposed Action provides a pathway towards a more diverse economy and resilient local food system; as well as tangible support for kalo cultivation that is at the heart and soul of Hawai‘i’s legacy and cultural identity, and is well recognized and protected by the State.</p>

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<p>5. Have a substantial adverse effect on public health</p>	<p>The Proposed Action will have no substantial adverse affect on public health. Because kalo cultivation and the production of nutrient-rich kalo will continue to increase local food security, promote individual health, and support experiential learning opportunities, the Proposed Action will have beneficial impacts on public health and well-being.</p>
<p>6. Involve adverse secondary impacts, such as population changes or effects on public facilities</p>	<p>The Proposed Action does not have any adverse secondary impacts. The Proposed Action does not propose any new infrastructure or additional use of State land. Rather, this EA is part of the process to request a long-term water lease to support ongoing kalo cultivation.</p>
<p>7. Involve a substantial degradation of environmental quality</p>	<p>The Proposed Action does not involve a substantial degradation of environmental quality. On the contrary, the Proposed Action will have neutral, if not beneficial impact on environmental quality by implementing coordinated watershed management efforts, mitigating flood impacts, and continuing to support Native biota that rely on a thriving Lo'i Kalo Irrigation System.</p>
<p>8. Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions</p>	<p>The Proposed Action will not have cumulative substantial adverse effects upon the environment. Rather, the Proposed Action will cumulatively have beneficial effects on the environment and further supports existing watershed management efforts. The Proposed Action allows the Hui to coordinate collaborative watershed management in a manner that protects the thriving traditional kalo cultivation practice within the Hanalei Bay Watershed.</p>
<p>9. Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat</p>	<p>The Proposed Action will not have an adverse effect on the habitat and well-being of rare, threatened, or endangered species within the Wai'oli Stream and Lo'i Kalo Irrigation System. Rather, the Proposed Action continues to support these species and habitats that are located within the project area by providing habitat for endangered Hawaiian waterbirds.</p>

<p>10. Have a substantial adverse effect on air or water quality or ambient noise levels</p>	<p>The Proposed Action will not have a substantial adverse effect on air or water quality or ambient noise. Rather, the Action will improve air and water quality through photosynthesis, evapotranspiration, ground water recharge, and flood mitigation. Led by low-impact, small-scale farmers, the Proposed Action will not contribute to ambient noise levels. The implementation of the Hui Watershed Management Plan will further improve the overall watershed health, and directly improve water quality throughout the Lo‘i Kalo Irrigation System.</p>
<p>11. Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, freshwater or coastal waters</p>	<p>The Proposed Action will have no substantial adverse effects on environmentally sensitive areas. The stream and Lo‘i Kalo Irrigation System are a historic and natural part of the Wai‘oli floodplain, and rely on flooded fields to cultivate kalo.</p> <p>The Wai‘oli Lo‘i Kalo Irrigation System itself slows flash floods and reduces the impact of floods, which naturally occurs in this area. Mitigation efforts described in the Hui’s Watershed Management Plan such as the phased removal of invasive overgrowth and thoughtful implementation of watershed management has the ability to reduce the intensity of potential damage to downstream users such as the kalo farmers and town of Hanalei.</p>
<p>12. Have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in county or State plans or studies</p>	<p>The Proposed Action will have no substantial adverse effect on scenic vistas and view planes. On the contrary, it would ensure the preservation and continuity of Hanalei Bay Watershed’s iconic scenic vistas and views, directly contributing to the panoramic views of natural vegetation and kalo-rich valley floor.</p>
<p>13. Require substantial energy consumption or emit substantial greenhouse gasses</p>	<p>The Proposed Action will have no substantial energy consumption or result in substantial emission of greenhouse gases. This is an existing use; no construction is proposed and any use of machinery equipment during cultivation or for maintenance purposes is relatively small and with a limited time frame.</p>

7.2. Anticipated Determination

Based on a review of the significance criteria outlined in HRS chapter 343 and HAR section 11-200.1-13, the Proposed Action will not result in significant adverse effects on the natural or human environment.

The project is consistent with the Hawai‘i State Plan; the State of Hawai‘i’s Environmental Policy; the 2050 Sustainability Plan; Hawai‘i State Land Use District Boundaries; Hawai‘i Coastal Zone Management Plan; Kaua‘i General Plan; Halele‘a Forest Reserve Plan; Hawai‘i Water Plan; and Department of Hawaiian Home Lands Planning Documents. The Proposed Action will have beneficial effects - protecting and enhancing natural habitat for Native plant and animal species, perpetuating traditional and customary Native Hawaiian practices, continuing to support the local economy and food security, and educating youth and community on the importance of protecting our island watersheds and cultural practices. Overall, the project will provide a public benefit while resulting in beneficial impacts to the surrounding environment.

A Finding of No Significant Impact (“FONSI”) is anticipated for this Proposed Action.

8. Coordination

8.1. List of Agencies, Organizations, and Individuals

As part of the scoping process for this action, early and ongoing consultation on the Proposed Action has been conducted with various agencies and stakeholder groups. See **Appendix A, Pre-Consultation**. Parties contacted in preparation of the Draft EA, comments received, those that were provided an opportunity to review the Draft EA, and Draft EA comments received are identified below. Copies of the comment letters and responses on the Draft EA are included in **Appendix D, Draft EA Comment Letters and Responses**.

	Early Consultation* <i>*stakeholders that submitted early consultation written comments are noted with “xx”</i>	Received Electronic Draft EA	Draft EA Comments Received
<u>Federal</u>			
U.S. Army Corps of Engineers, Civil Works Division	x	x	-
U.S. Fish and Wildlife Service	x	x	-

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Department of Interior, U.S. Geological Survey		x	-
<u>State of Hawai‘i</u>			
Department of Agriculture	x	x	-
Department of Business, Economic Development & Tourism	x	x	-
Department of Hawaiian Home Lands	x	x	x
Department of Health, Clean Water Branch	x	x	-
DLNR, Commission on Water Resource Management	x	x	-
DLNR, Division of Aquatic Resources	x	x	x
DLNR, Division of Forestry and Wildlife	x	x	-
DLNR, Office of Conservation and Coastal Lands	x	x	x
DLNR, State Historic Preservation Division	x	x	-
Office of Hawaiian Affairs	xx	x	x
State Representative, Nadine Nakamura	xx	x	-
State Senate President, Ron Kouchi	x	x	x
University of Hawai‘i - CTAHR	x	x	-
<u>Counties</u>			
Kaua‘i County Department of Planning	x	x	-
Kaua‘i County Department of Public Works	x	x	-
Hawai‘i County Councilmember, Holeka Goro Inaba	-	-	x
Kaua‘i Emergency Management Agency	-	x	-
Kaua‘i County Office of the Mayor	x	x	-
<u>Community</u>			
Bremer, Leah	-	-	x

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Chun, Hōkū	-	-	X
Deike, Alexa	-	-	X
EarthJustice	-	-	X
Giambelluca, Thomas	-	-	X
Hanalei Watershed Hui	XX	X	-
Hawai‘i Land Trust	-	-	X
Heacock, Don	XX	X	-
Hanalei to Hā‘ena Community Association	XX	X	-
Hanalei Hawaiian Civic Club	X	X	-
Hawai‘i Farm Bureau / Kaua‘i County Farm Bureau	X	X	-
Hawai‘i Farmers Union United	X	X	-
Huliauapa‘a	X	X	-
Idle, Jessica	-	-	X
Kamehameha Schools	X	X	-
Kaua‘i Taro Growers Association	-	X	-
Kido, Michael	XX	X	-
Kīpuka Kuleana	X	X	-
Kua‘āina Ulu ‘Auamo (KUA)	-	X	X
Mackenzie, Melody Kapilialoha	-	-	X
McDonald, MJ	-	-	X
McGregor, Davianna	-	-	X
Nā Maka Onaona / Nā Kilo ‘Āina	X	X	-
Saffery, Maya	-	-	X
Schlack, Emily	-	-	X
Sierra Club of Hawai‘i	-	-	X

Waipā Foundation	xx	x	x
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8.2. Summary of Comments

A summary of comments received during the Draft EA comment period is provided below. For more information, refer to comment letters in **Appendix D, Draft EA Comment Letters and Responses**.

Commenter	Response
Department of Hawaiian Home Lands	Shares that DHHL conducted a virtual beneficiary consultation meeting regarding the Hui’s request for a water lease. Beneficiary participants unanimously voted to support 1) no reservation of water from Wai‘oli Stream; 2) a gratis rate for the Hui’s water license; and 3) educational opportunities in lieu of a licensing fee.
DLNR, Division of Aquatic Resources	No objections. Acknowledges many Native aquatic species present in the area. Recommends regular monitoring and surveying in order to ensure enough water is being maintained over the lease term; requests opportunity to review and comment on any potential future changes.
DLNR, Office of Conservation and Coastal Lands	No objections. Requests that the Hui correspond with OCCL to determine need for permitting for future maintenance/upkeep of Wai‘oli Stream.
Office of Hawaiian Affairs	Agrees with the anticipated finding of no significant impact and that the project will aid in the protection and maintenance of Wai‘oli Valley’s natural and cultural resources. Emphasizes that it is essential to consider the Hui’s DEA in the context of the intimate connection between Native Hawaiians and the ‘āina that sustains us both physically and spiritually. Appreciates the Hui’s efforts to coordinate with the State Historic Preservation Division (“SHPD”) and encourages future engagement with SHPD.
State Senate President, Ron Kouchi	Acknowledges the Hui’s efforts in addressing flood damage after the 2018 floods and the Hui’s intergenerational knowledge of Wai‘oli. Shares that a long-term water lease will allow the Hui to provide fresh water for lo‘i kalo and to pass on their generational knowledge to future generations.
Hawai‘i County Councilmember, Holeka Goro Inaba	Comments in support. Acknowledges kalo cultivation as a traditional and customary practice. Shares that the farmers of

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	this ‘āina who have ensured sustenance for their ‘ohana and pae ‘āina deserve our support.
Bremer, Leah	Comments in strong support. Shares that supporting and maintaining lo‘i kalo is critical for sound and just natural resource management since it provides important cultural, ecological, hydrological, and economic benefits. Healthy lo‘i kalo are key to community resilience to climate change.
Chun, Hōkū	Comments in strong support. Shares that the Hui are pillars of the community and their work feeds and sustains the community. Hopes their work extends beyond Kaua‘i.
Deike, Alexa	Comments that Kānaka Maoli have stewarded water guided by principles of aloha ‘āina and that many would argue that the Hui should be exempt from the water lease and chapter 343 requirement.
EarthJustice	Comments that the Hui’s proposed water lease is unique in that it directly supports a protected public trust use of water (kalo cultivation) and is an integrated biocultural system. Includes legal framework and analysis of cultural and environmental benefits of the proposed long-term water lease.
Giambelluca, Thomas	Comments in support. Shares the the public interest is well served by the Hui’s work and a long-term water lease. Comments that traditional cultural practices that enhance resiliency to extreme events is among the best management options available to reduce flood impacts on Kaua‘i. Includes additional scientific resources and resources.
Hawai‘i Land Trust	Comments in support. Holds conservation easement in Wai‘oli Valley and shares that kalo cultivation is integral to the community’s identity on Kaua‘i. Hui’s collective stewardship provide reciprocated benefits for people and the environment.
Idle, Jessica	Comments in support. Comments that lo‘i is a critical resource for waterbirds and lo‘i kalo farmers – including the Hui – could play critical role for recovery of endemic waterbirds. Comments regarding predator control efforts and botulism.
Kua‘āina Ulu ‘Auamo (KUA)	Comments in support. Also supports long-term 65-year water lease gratis. Shares that the Hui is an invaluable resource of generational place-based knowledge and a critical part of caring for Hawai‘i’s natural and cultural resources in a responsible

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	manner. Applauds DEA’s contextual insight around Kānaka Maoli worldviews, history, and language as a matter of contemporary and historic significance.
Mackenzie, Melody Kapilialoha	Comments in support. Shares that Hui’s practices have an integral role in Hawai‘i’s historical and present-day society and enjoy special constitutional and statutory protections.
McDonald, MJ	Comments in strong support. Comments that kalo cultivation is vital for community sustainability and Maoli cultural identity. Shares that Hui’s place-based knowledge maintains Wai‘oli and Hanalei Kalana’s ‘āina and its resources, but also ensures responsible use of wai.
McGregor, Davianna	Comments in support. Shares that a long-term water lease will have a significant positive environmental and cultural impact; sustain and affirm the public trust; and have a positive effect on the economic welfare, social welfare, and cultural practices of the Wai‘oli Valley families and State of Hawai‘i as a whole.
Saffery, Maya	Comments in strong support. Comments that the EA demonstrates Hui’s commitment to the work of transforming land to ‘āina through traditional and customary Native Hawaiian use of water from the stream. Shares that the Hui’s cultural practice has benefitted the land and water of Wai‘oli as well as the community it feeds.
Schlack, Emily	Comments in strong support. Shares that traditional and customary practices of Native Hawaiians are an incredible resource.
Sierra Club of Hawai‘i	Shares that there is no one better qualified or more committed to steward these natural resources in perpetuity and that continued lo‘i kalo farming/infrastructure increases climate resilience through flood mitigation and local food production.
Waipā Foundation	Comments in strong support. Shares that the Hui is a shining example of Indigenous excellence, traditional and customary practices, and is a model for the larger Hawai‘i nei.

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Final Environmental Assessment, August 2021

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Final Environmental Assessment, August 2021

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APPENDICES

**APPENDIX A:
SUMMARY OF PRE-CONSULTATION OUTREACH**

SUMMARY OF PRE-CONSULTATION OUTREACH	
The following represents a summary of government agencies, community organizations, and individual stakeholders that were contacted by the Hui and its representatives for input on this Draft EA. Substantive written comments are also included.	
ENTITY	SUMMARY
FEDERAL	
U.S. Army Corps of Engineers, Civil Works Division	The Hui contacted a Kaua'i-based agency representative via phone on 9/23/2020 and left a voice message. After no response, the Hui and Agent contacted a regulatory project manager on 10/21/2020. The Agent spoke with the manager via phone on 10/22/2020. <u>Outcome:</u> No comment since work is not occurring in Federal waters.
U.S. Fish and Wildlife Service	The Hui contacted a Kaua'i-based agency representative. The Agent connected with project leader and deputy project leader via email on 10/21/2020. The Agent spoke with the Project leader via phone on 10/22/2020. <u>Outcome:</u> Confirmed available references for the watershed. No specific FWS information related to Wai'oli Watershed.
STATE	
Department of Agriculture	The Agent contacted the agency's main line to determine who the best contact would be to discuss the DEA est. 10/20/2021. Phone call was returned to Agent from the Market Development Branch. <u>Outcome:</u> No comment on DEA.
Department of Business, Economic Development and Tourism (DBEDT)	The Agent contacted the agency's main phone line on 10/20/2021 to determine who the best contact would be to discuss the DEA. Phone call was returned to Agent from the Community Based Economic Development (CBED) Branch. <u>Outcome:</u> Staff shared that the nearby Waipā Foundation works with DBEDT on community economic development activities. They provided additional background sharing that the State Office of Hawaiian Affairs (OHA) also collaborates with the Hui. The staff expressed interest in the DEA as the project could qualify for funding related enterprise zones or CBED for 501c3 organizations.
Department of Hawaiian Home Lands (DHHL)	The Hui has been in close coordination with the Department of Hawaiian Homelands throughout this project. For example, the Hui coordinated with DHHL to facilitate a Beneficiary Consultation in Fall of 2020. In January 2021, the Hawaiian Homes Commission voted to accept the Beneficiary Consultation Report including the staff's recommendation not to seek a reservation of water and to support a long-term water lease at a gratis rate.
Department of Health (DOH), Water Quality	The Agent contacted DOH on 9/22/2020 via phone and spoke with the staff about water quality. <u>Outcome:</u> The staff shared that turbidity is an issue statewide. He noted that rain and silt in the water can influence turbidity in water. He also shared that the State's standards for turbidity are very low and have not been updated. He recommended we look at national standards for turbidity. Staff also indicated that the 2020 report is with the EPA for approval, and shared with the Hui the draft 2020 State Water Quality Report. Staff indicated the 2020 report for Wai'oli, based on data, everything stayed the same - no difference. He shared that the DOH water quality data for the area is from the Waipā Foundation.
Department of Land and Natural Resources, Commission on Water Resource Management (CWRM)	The Hui has been working closely with DLNR-CWRM throughout the process, including amending the Interim Instream Flow Stands for Wai'oli Stream in May 2021.
Department of Land and Natural Resources, Division of Aquatic Resources (DAR)	The Agent contacted DAR on 9/21/2020 via phone and spoke with the staff about the DEA. <u>Outcome:</u> Staff provided comments that included: (1) acknowledge species can exist in area and include a proactive approach. (2) Because of similarity to and proximity with Waipā, address findings in Waipā Stream. (3) Acknowledgement that there is not much data on fresh water in Hawai'i and recommended that the Agent contact Hanalei Watershed Hui who has a better understanding of the Hanalei Bay aquatic species.
Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW)	The Hui has been working closely with DOFAW with regard to a watershed management plan in support of a long-term water lease.
Department of Land and Natural Resources, Office of Conservation and Coastal Lands (OCCL)	The Agent contacted OCCL on 11/21/2020 via phone and spoke with the administrator about the DEA. <u>Outcome:</u> The Administrator recommended that the DEA clarify that the Project is an ongoing, traditional use and offered his office's support.

APPENDIX C: SUMMARY OF PRE-CONSULTATION OUTREACH

Department of Land and Natural Resources, State Historic Preservation Division, Kaua'i Historic Preservation Review Commission (SHPD)	The Hui contacted the agency's on-island representative on 9/18/2020 and 9/23/2020 via phone, and left a message on the main phone line on 9/18/2020. <u>Outcome:</u> No response.
Office of Hawaiian Affairs	The Hui contacted an OHA representative on 9/25/2020 via email. The Agent followed-up with an email on 10/19/2020. <u>Outcome:</u> OHA representative responded on 9/25/20 and agreed to kōkua. OHA has also been working closely with the Hui to provide supporting research pertaining to the cultural history of Wai'oli and submitted a number of testimonies in support of direct negotiation for a long-term water lease.
State Representative	The Hui emailed a Pre-Consultation Letter on 9/25/2020 and the Agent followed up 10/20/2020 via email. <u>Outcome:</u> Appreciated heads up. Sent photos to the Hui for DEA use.
State Senator	The Hui and Agent sent Pre-Consultation Letters on 9/25/2020 and 10/20/2020 via email. <u>Outcome:</u> No response.
University of Hawai'i – College of Tropical Agriculture and Human Resources (CTAHR)	The Agent contacted CTAHR on 9/28/2020 via phone and spoke with the administrator about the DEA. <u>Outcome:</u> UH CTAHR is supportive of the project and recommended tying the DEA discussion into the grand challenge of today - agricultural districts and the need for food growth to feed current needs and reduce transportation from the mainland. The staff further stated that the Project remains relevant today (re: COVID); the world is different and kalo growth / local farmers can help everyone. The bigger picture is about helping everyone. Farming feeds people.
COUNTY	
Kaua'i County, Department of Public Works	The Hui emailed the Acting County of Kaua'i Engineer on 9/25/2020 and the Agent followed up via phone on 9/25/2020 about the DEA seeking Pre-Consultation comments. <u>Outcome:</u> The Acting Engineer indicated the County's support and offered further support from its Department as the Hui needs. He shared that the County continues to work with Hui.
Kaua'i County, Department of Planning	The Agent contacted the Planning Department on 10/9/2020 via phone. <u>Outcome:</u> The office staff provided technical support related to the County's Heritage Map. The County's Managing Director indicated the County's support and offered further support from its Department as the Hui needs. He shared that the County continues to work with Hui.
County of Kaua'i Mayor's Office	The Agent contacted the Managing Director of the County of Kaua'i on 9/25/2020 via phone and spoke with the administrator about the DEA seeking Pre-Consultation comments from its Departments. <u>Outcome:</u> The office will keep an eye out for the DEA comment period. Indicated support for Project.
STAKEHOLDERS	
Maka'ala Ka'aumoana, Hanalei Watershed Hui (HWH)	The Hui reached out to HWH on 9/21/2020 with respect to water quality impacts and sought data and feedback to ensure that the DEA sufficiently addressed concerns. The Agent followed-up on 9/22/2020. <u>Outcome:</u> Recommended that the DEA discuss water quality for Wai'oli or surrounding areas addressing turbidity, indirect sewer pollution, impact on aquatic species in the Bay or stream, and address the ho'i that empty into Hanalei River. Representative provided Agent with several documents for use in the DEA.
Caren Diamond, Hā'ena-Hanalei Community Association	The Hui reached out on 9/25/2020 to ensure it was covering all bases and to address any concerns the Association might have. The Agent followed-up on 10/20/2020 via email. <u>Outcome:</u> Expressed support for the project as "an important step for continuing the traditional farming practices in perpetuity". Representative shared documents related to Wai'oli and water resources.
Michael Kido, Hawai'i Stream Research Center Director	The Hui reached out on 9/22/2020, and the Agent followed-up on 9/29/2020 via email. <u>Outcome:</u> Provided baseline data and edited a portion of the DEA related to aquatic species found in Wai'oli Stream.

APPENDIX C: SUMMARY OF PRE-CONSULTATION OUTREACH

<p>Don Heacock, Retired DAR Kaua'i District Aquatic Biologist / Kaua'i Organic Agroecosystems</p>	<p>The Hui reached out on 9/22/2020, and the Agent followed-up on 9/29/2020 via phone. <u>Outcome:</u> Discussed the frequency of 'o'opu and 'ōpae in streams and 'auwai. Indicated that they still see hīhīwai in stream especially prior to 2018. Shared that the DEA should follow Hutchin's 1950 report re: quantity of base flow being diverted, and further added that the Hui should measure the flow, starting in the stream.</p>
<p>Matt Rosener, North Shore Hydrologic Services</p>	<p>The Hui reached out via email on 9/2/20 with regard to resources and data on Wai'oli, water quality health, and waterbird species. Engaged in discussion. <u>Outcome:</u> Via email, provided relevant information and resources. Conducted water quality testing for the Hui.</p>
<p>Adam Asquith, Ph.D., entomologist and kalo farmer</p>	<p>The Hui reached out on 9/22/2020 with regard to data on Wai'oli Stream. <u>Outcome:</u> Shared that he does not have any information on Wai'oli Stream.</p>
<p>Hanalei Hawaiian Civic Club</p>	<p>The Agent sent the Pre-Consultation Letter on 10/21/2020 via email. <u>Outcome:</u> No response.</p>
<p>Hawai'i Farm Bureau (or Kaua'i County Farm Bureau)</p>	<p>The Agent contacted the organization on 9/22/2020 via phone and voice message. <u>Outcome:</u> No response.</p>
<p>Hawai'i Farm Union United</p>	<p>The Agent contacted the organization on 10/20/2020 via email. <u>Outcome:</u> No response.</p>
<p>Huliupa'a and Kīpuka Kuleana</p>	<p>These organizations have worked closely with the Hui to complete a Cultural Impact Assessment (CIA) that informs this DEA.</p>
<p>Nā Maka Onaona / Nā Kilo 'Āina</p>	<p>The Hui contacted the organization on 9/23/2020 via phone. <u>Outcome:</u> The organization expressed that they are supportive of the Project. They highlighted the benefits of an aquatic species inventory.</p>
<p>Waipā Foundation</p>	<p>The Hui reached out on 9/2/2020, and the Agent followed-up on 9/3/2020 via email. <u>Outcome:</u> The organization shared multiple reports including its rainfall data and aquatic species research with the Hui. The organization continues to work directly with Hui.</p>



Fwd: Connecting Wayne and Tricia

D. Kapua'ala Sproat <[redacted]>
To: A Lum <[redacted]>

Tue, May 11, 2021 at 4:32 PM

D. Kapua Sproat (she/her/hers)
*Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law
& the Environmental Law Program
Director, Ka Huli Ao
Director, Environmental Law Clinic
William S. Richardson School of Law
University of Hawai'i at Mānoa
2515 Dole St., Honolulu Hawai'i 96822
P (808) 956-7489 [redacted]*

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----- Forwarded message -----

From: **Wayne Tanaka** [redacted]
Date: Fri, Sep 25, 2020 at 8:54 AM
Subject: RE: Connecting Wayne and Tricia
To: [redacted] Tricia Dang <tricia@tridason.com>
Cc: Mahina Tuteur [redacted]

Sounds good! Tricia, please just let me know if/when you would like to talk about the EA.

Mahalo nui,
Wayne

From: D. Kapua'ala Sproat [redacted] >
Sent: Friday, September 25, 2020 8:50 AM
To: Tricia Dang <tricia@tridason.com>; Wayne Tanaka [redacted]
Cc: Mahina Tuteur [redacted]
Subject: Connecting Wayne and Tricia

Aloha Wayne!

Happy Aloha Friday! Hope this email finds you smiling and faring well during the pandemic! By his email, i'm connecting you with Tricia Dang. Tricia is helping the Wai'ol Valley Taro Farmers complete an Environmental Assessment or EA as one of conditions necessary to secure a long term Water Lease from you folks. My Environmental Law Clinic is con inuing to kōkua the farmers this semester, and we are coordinating with Tricia on the DEA.

As you well know, after the 2018 floods, recovery efforts determined that the farmers mānowai (water intake) is on State Conservation land. This triggered a slew of permit ing and other approvals (despite the emergency proclamations). We have been making steady progress over the last two years and the Hui -- in no small part due to OHA's continued support and your advocacy in particular Wayne -- has a right of entry and easement for their lo'i kalo irrigation system and a revocable permit for their water. This fall, we have been working on a longer term water lease and Tricia is coordinating with the farmers and my clinic to complete the EA.

You have been working most closely with the Clinic and Hui on this over the last couple years. So, Tricia wanted to talk story with you to make sure we're covering all the bases and that we specifically address any concerns or issues OHA may have. Tricia will follow up about a time to talk story. I have also cc'd Mahina who is co-teaching the clinic with me (U'i is out on maternity leave).

Mahalo in advance for your support and kōkua Wayne! And don't hesitate to text or call if you need anything from me or wanna talk story.

mahalo nui,
kapua

D. Kapua Sproat (she/her/hers)
Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law

& the Environmental Law Program
Director, Ka Huli Ao
Director, Environmental Law Clinic
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RE: WAIOLI VALLEY TARO HUI EA - RE: Connecting Rep Nakamura and Tricia Dang

1 message

Rep. Nadine Nakamura [REDACTED]
To: Tricia Dang <tricia@tridason.com>

Wed, Nov 11, 2020 at 9:58 AM

Thanks for this update!

From: Tricia Dang <tricia@tridason.com>
Sent: Tuesday, October 20, 2020 11:51 AM
To: Rep. Nadine Nakamura [REDACTED]; Ben Viernes [REDACTED]
Subject: WAIOLI VALLEY TARO HUI EA - RE: Connecting Rep Nakamura and Tricia Dang

Aloha Representative Nakamura and Ben,

Apologies for the delay in following up on Kapua's email. On behalf of the Wai'oli Valley Taro Hui, I am writing their Environmental Assessment (EA). We anticipate submitting the draft for public comment at the end of this month.

For your awareness, I copied the summary of the EA below. Please let me know if you have any comments/recommendations on anything specific you would like us to cover. We are using this as a reference document that the farmers can use in the future, so if you have anything you are working on that you would like us to include, please send it to me and I can work on incorporating the details (I can also send you a draft to review prior to OEQC submittal). For example, if you have any information that you can share as reference, I would be happy to include key details in the draft EA. Otherwise, I will include you in our electronic distribution once the EA is published.

Generally related to the community - in the EA, we talk about the history and legacy of kalo cultivation in the Hanalei / Waioli area, contributions to local food security, and the Hui's purpose of education/community engagement to empower future generations. Unlike most EAs, there is no new request in terms of physical infrastructure or improvements, rather, the request is the farmers continuing to do what they have been doing for generations with the addition through this formal process. We will be including the approximate range of water needs which is based on a 1989 Water Commission registration of 13.5 mgd and well documented standard water needs for thriving kalo cultivation.

Happy to talk more on the phone if you would like [REDACTED]

Thanks so much. Summary copied below,
Tricia**SUMMARY OF EA:**

The Proposed Action seeks legal approval to continue a traditional and customary Native Hawaiian use of water from Wai'oli Stream (TMK Plats (4) 5-6-001, 002, and 004; (4) 5-5-005 to 009; and, (4) 5-4-003) for lo'i kalo cultivation, a cultural practice that has fed Wai'oli Valley and its people since time immemorial. For the Wai'oli Valley Taro Hui and the Wai'oli community, traditional kalo cultivation is its cultural foundation connecting Halele'a (Hanalei) families over generations and is a time-honored part of this community's history and legacy. More so, the water that flows through this existing yet ancient system is a lifeway that supports kalo cultivation traditions and perpetuates a living Hawaiian culture, while also feeding the community and preparing the next generation to carry on this vital practice into the future. Ma ka hana ka 'ike – the learning is in the doing (Pukui, 1983).

In the wake of the 2018 floods, disaster recovery efforts determined that the farmers' mānowai, the traditional intake of the traditional irrigation system used for kalo cultivation, is on State conservation lands. This triggered a slew of permitting and other approvals, including this water lease under Hawai'i Revised Statutes ("HRS") chapter 171, which the Hui has worked diligently to complete over the last two years. Today, with support from natural and cultural resource partners and the County of Kaua'i, the Hui continues to address and mitigate the damage caused by the devastating 2018 floods. The farmers' ability to maintain and repair the lo'i kalo irrigation system – with sufficient throughflow to support traditional lo'i while maintaining beneficial instream uses – is imperative.

On February 28, 2020, Hawai'i's Board of Land and Natural Resources ("BLNR") unanimously voted to award the Hui a one-year Revocable Permit to continue its water use from Wai'oli Stream and a perpetual easement for its lo'i kalo irrigation system. The Hui anticipates submitting its request for a long-term water lease after completing the HRS chapter 343 environmental review process, consulting with the Department of Hawaiian Home Lands and Department of Land and Natural Resources-Office of Conservation and Coastal Lands, submitting a Watershed Management Plan, and working with the Commission on Water Resource Management to establish numeric interim instream flow standards.

This long-term lease will provide the legal approval for the continued diversion of water from Wai'oli Stream through the traditional lo'i kalo irrigation system within this watershed, ensuring the farmers have more reliable access to the resources intrinsically tied to traditional cultivation practices that have been documented as part of the history and environment of this area since time immemorial. This Environmental Assessment will detail the existing and beneficial impacts of water use for traditional kalo cultivation from Wai'oli Stream. At bottom, as Suzanne Case, BLNR Chair, explained during the February 2020 BLNR Board meeting, the Hui seeks to "fit an ancient system into a new legal system."

Tricia W. Dang

Tridason LLC



www.tridason.com

****Due to COVID-19 related school and support service closures, please pardon the delay in responding as business and working schedules are affected.**

On Fri, Sep 25, 2020 at 2:17 PM Rep. Nadine Nakamura [REDACTED] wrote:

Thanks Kapua and nice to meet you Tricia! Appreciate the update. Happy to assist in any way!

Sent from my iPhone

On Sep 25, 2020, at 7:54 AM, D. Kapua'ala Sproat [REDACTED] wrote:

Aloha Representative Nakamura and Ben!

By this email, I'm introducing you folks to Tricia Dang. Tricia is helping the Wai'oli Valley Taro Farmers complete an Environmental Assessment or EA as one of conditions necessary to secure a long term Water Lease from the Department of Land and Natural Resources.

As you well know, after the 2018 floods, recovery efforts determined that the farmers mānowai (water intake) is on State Conservation land. This triggered a slew of permitting and other approvals. We have been making steady progress over the last several years and they now have a right of entry and easement for their lo'i kalo irrigation system and a revocable permit for their water. This fall, we have been working to secure a longer term water lease and Tricia is working with the farmers and my clinic to complete the EA.

Tricia will be reaching out to you, as the farmers' elected representative, to seek your mana'o on the project/EA. If you have time, a letter of support would be most helpful.

As always, if you have any questions, please don't hesitate to reach out to me. We are grateful for your continued kōkua and aloha!

mahalo nui,

kapua

D. Kapua Sproat (she/her/hers)
*Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law
& the Environmental Law Program
Director, Ka Huli Ao
Director, Environmental Law Clinic
William S. Richardson School of Law
University of Hawai'i at Mānoa*

Re: Waioli EA - Follow up with Tricia

1 message

Makaala Kaaumoana [redacted]
To: Tricia Dang <tricia@tridason.com>

Sun, Oct 25, 2020 at 12:43 PM

We have used 85% for a few years now. Original source was taro growers association.
Mk

On Thu, Oct 22, 2020, 10:37 AM Tricia Dang <tricia@tridason.com> wrote:
Mahalo Makaala!

You mentioned in the call Hanalei produces 85% of the kalo. This is part of my planner dilemma - every agency has a different number and method to calculate. Can you point me to your source - otherwise, i went federal and used this....feels very underestimated.

Of the statewide harvest, Kaua'i County accounted for 32 to 56% of the state's kalo acreage and produced between 43 and 75% of the state's total production (NASS 2017a). From 2000 to 2017, kalo production in Hawai'i decreased from 7 million pounds to 3.6 million pounds, and average yields per acre fell from about 15,000 pounds per acre to 10,530 pounds per acre (NASS, 2017).

**Of course i didn't document the link so now I am in the maze of fed website design.

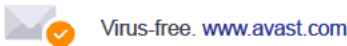
On Thu, Oct 22, 2020, 10:16 AM Makaala Kaaumoana [redacted]

Mahalo for your call. Sorry, not sorry, for talking your ear off!
Here are docs and contacts I promised.

[redacted]@fws.gov
[redacted]@pacificbirds.org

cut and paste away!

Makaala



On Thu, Oct 22, 2020 at 9:59 AM Tricia Dang <tricia@tridason.com> wrote:

Aloha Makaala,

Please send over your H&H proposal when you have chance...and the Targeting Initiative Grant if possible.

Thanks so much for the lively and informative call!
Tricia

Tricia W. Dang
Tridason LLC
808-542-9251
www.tridason.com

***Due to COVID-19 related school and support service closures, please pardon the delay in responding as business and working schedules are affected.*

—
Makaala Kaaumoana

[redacted]
[redacted] home
[redacted] cell
[redacted] fax

Re: Water quality data and other mana'ō

1 message

Tricia Dang <tricia@tridason.com>

Tue, Sep 22, 2020 at 4:54 PM

To: Makaala Kaaumoana [REDACTED]
Cc: "D. Kapua'ala Sproat" [REDACTED]

Aloha Makaala,

Mahalo for your help. I just sent an email outlining the reports and studies we have looked at to discuss water quality and native habitats in the Waioli stream (and surrounding streams). However, wondering if you could guide me to any good studies on Hanalei Bay water quality and aquatic species?

The EA requires us to discuss the stream - start to end, which includes a discussion about the water after it leaves the hoi and returns to the main stream and then into the Bay. The challenge in the discussion is 2 hoi enter Hanalei River since the focus is Waioli stream, and then also discuss the water quality in Hanalei Bay and the many factors that play into that. Kapua thought you would be the best source to refer me to info (also Heather at DAR mentioned your name too!)

A summary of our draft proposed action:

The proposed action seeks legal approval to use water from Wai'oli Stream (TMK 5-5-006:888) for the purpose of lo'i kalo, a cultural practice that has taken place in Wai'oli Valley for time immemorial. For the Wai'oli Valley Taro Hui/Wai'oli community, traditional kalo cultivation is its cultural foundation. Similar to how the lo'i kalo irrigation system weaves through the land, the practice of cultivating kalo connects families over generations and is a time-honored part of the community's history and legacy.

Today, the Hui with support from natural and cultural resources partners and the County of Kaua'i continue to address and mitigate the damage caused by the devastating 2018 flooding. The ability to maintain and repair the lo'i kalo irrigation system - a throughflow for in-stream and in-watershed use is imperative. More so, the water that flows through the existing traditional system is the lifeway to support kalo cultivation traditions in the way that our ancestors did, providing nourishment for the community and preparing the next generation to continue the cultural practice into the future.

On February 28, 2020 BLNR unanimously voted to award the Hui a Revocable Permit for Wai'oli Stream water use. The Hui anticipates submitting its request for a long-term water lease upon completing the Chapter 343, HRS, environmental review process, conducting consultation with DHHH and DLNR-OCCL, completing a water management plan that establishes instream flow standards, and participating in the required auction process.

The long-term lease will allow the continued activity of diverting water from Wai'oli Stream to the traditional lo'i kalo irrigation system, ensuring the kalo farmers have access to the water resources intrinsically tied to traditional cultivation practices that has been documented as being a part of the history and environment of this area. The EA will discuss the existing and beneficial impact of water use from the Wai'oli Stream for traditional kalo cultivation. Thus, the Hui seeks to "fit an ancient system into a new process".

I will plan to call you tomorrow morning if you are available.

Mahalo,
Tricia

Tricia W. Dang
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808-542-9251
www.tridason.com

****Due to COVID-19 related school and support service closures, please pardon the delay in responding as business and working schedules are affected.**

On Mon, Sep 21, 2020 at 4:32 PM Makaala Kaaumoana [REDACTED] wrote:

Aloha e Kapuaala a me Tricia, happy to help. I have copied Andy Hood for expert advice and, as expected, I am happy to offer opinion /advice.

Makaala
[REDACTED]

On Mon, Sep 21, 2020, 2:49 PM D. Kapua'ala Sproat <[REDACTED]> wrote:

Aloha Maka'ala!

Hope this email finds you well. I'm reaching out -- as usual -- with a favor to ask. Do you have time to connect with Tricia Dang please? Tricia is working with the Wai'oli farmers (and my clinic is helping out on the side) with their DEA for their water lease. Wanted to consult with you about a bunch of stuff, but water quality in particular.

Cc'd Tricia so you folks can be in touch.

mahalo nui,
kapua

D. Kapua Sproat (she/her/hers)
*Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law
& the Environmental Law Program
Director, Ka Huli Ao
Director, Environmental Law Clinic
William S. Richardson School of Law
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Re: Historic Report 1964

1 message

c. diamond [REDACTED]
To: Tricia Dang <tricia@tridason.com>

Wed, Oct 21, 2020 at 12:17 PM

Aloha, glad to share, scanned Barbara Robeson's files years ago, here is another interesting water resource doc from 1939

On Wednesday, October 21, 2020, 11:40:19 AM HST, Tricia Dang <tricia@tridason.com> wrote:

Aloha Caren,

Wow! 1964 - I love it (it's the planner in me). Thank you for sharing, I will definitely review and consider for the EA.

Thanks so much,
Tricia

Tricia W. Dang
Tridason LLC
808-542-9251
www.tridason.com

***Due to COVID-19 related school and support service closures, please pardon the delay in responding as business and working schedules are affected.*

On Wed, Oct 21, 2020 at 11:09 AM Caren [REDACTED] wrote:

Aloha Tricia, this seems an important step for continuing the traditional farming practices in perpetuity . Sending along this document from 1964 which includes Waioli not for inclusion but it may be of interest.
Mahalo Nui, Caren

>
>

 **water resources of Kauai 1939.pdf**
6648K

Re: Connecting Caren and Tricia - Waioli Valley Taro Hui EA

1 message

Tricia Dang <tricia@tridason.com>
 To: Caren [REDACTED] >

Tue, Oct 20, 2020 at 10:57 AM

Aloha Caren,

Following up on Kapua's email. On behalf of the Wai'oli Valley Taro Hui, I am writing their Environmental Assessment (EA). We anticipate submitting the draft for public comment at the end of this month.

For your awareness, I copied the summary of the EA below. Please let me know if you have any comments/recommendations on anything specific you would like us to cover in this public process. For example, if you have any community documents that you can share as reference, I would be happy to include key details in the draft EA. Otherwise, I will include you in our electronic distribution once the EA is published.

Generally related to the local community - in the EA, we talk about the history and legacy of kalo cultivation, contributions to local food security, the Hui's purpose of education/community engagement to empower future generations. Unlike most EAs, there is no new request in terms of physical infrastructure or improvements, rather, the request is the farmers continuing to do what they have been doing for generations with the addition through this formal process.

Happy to talk more on the phone if you would like - 808.542.9251.

Thanks so much. Summary copied below,

Tricia
 Summary of EA:

The Proposed Action seeks legal approval to continue a traditional and customary Native Hawaiian use of water from Wai'oli Stream (TMK Plats (4) 5-6-001, 002, and 004; (4) 5-5-005 to 009; and, (4) 5-4-003) for lo'i kalo cultivation, a cultural practice that has fed Wai'oli Valley and its people since time immemorial. For the Wai'oli Valley Taro Hui and the Wai'oli community, traditional kalo cultivation is its cultural foundation connecting Halele'a (Hanalei) families over generations and is a time-honored part of this community's history and legacy. More so, the water that flows through this existing yet ancient system is a lifeway that supports kalo cultivation traditions and perpetuates a living Hawaiian culture, while also feeding the community and preparing the next generation to carry on this vital practice into the future. Ma ka hana ka 'ike – the learning is in the doing (Pukui, 1983).

In the wake of the 2018 floods, disaster recovery efforts determined that the farmers' mānowai, the traditional intake of the traditional irrigation system used for kalo cultivation, is on State conservation lands. This triggered a slew of permitting and other approvals, including this water lease under Hawai'i Revised Statutes ("HRS") chapter 171, which the Hui has worked diligently to complete over the last two years. Today, with support from natural and cultural resource partners and the County of Kaua'i, the Hui continues to address and mitigate the damage caused by the devastating 2018 floods. The farmers' ability to maintain and repair the lo'i kalo irrigation system – with sufficient throughflow to support traditional lo'i while maintaining beneficial instream uses – is imperative.

On February 28, 2020, Hawai'i's Board of Land and Natural Resources ("BLNR") unanimously voted to award the Hui a one-year Revocable Permit to continue its water use from Wai'oli Stream and a perpetual easement for its lo'i kalo irrigation system. The Hui anticipates submitting its request for a long-term water lease after completing the HRS chapter 343 environmental review process, consulting with the Department of Hawaiian Home Lands and Department of Land and Natural Resources-Office of Conservation and Coastal Lands, submitting a Watershed Management Plan, and working with the Commission on Water Resource Management to establish numeric interim instream flow standards.

This long-term lease will provide the legal approval for the continued diversion of water from Wai'oli Stream through the traditional lo'i kalo irrigation system within this watershed, ensuring the farmers have more reliable access to the resources intrinsically tied to traditional cultivation practices that have been documented as part of the history and environment of this area since time immemorial. This Environmental Assessment will detail the existing and beneficial impacts of water use for traditional kalo cultivation from Wai'oli Stream. At bottom, as Suzanne Case, BLNR Chair, explained during the February 2020 BLNR Board meeting, the Hui seeks to "fit an ancient system into a new legal system."

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On Fri, Sep 25, 2020 at 9:03 AM D. Kapua'ala Sproat [REDACTED] wrote:
 Aloha Caren!

Happy Aloha Friday! By this email, I'm connecting you with Tricia Dang. Tricia is helping the Wai'ol Valley Taro Farmers complete an Environmental Assessment or EA as one of conditions necessary to secure a long term Water Lease from BLNR. My Environmental Law Clinic is continuing to kōkua the farmers this semester, and we are coordinating with Tricia on the DEA.

I'm pretty sure we talked story about this a little when we were meeting with Uncle Pres, but as you likely know anyways, after the 2018 floods, recovery efforts determined that the farmers mānowai (water intake) is on State Conservation land. This triggered a slew of permitting and other approvals (despite the emergency proclamations). We have been making steady progress over the last two years and the Hui now has a right of entry and easement for their lo'i kalo irrigation system and a revocable permit for their water use. This fall, we have been working on a longer term water lease and Tricia is coordinating with the farmers and my clinic to complete the EA.

We wanted to reach out to the Ha'ena-Hanalei Community Association and I thought of you cause you wrote the comment letter on the development in Limahuli and were also tracking OCCL. So, Tricia wanted to talk story with you to make sure we're covering all the bases and that we specifically address any concerns or issues the community association may have. Tricia will follow up about a time to talk story. I have also cc'd Mahina Tuteur who is co-teaching the clinic with me.

Thanks so much Caren, I know you're super busy!

mahalo nui,
kapua

D. Kapua Sproat (she/her/hers)

*Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law
& the Environmental Law Program*

Director, Ka Huli Ao

Director, Environmental Law Clinic

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Fwd: Kokua with Wai'oli

----- Forwarded message -----

From: Don Heacock <[redacted]>
Date: Fri, Sep 25, 2020 at 11:21 AM
Subject: Re: Kokua with Wai'oli
To: Adam ASquith <[redacted]>
Cc: Michael Kido <[redacted]>, "D. Kapua'ala Sproat" <[redacted]>, Tricia Dang <tricia@tridason.com>, Mahina Tuteur <[redacted]>

Aloha Kapua e hoaloha,
Have Trisha call me (c [redacted]) because I can sit up a face to face to interview experienced 'o'opu fishers in Waioli River. We could all benefit from this information.
Aloha no e malama Pono,
DonTaro

Sent from my iPhone

On Sep 24, 2020, at 8:43 AM, Adam ASquith <[redacted]> wrote:

Kapua and All:

Good to hear that everyone is safe and healthy. Waioli is probably the only stream on the north shore that I have not been up. Sorry that I do not have any observations even.

I sure miss everybody. So glad to hear that your family is still connecting to the resources and the life, Kapua. Sooooo important. As Jerry Santos sings, "Change is a strange thing, it cannot be denied." But, damn, it's a hard pill to swallow sometimes.

I so look forward to reconnecting with everybody when we are over this thing.

Aloha

Adam

On Thursday, September 24, 2020, 06:26:39 AM HST, D. Kapua'ala Sproat <[redacted]> wrote:

Aloha Mike!

This is so very helpful, mahalo plenty! This is exactly why i reached out to you folks! The valley and stream haven't endured major change -- still largely kalo. There is more building in the conservation zone recently, but largely illegal houses so not additional pressure on the stream.

Tricia may have more follow up -- but i think this is exactly the kind of info we need. Mahalo Mike!

I hope you are safe and well in Washington. I will always think of you in Kalihiwai, especially when i go by your driveway.

mahalo plenty!
kapua

D. Kapua Sproat (she/her/hers)
Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law
& the Environmental Law Program
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On Thu, Sep 24, 2020 at 5:59 AM Michael Kido <[REDACTED]> wrote:

Aloha Kapua. I'm glad you guys are safe on Kauai. I'm in WA state and it's a little sketchy going out over here even just to the market.

I looked through my Kauai field notebooks and Don is correct that we never conducted any formal surveys in Waioli Stream.

However, I did run across a note from 11/17/89 when we were interested in documenting *o opu-nakea* spawning in North Kauai streams. The Hanalei Bridge was closed earlier in the week because of flooding and we would check streams at the bridges on our way to Wainiha where we knew fish would be spawning in the 'first riffles' after a major flooding event.

In Waioli Stream we documented *o opu-nakea* spawning in a roughly 75 meter stretch of stream at the bridge road crossing using underwater visual census (UVC) (basically wetsuit-mask-snorkel). We observed 20+ egg masses laid in nests on basalt substrate which were being guarded by single fish (could not tell if male or female) with highest nest densities recorded below the bridge. It was interesting that there was old coral reef underlying the streambed and egg masses were only laid on stream rocks not the coral.

So, at the time there was a reproductively viable population of *o opu-nakea* in Waioli Stream although Don saw a tilapia in the stream which was concerning to us.

Native stream animals are adapted to periodic floods even big ones like those that close the Hanalei Bridge so their resident populations persist in the stream continuum (i.e. from mountain-to-sea). If there have not been any major disturbances to the watershed or significant plantation-style water diversion, then native stream animal populations are probably still viable in Waioli Stream.

Hope this is of help in developing your EA.

Mahalo

Mike

From: "D. Kapua'ala Sproat" <[REDACTED]>
Date: Tuesday, September 22, 2020 at 6:11 AM
To: Don Heacock <[REDACTED]>, Adam ASquith <[REDACTED]>, Mike Kido <[REDACTED]>
Cc: Tricia Dang <tricia@indason.com>, Mahina Tuteur <[REDACTED]>
Subject: Kokua with Wai'oli

Aloha Adam, Mike, and Don!

I'm reaching out -- as usual -- for kōkua please. This semester my environmental law clinic is working with the Wai'oli Taro Farmers. As you may know, they were super bussed up in the 2018 floods, after which time recovery efforts revealed that their mānowai is on conservation land. SO: my clinic has been helping them with permitting and everything else. We worked with them (and BLNR) to secure a right of entry, easement, and revocable permit for their water use. And, now we're doing ground work for a water lease under HRS 171.

SO: i'm emailing to connect you with Tricia Dang. She is helping us with the EA for the water lease. And, in particular, we were wondering if you folks had any data or other info about our native stream animals in Wai'oli Stream. In talking with the farmers, they regularly see opua and opae in the streams and even the auwai. And, they still see hihiwai from time to time in the stream, tho they remember more being in the streams previously (and, admittedly, the stream was heavily impacted by the 2018 floods).

Maybe this is just my own memory -- but i seem to think that you folks did baseline for a lot of our streams over the years and i was hoping you folks did Wai'oli at some point formally or informally. And, as experts, your recollection of the stream (presence or absence of animals and general location) would be helpful. Data even better, but we'd take whatever.

Same for water quality. Wai'oli Stream was actually added to Hawaii's Clean Water Act 303(d) list in July 2018 for turbidity and enterococci. BUT: that was after the floods and data from Matt Rosener at Waipā has since showed that much of the turbidity cleaned up.

Anyways, Tricia will follow up with more specifics, but i wanted to reach out initially with this ask.

That said, i hope you folks are all safe and well. I came home for Spring Break with my husband and two boys for Spring Break in March and we're still here -- one of the silver linings of the pandemic for sure. Kaua'i (and Kalihiwai in particular) is the best place to ride out something like this. And, it gives us more time to spend with my mom and dad and to eat kale and poi. Anyways, sending aloha and well wishes to each of you. Mahalo in advance for any kōkua you can provide!

PS: i cc'd Tricia and Mahina (our Post Doc who is helping with clinic)

mahalo nui,
kapua

D. Kapua Sproat(she/her/hers)
*Professor of Law, Ka Huli Ao Center for Excellence in Native Hawaiian Law
& the Environmental Law Program
Director, Ka Huli Ao
Director, Environmental Law Clinic
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Re: FW: Partnering on EA for Waioli, Kaua'i

1 message

Matt Rosener [REDACTED]

Fri, Sep 11, 2020 at 2:49 PM

To: Tricia Dang <tricia@tridason.com>

Cc: dominique leu cord [REDACTED] >

Aloha Tricia,

You're welcome to reference data from the Waipa Garden rain gage, I'm attaching a spreadsheet here that shows monthly and annual totals since 2012 when I first set up the gage. Note that there were periods of missing data for 2011 and 2012, but the annual totals represent complete data for the 2013-2018 calendar years and the 2012-2018 water years (Oct 1 - Sep 30). For 2019, we had 66.80" of rain through 11/25/19 so not quite a complete record for last year. There should be new data since then but we haven't downloaded it yet which is a good reminder for me to do that!

Also, might want to look into records for the NWS Hanalei rain gage which is located in Waioli I think. The NWS station number for this gage is HNIH1, and some of that data is available at: <https://w2.weather.gov/hfo/hydrology> Not sure the period of record for this gage, but I think it goes back farther than the Waipa gage. Also, the NWS gage has some substantial gaps, including part of the April 2018 flood event. The Waipa gage has the best N. Shore rain record for that flood, it was ~ 55" for the storm in about 28 hours, the NWS certified the 49.69" as a national record for a 24-hour period.

I haven't looked at rainfall for the Hurricane Lane storm, but the data should be included in the attached spreadsheet.

The gage at the Princeville Airport generally gets quite a bit less rainfall than Waipa/Waioli, but it probably has a longer record.

Hope this helps!

matt

Matt Rosener
Hydrologist / Water Resources Engineer
Port Angeles, WA / Hanalei, HI

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On Fri, Sep 11, 2020 at 2:56 PM Tricia Dang <tricia@tridason.com> wrote:

Mahalo Matt!

Reviewed the docs last night and what great research and findings. I am going to use the 1 monitoring site at the mouth of the Waioli Stream in our EA. I will likely explain the indirect impact of residential cesspools along the stream path.

On another note - I am using the rain gauge info from princeville since it is publicly available. Kapua said that Waipa has its own rain gauge. Any chance you can share that data with me. I think she really wanted to at least discuss the amount of rain received in during the April floods and the flooding from Hurricane Lane in the August 2018. If you have basic data you can share, that would be really helpful. Otherwise this is all I got:

For the North Shore of Kauai, Princeville is the nearest tracking point, reporting 72.42 inches of rain in 2017, 74.53 inches in 2016, and 71.87 inches in 2015. The lowest rainfall between 2003 and 2017 was in 2010 with 52.02 inches and the highest rainfall was in 2004 with 93.17 inches of rain documented. (State Data book, 2019).

Thanks so much!

Tricia

Tricia W. Dang
Tridason LLC
808-542-9251
www.tridason.com

****Due to COVID-19 related school and support service closures, please pardon the delay in responding as business and working schedules are affected.**

On Tue, Sep 8, 2020 at 2:48 PM Matt Rosener [REDACTED] > wrote:

Aloha Tricia,

Had a chance to talk to Stacy today, just wanted to check with her before I shared, but attached here is the grant report I mentioned when we talked last week.

You can find the lo'i water chemistry data in Tables 12 and 13 and the snorkel survey data summarized in Table 15, along with the stream bioassessment report by UH, attached also.

Let me know if you have any questions.

Mahalo,

matt

Matt Rosener
Hydrologist / Water Resources Engineer
Port Angeles, WA / Hanalei, HI

On Thu, Sep 3, 2020 at 5:20 PM Tricia Dang <tricia@tridason.com> wrote:

Mahalo Matt. I think the water study would be an excellent addition to document in the EA. We could include a summary and water chemistry data in the draft EA. Then we can include the variable data in the final if time is an issue.

Tricia

Tricia W. Dang
Tridason LLC
808-542-9251
www.tridason.com

***Due to COVID-19 related school and support service closures, please pardon the delay in responding as business and working schedules are affected.*

On Thu, Sep 3, 2020 at 11:25 AM Matt Rosener <[REDACTED]> wrote:

Aloha Dominique,

Mahalo for the update on stream project contracting, I hope the Waioli project will be fully funded.

Unfortunately, but I can't think of much to share on what happens to water as it flows through the lo'i. I can say generally that the water quality changes from inlet to outlet, as does the water flow rate. I don't have flow rate data for the Waipa lo'i but if this information would be helpful, this will probably be a good source: <https://pubs.usgs.gov/of/2007/1157/> This study primarily looked at water use in lo'i but also has findings on water temperature too.

We did some focused water quality monitoring at Waipa where we used a fallow lo'i as a sort of filter basin that received water from an upstream lo'i before discharging into a drainage ditch. We collected water samples about once a month at points where 1. water enters the lo'i, 2. water exits the lo'i and enters the filter basin, and 3. water exits the basin and flows into the drain ditch. With about 16 sampling dates total, this allows comparison of water quality at lo'i inlet and outlet points. The water chemistry data is compiled and easily sharable if will be useful for the EA. Just let me know if you'd like me to send it over. The other water quality data on physical variables (temp, dissolved oxygen, turbidity) would need to be organized before we can share it, but again, let me know if it would be helpful for the EA, and I'll see what I can do.

Sorry I can't think of anything else I have to share on this.

matt

Matt Rosener
Hydrologist / Water Resources Engineer
Port Angeles, WA / Hanalei, HI

On Wed, Sep 2, 2020 at 1:34 PM dominique leu cord <[REDACTED]> wrote:

Aloha Matt,

I got an update from [REDACTED] on [REDACTED] grants, [REDACTED]

In the meantime I have a question for you. Tricia Dang, cc'd, is compiling the EA for the Wai'oli Taro Valley Hui (WVTH) which will forward our water Lease application. She is needing:

"I think I have what I need, but definitely could be stronger in certain areas such as describing what happens to water as it flows through the loi, all the wonderful stuff related to freshwater flowing slowly through loi (animals, plants, volume of water, flood reduction, etc)."

I sent her the things in this [drive](#), for reference. I also asked Jen Waipa at USFWS, she said they have little to nothing and to direct ask NCRS or CTAHR. In the drive is the current draft mgmt plan USFWS has for Hanalei Refuge. I'm curious if you could add any other resources. Maybe more specifically to water? As no-take in a kalo system (minus trans-evaporation) or even on water quality or health of in-stream, riparian or native waterbird species?

If get, please email Tricia and/or add to drive. I cant believe there is nothing on this, I would almost expect there to be Hanalei specific studies?

Aloha to Megan, hope you guys get out here sooner than later.

Mālama,

Dominique



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Waipa Garden Rainfall Record.xlsx

8526K

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
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COMMISSION ON WATER RESOURCE MANAGEMENT

May 18, 2021
Honolulu, Hawai'i

Amend Interim Instream Flow Standards for Wai'oli Stream
In the Surface Water Hydrologic Unit of Wai'oli (2018)
Wai'oli Stream, Halele'a, North Kaua'i

SUMMARY OF REQUEST:

Staff is requesting that the Commission consider the recommendations for amending the interim instream flow standard (interim IFS) for one stream in the Wai'oli surface water hydrologic unit in North Kaua'i:

WAI'OLI (2018): Wai'oli Stream

LOCATION MAP: See Figure 1

BACKGROUND:

The State Water Code (Code), Chapter 174C, Hawai'i Revised Statutes (HRS), provides that the Commission may adopt interim IFS on a stream-by-stream basis or a general IFS applicable to all streams within a specified area. This submittal seeks to address one stream in North Kaua'i.

The current interim IFS for the stream being considered was established under Hawaii Administrative Rules (HAR) §13-169-48, which, in pertinent part, reads as follows:

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

The current interim IFS became effective on October 8, 1988. Following the initial registration of stream diversions works, any new or substantially modified stream diversion works structure requires a permit for construction and amendment to the interim IFS.

Based upon the best available information, as presented in the Instream Flow Standard Assessment Report (IFSAR)¹ (see Exhibit 1) and provided in the informational submittal presented to the Commission at the regularly scheduled meeting on April 20, 2021 (see Exhibit 2), staff have developed a recommendation that seeks to balance public trust uses and is supported by the Wai'oli Valley Taro Hui (Hui) (see Exhibit 3).

Understanding that the availability of hydrologic data in this stream is limited, as new data are developed, decisions may be revised by a future Commission action. Due to the complex and dynamic nature of Hawai'i's stream systems, adaptive management affords staff the ability to proceed in making reasonable management decisions and ensuring that impacts are minimized in the face of uncertainty, thus allowing staff to proceed responsibly while advancing the clear intentions of the Code.

The assessment of instream uses for the Wai'oli hydrologic unit will address the interim IFS for Wai'oli Stream (Figure 1).

Water from the main stem of Wai'oli Stream is conveyed to the tributary on the right bank via a mānowai at about the 160 foot elevation. Diversion 1412 (i.e., the po'owai) then conveys water to the East Wai'oli Ditch (Figure 2). The end users of the East Waioli Ditch (i.e., the auwai) are kalo farmers that are part of the Wai'oli Valley Taro Hui.

TRADITIONAL AND CUSTOMARY NATIVE HAWAIIAN RIGHTS AND PRACTICES

- 1) The identity and scope of cultural, historical, and natural resources and traditional and customary Native Hawaiian rights exercised in the area.

In summary, the community frequents Hanalei Bay and Wai'oli Stream, which both serve as a habitat for a range of native stream animals, including 'o'opu nake'a (*Awaous guamensis* or freshwater goby), 'o'opu naniha (*Stenagobius hawaiiensis* or Naniha goby), 'ōpae kala'ole (*Atyoida bisulcate* or spineless shrimp), 'ōpae 'oeha'a (*Macrobrachium grandimanus* or Hawaiian prawn), and hīhīwai or wī (*Neritina granosa*). The community have long fished and gathered in these waters with nets, poles, and kahe (a ramp-like structure made from bamboo)—some of which they make themselves. And, just as the farmers provide kalo for the people of Kaua'i, the community help to feed those who fish and gather alongside them by sharing their catch². Although fishing, hunting, and gathering are prevalent subsistence practices, it is

¹ <https://dlnr.hawaii.gov/cwrm/surfacewater/ifs/2018-Waioli/>

² Vaughan, M.B. 2018. Kaiāulu: Gathering Tides. ISBN 9780870719226

important to note that the Hui also perpetuates religious and spiritual traditions. For example, several members highlighted the significance of pule (prayer), while others gather fresh water for ho'okupu (offering). The Hui has historic and ongoing traditional and customary practices exercised throughout this kalana, including the use of kalana itself.

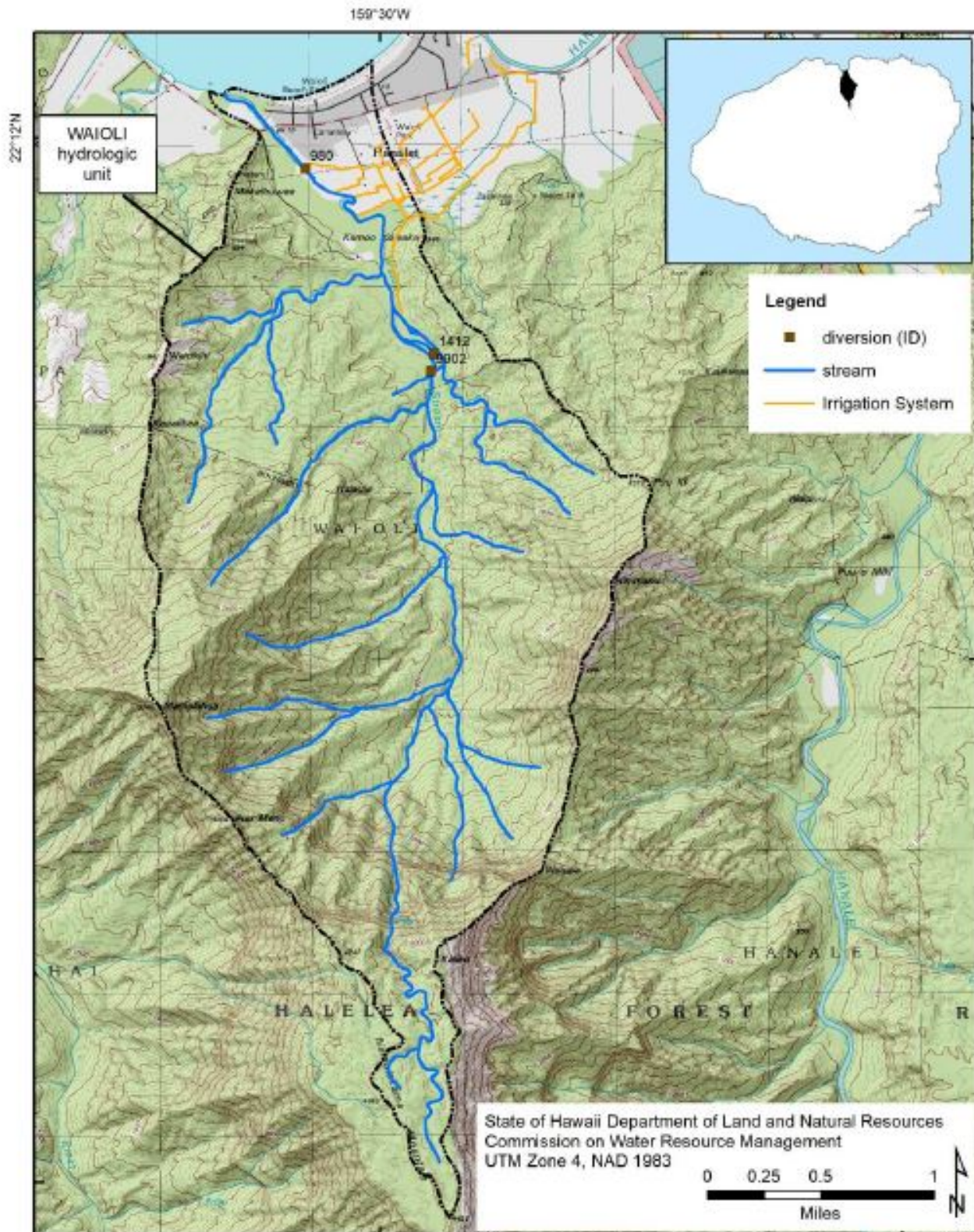
- 2) The extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.

The proposed IIFS is not anticipated to affect or impair traditional and customary practices of Native Hawaiians identified in this kalana, but instead will help to support and protect them by ensuring, even during drought or low-flow scenarios, a balanced and customary approach to water distribution.

- 3) What feasible action, if any, could be taken by the Commission within regard to this application to reasonably protect Native Hawaiian rights.

The Commission can recognize the range of Traditional and Customary rights and practices that exist including but not limited to the lo'i kalo, gathering in and around the stream and 'auwai, spiritual practices, and the traditional land and water management system of kalana.

Figure 1. USGS topographic map of the Wai'oli hydrologic unit, registered diversions (ID) and irrigation systems in Kaua'i.



RECOMMENDATIONS

- **Proposed Action: Amended Interim IFS**
 Staff recommends that one measurable interim IFS be established for Wai'oli Stream near an altitude of 80 feet, below the confluence of Wai'oli Stream and the Wai'oli tributary on the right bank. The interim IFS shall be established at a flow of 6.3 cfs (4.0 mgd) at all times, unless the Commission declares an emergency or water shortage. Supporting the Native Hawaiian custom of keeping half of the stream's flow remaining in the stream³, this value represents 50% of the estimated 90th percentile flow (Q₉₀) at the po'owai, which was estimated to be 12.5 cfs (8.0 mgd). Thus, it is expected that during drought conditions, only 50% of the water, shall be diverted from the stream in order to protect instream values. This results in a varying amount of water for kalo production based on the amount of water flowing in the stream (Table 2). The interim IFS may be revised by future Commission action as more data are gathered.

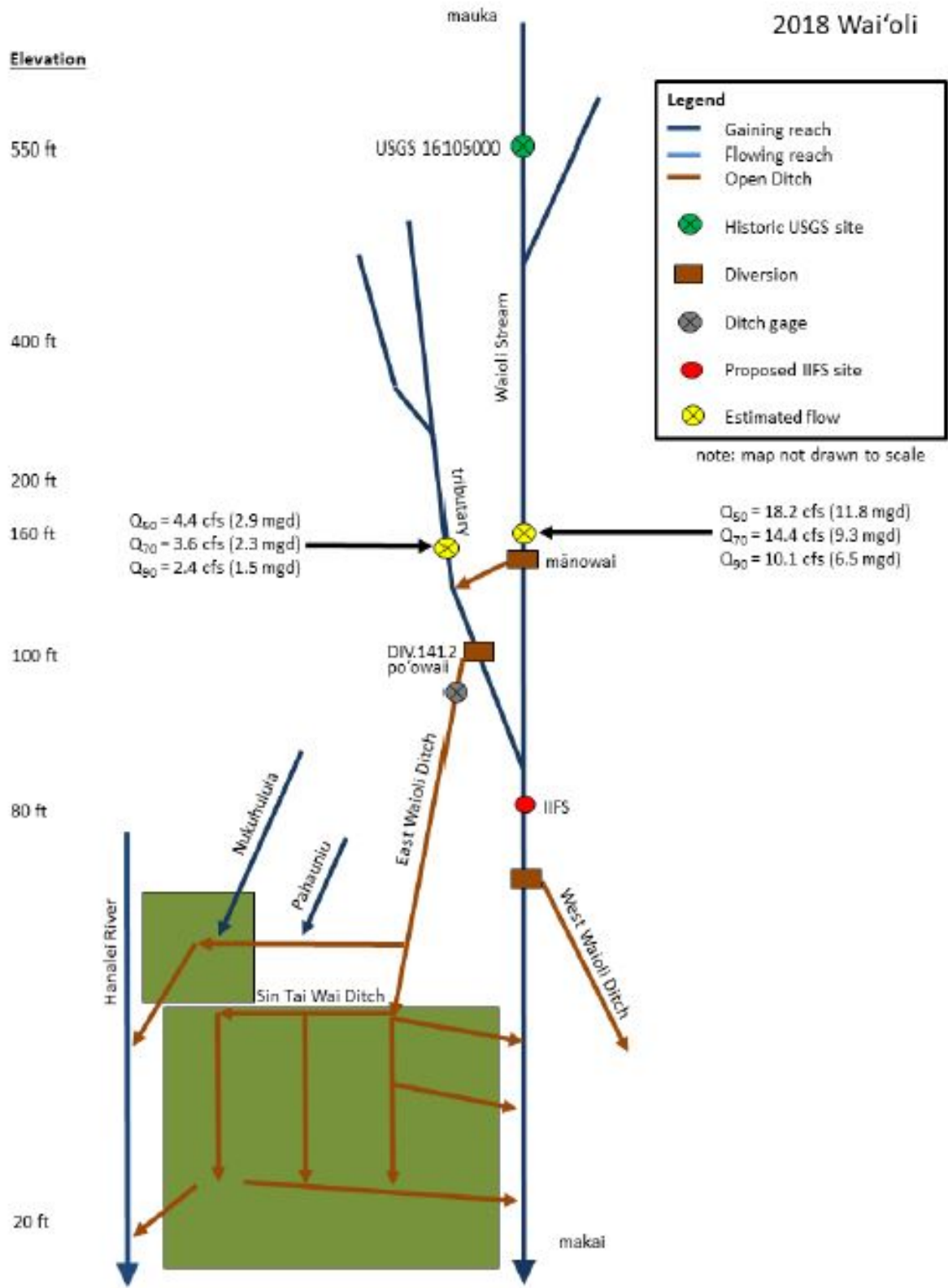
Table 2. Low-flow duration values in Wai'oli Stream, Wai'oli tributary, and downstream points based on the proposed IIFS.

location	Q ₅₀	Q ₇₀	Q ₉₀
Wai'oli Stream above mānowai	18.2 (11.8)	14.4 (9.3)	10.1 (6.5)
Estimated tributary inflow on right bank	4.4 (2.9)	3.6 (2.3)	2.4 (1.5)
Total water available at po'owai	22.6 (14.6)	18.0 (11.6)	12.5 (8.0)
IIFS below confluence of tributary with Wai'oli Stream	6.3 (4.0)	6.3 (4.0)	6.3 (4.0)
Available at the po'owai	16.3 (10.6)	11.7 (7.6)	6.3 (4.0)

- **Monitoring**
 - The Wai'oli Valley Taro Hui will monitor East Wai'oli Ditch below the Diversion 1412 intake and report the quantity of water removed at the po'owai to the Commission quarterly (e.g., estimated daily flows based on frequent readings). Staff shall work with the Wai'oli Valley Taro Hui to install a gaging device (e.g., Parshall Flume). Readings shall be taken on a sub-weekly basis (i.e., 3 to 4 times per week), with water use reporting to the Commission on a quarterly basis.
 - Staff shall make periodic low-flow measurements in the stream and at the ditch intake.
 - Staff will work with the Wai'oli Valley Taro Hui to make synoptic measurements within Wai'oli to better understand gains in streamflow from the historic USGS station to the mānowai.
- **Evaluation**
 - Within five years from the date of adoption of an interim IFS, staff shall report to the Commission on the progress of implementing the interim IFS and the application of the adaptive management strategies outlined above, and the impacts of the interim IFS upon instream and noninstream uses.

³ Dr. Lilikalā Kame'eleihiwa testimony in Waiāhole CCHOA95-1, Commissions FOF No. 976 (CCHOA95-1 Dec. 24, 1997) and Emma Metcalf Nakuaina, Ancient Hawaiian Water Rights: And Some of the Customs Pertaining to Them, in Hawaiian Almanac & Annual For 1894. (1893) p. 79.

Figure 2. Schematic depiction of Wai'oli Stream, historic USGS monitoring station, and estimated flows, in relation to the East Wai'oli Ditch, lo'i and associated ho'i in the Wai'oli and Hanalei area.



- As the current lack of data regarding stream flows have affected Commission staff's ability to estimate low-flow characteristics, if sufficient data are gathered to warrant revising the interim IFS, that will be done at a future Commission date.
- Traditional and Customary Native Hawaiian Rights and Practices
 - Per HRS 174C-101, the Commission recognizes the range of Traditional and Customary practices that exist in this watershed including but not limited to lo'i kalo, gathering in and around the stream and 'auwai, spiritual practices, and the traditional land and water management system of kalana.

Ola i ka wai,

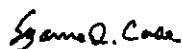


M. KALEO MANUEL
Deputy Director

Note: Exhibits are available from the Commission website at
<http://dlnr.hawaii.gov/cwrm/surfacewater/ifs/kauai/2018-waioli/>.

- Exhibit 1 DRAFT Instream Flow Standard Assessment Report PR-2021-01
<https://files.hawaii.gov/dlnr/cwrm/ifsar/PR202101-2018-WaioliDraft.pdf>
- Exhibit 2 Staff Submittal on April 20, 2021
<https://files.hawaii.gov/dlnr/cwrm/submittal/2021/sb20210420C3.pdf>
- Exhibit 3 Written testimony provided by the Wai'oli Valley Taro Hui, etal.
<https://files.hawaii.gov/dlnr/cwrm/submittal/2021/sb20210420C3T.pdf>

APPROVED FOR SUBMITTAL:



SUZANNE D. CASE
Chairperson

I Mano ka Wai‘oli

*Sustaining the Joyous Waters,
A Cultural Impact Assessment of the Wai‘oli Lo‘i Kalo Irrigation System*

Kaua‘i Mokupuni
Halele‘a Moku, Wai‘oli Ahupua‘a
Hanalei Kalana



Dominique Leu Cordy, M.A.
&
Lilia Merrin, M.A.

Prepared for:
Wai‘oli Valley Taro Hui

Prepared by:
Nohopapa Hawai‘i October 2020

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Abbreviations and Glossary of Hawaiian Terms

Abbreviations

Above mean sea level	amsl
Bernice Pauahi Bishop Museum	BPBM
Board of Land and Natural Resources	BLNR
Commission on Water Resource Management	CWRM
Cubic feet per second	cfs
Department of Accounting and General Services	DAGS
Department of Hawaiian Home Lands	DHHL
Division of Aquatic Resources	DAR
Environmental Assessment	EA
Fahrenheit	°F
Flood Insurance Rate Map	FIRM
Gallons per acre per day	gad
Kaua'i Historic Society	KHS
National Wildlife Refuge	NWR
Hawai'i Revised Statutes	HRS
Hawai'i Stream Assessment	HSA
Land Commission Award	LCA
Land Court Application	LCApp
Million gallons per day	mgd
National Register of Historic Places	NRHP
Native Register	NR
Native Testimony	NT
Office of Conservation and Coastal Lands	OCCL
Office of Hawaiian Affairs	OHA
Register Map	RM
Department of Land and Natural Resources	DLNR
State Historic Preservation Division	SHPD
United States Geological Survey	USGS
University of Hawai'i	UH
Wai'oli Valley Taro Hui, Inc.	Hui

Glossary of Hawaiian Terms

ae‘o	Hawaiian stilt, endemic waterbird
‘ai pono	eating of traditional Hawaiian foods
‘āina	land
ahupua‘a	land division
akua	god, deity
‘alae ke‘oke‘o	Hawaiian coot, endemic waterbird
‘alae ‘ula	Hawaiian moorhen, endemic waterbird
ali‘i	chief
‘auwai	irrigation ditch
corm	food-bearing underground stem (see ‘i‘o)
hinana	young ‘o‘opu, formerly caught in nets
hīhīwai	also called wī, freshwater pūpū (mollusk)
ho‘i	out-takes or returns
huli	revegetative portion of kalo that is re-planted, between corm and leaf
kalo	<i>Colocasia esculenta</i> , or taro
kalo pa‘a	cooked table kalo
Kānaka Maoli	Native Hawaiian
kī	<i>Cordyline fructosa</i> , ti, ti leaf, lā‘ī, lau‘ī
kinolau	physical manifestation
mahi‘ai	farmer
moloa maoli	Hawaiian duck, endemic waterbird
kuāuna	bank or border of a kalo patch
kūpuna	ancestors, also grandparent
lā‘ī	<i>Cordyline fructosa</i> , ti, ti leaf, kī, lau‘ī
lawai‘a	fisher
lau	leaf, specifically often kalo leaf
lo‘i	flooded/wetland irrigated field
lo‘i kalo	irrigated wetland field growing kalo
lū‘au	kalo leaf
ma kai	to/towards the ocean
ma uka	to/towards the mountain
mana wai	tributary
mana‘o	thought, idea, belief, opinion
mānowai	traditional intake
manu	bird
mele	song or poetic text
moku	district
mo‘olelo	oral history, historic tale, legend
muliwai	river mouth characterized by brackish water
na‘au	physically the center of your body, metaphorically: gut, heart, feeling
nā‘ū	endemic Hawaiian gardenia
nī‘oi	Hawaiian chili pepper

nūpepa	Hawaiian Language newspapers
‘ōlena	turmeric
oli	chant or chant text
pae ‘āina	archipelago
po‘owai	secondary water diversion
pu‘uone loko i‘a	inter-tidal fishpond
wai	fresh water
wī	short for hīhīwai

Introduction

At the request of the Wai'oli Valley Taro Hui ("Hui"), a 501(c)3 non-profit with federal tax exempt status, Nohopapa Hawai'i, LLC conducted a Cultural Impact Assessment ("CIA") for the Wai'oli Lo'i Kalo Irrigation System. The Hui is applying for a long-term water lease pursuant to Hawai'i Revised Statutes ("HRS") chapter 171; this CIA will be appended to an Environmental Assessment ("EA") for the continued use of water from this system. The Proposed Action seeks legal approval to continue to use water from Wai'oli Stream at its source (TMK 5-6-002:001) for the purpose of wetland kalo cultivation, a Native Hawaiian practice that has been a cultural foundation and has shaped the Indigenous landscape of the greater Wai'oli community since time immemorial. Similar to how the lo'i kalo (wetland taro) irrigation system weaves through the land, the practice of cultivating kalo connects families over generations and is a time-honored part of the community's history and legacy. This CIA seeks to assess the cultural impacts associated with the proposed long-term water lease for continued wetland kalo cultivation within the traditional Wai'oli Lo'i Kalo Irrigation System.

The primary purposes of this study are: to account for historical and archival information; document appurtenant rights to water for traditional use; identify cultural resources, beliefs, and practices in the Project Area; give voice to community 'ike (knowledge) and mana'o (thoughts) on the Proposed Action; and summarize community uses, resources, concerns, and recommendations as they relate to Native Hawaiian traditional and customary practices within the Study Area; specifically, how the Proposed Action might impact these practices, beliefs, and resources, both in the present and in the future.

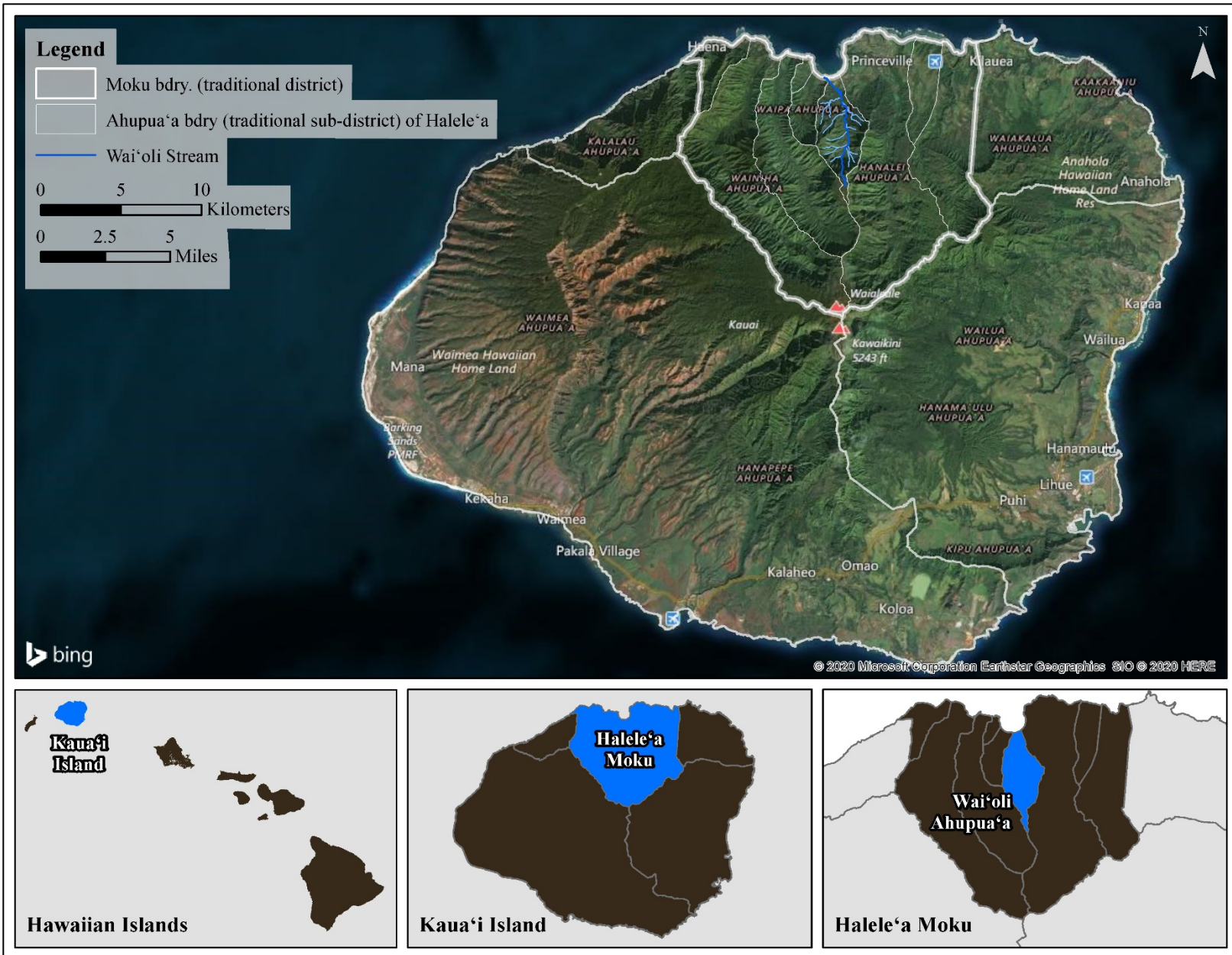


Figure 1. Depiction of Wai'oli Stream in relation to Kauai Island and the main Hawaiian Islands.

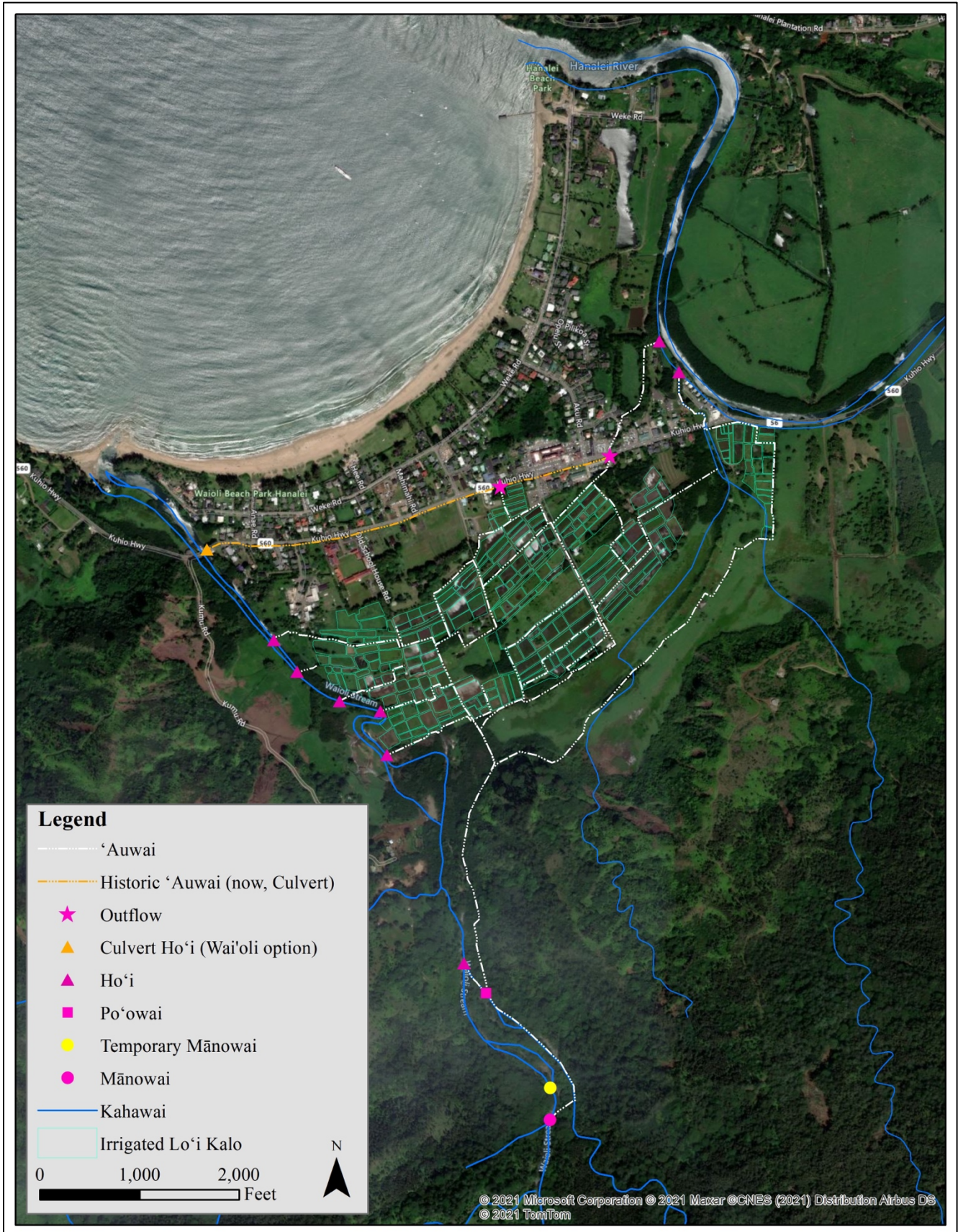


Figure 2. Depiction of Study Area: The Wai'oli Lo'i Kalo Irrigation System.

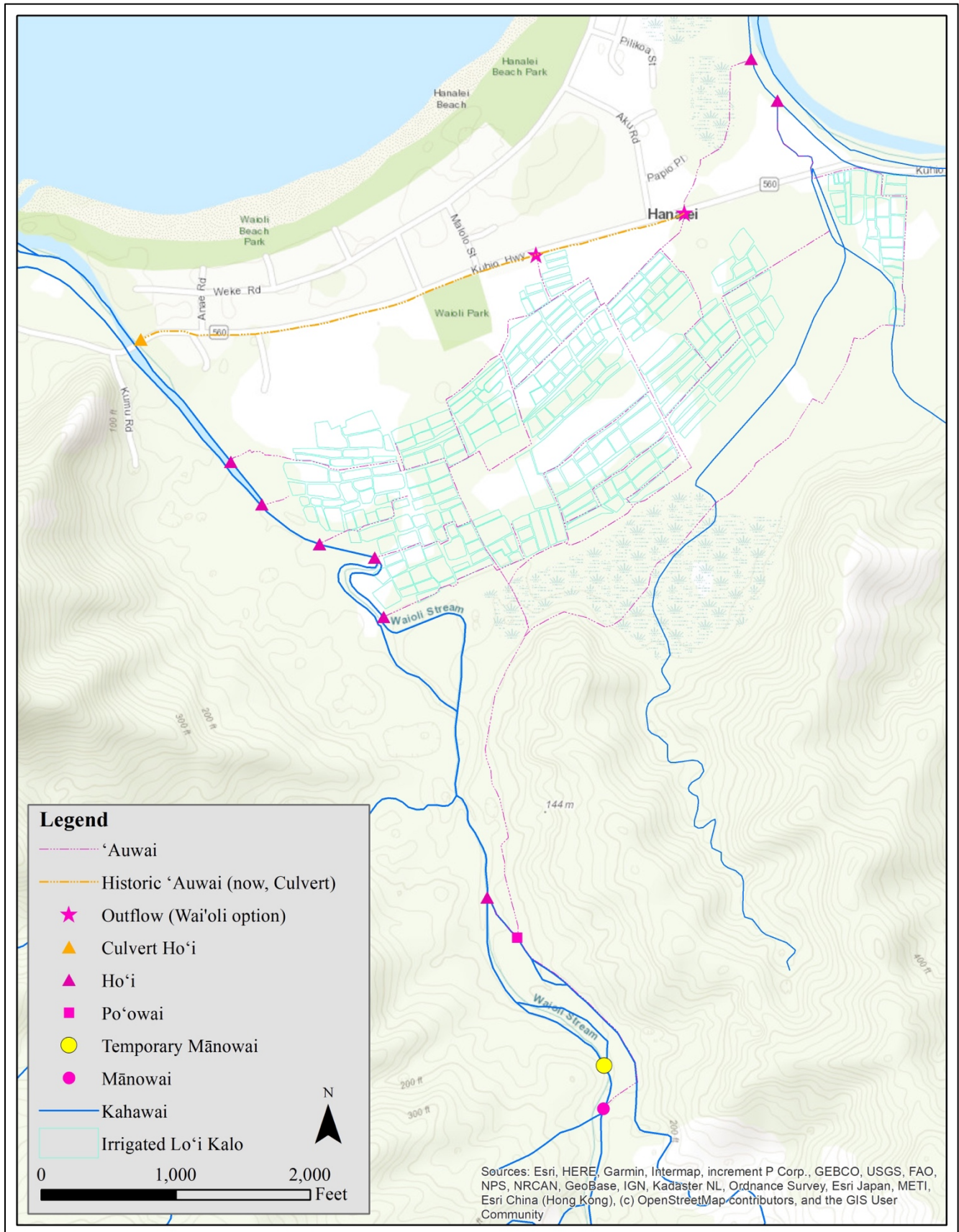


Figure 3. Depiction of Study Area: The Wai'oli Lo'i Kalo Irrigation System.

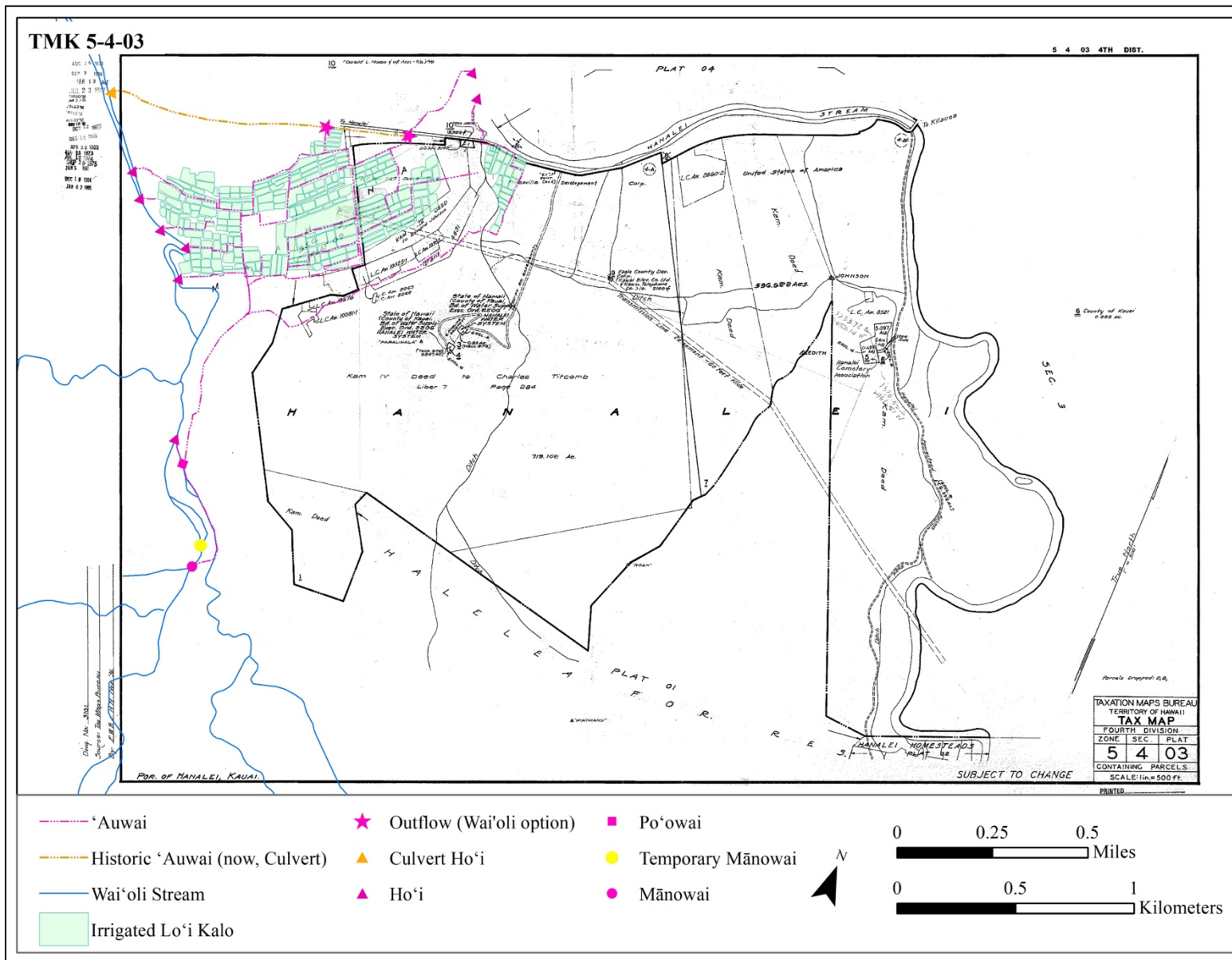


Figure 4. Tax Map Key Plat 5-4-03

TMK Plat 5-5-06

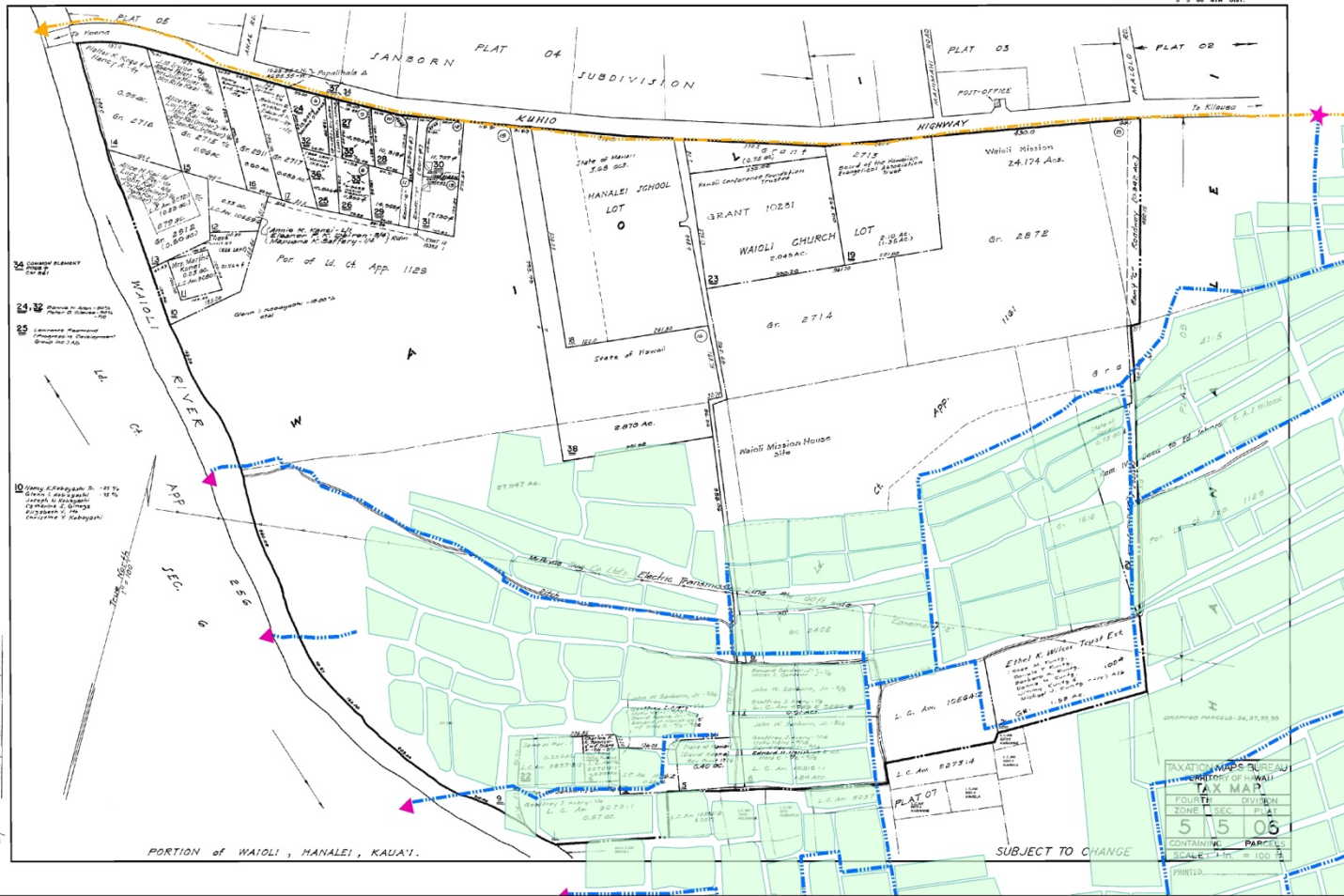


Figure 5. Tax Map Key Plat 5-5-06

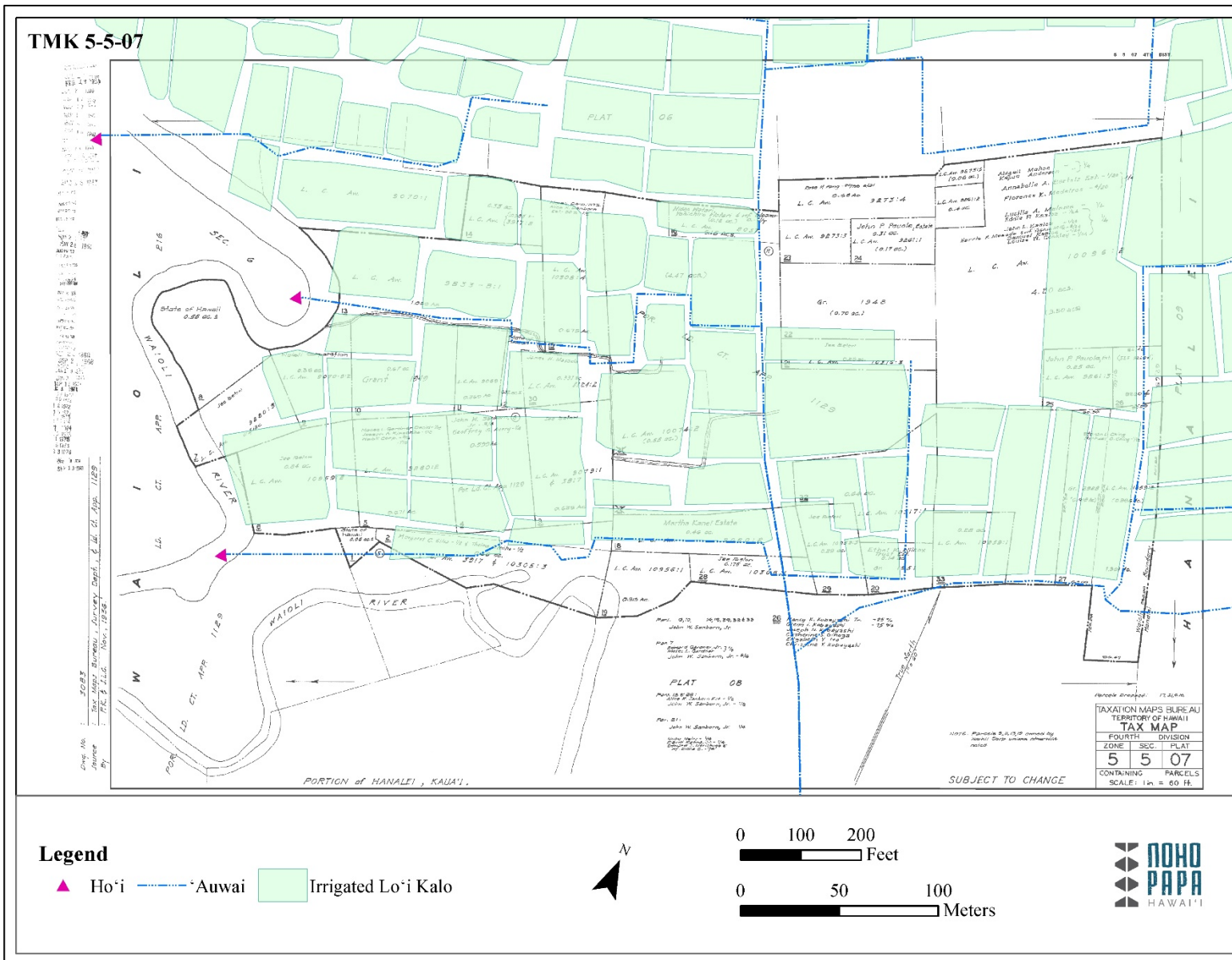


Figure 6. Tax Map Key Plat 5-5-07 depicting location of Wai'oli Lo'i Kalo Irrigation System.

TMK Plat 5-5-08

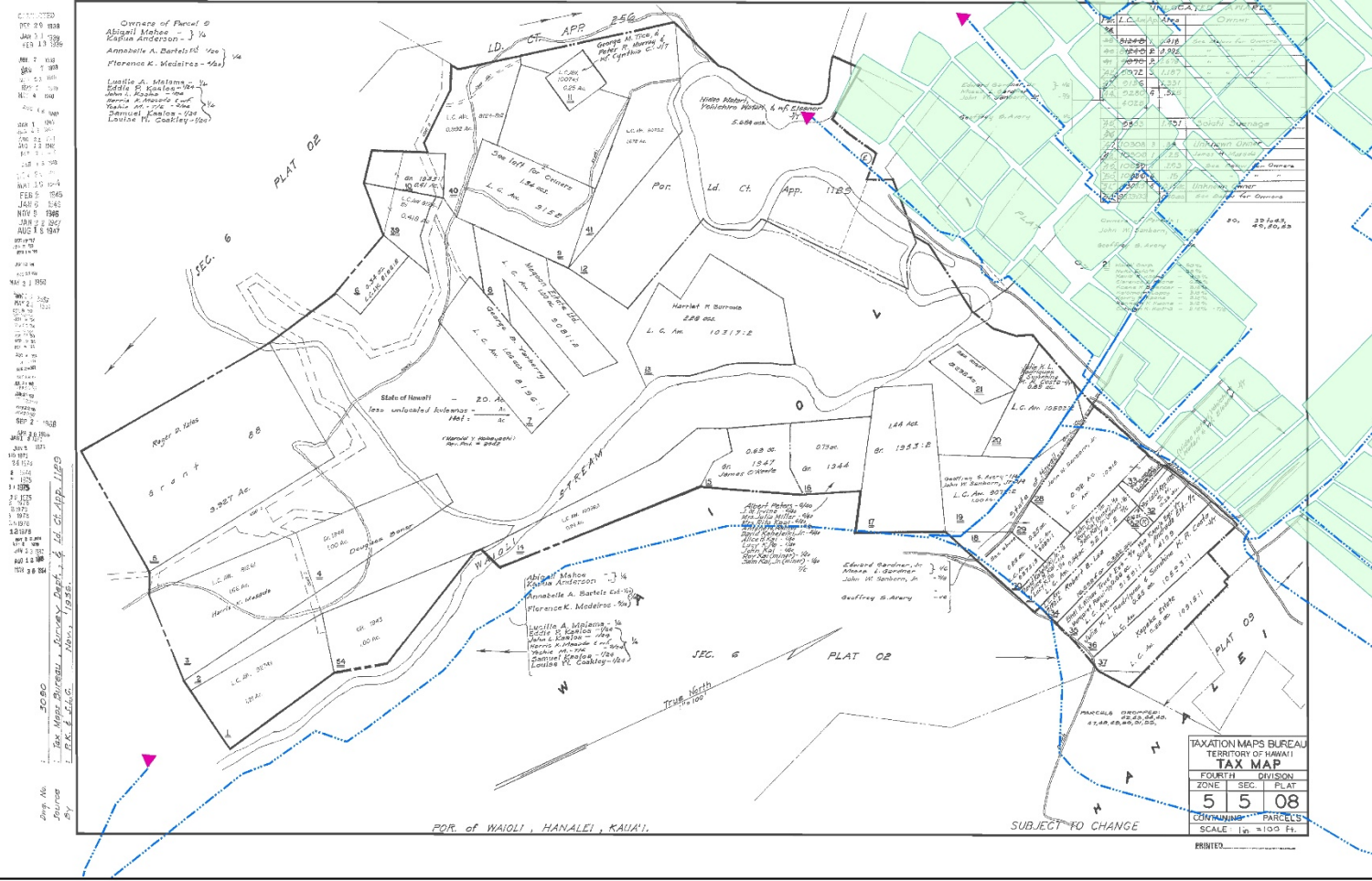


Figure 7. Tax Map Key Plat 5-5-08 depicting location of Wai'oli Lo'i Kalo Irrigation System.

Scope of Work and Guiding Principles

The study spanned a three-month period from August to October 2020. Project personnel included: Kelley Uyeoka, M.A., Dominique Leu Cordy, M.A., Lilia Merrin, M.A., and Momi Wheeler, B.S. While conducting this study, Nohopapa Hawai'i's research team incorporated a set of values to guide our research, analysis, behavior, perspective, and overall frame of reference, including:

- **Aloha 'āina** - to have a deep and cherished love for the land that created and sustains us
- **Ha'aha'a** - to be humble, modest, unassuming, and unobtrusive
- **Ho'omau** - to recognize, appreciate, and encourage the preservation, perpetuation, and continuity of our wahi pana (storied places) and lāhui (nation)
- **'Ike pono** - to recognize, feel, and understand righteousness, properness and goodness in all we do
- **'Imi Na'auao** - to seek knowledge or education; be ambitious to learn
- **Kuleana** - to view our work as both a privilege and responsibility
- **Pule** - to open the connection and communication lines to a higher source of power so that this work is intentionally guided

With these values as a kahua or foundation, the project team also looked to guiding documents, including the Hawai'i Environmental Council's Guidelines for Assessing Cultural Impacts (Appendix A: Guidelines for Assessing Cultural Impacts), A Bill for Environmental Impact Statements (Appendix B: A Bill for Environmental Impact Statements), and Act 50 [State of Hawai'i 2000] (Appendix C: Act 50 [State of Hawai'i 2000]). Through multiple planning meetings, Nohopapa and the Wai'oli Valley Taro Hui developed a general scope of tasks to guide this CIA.

1. Project Planning – meetings with the Wai'oli Valley Taro Hui, made up of sixteen (16) kalo farmers and their families, all with genealogical ties to Halele'a, and topic area experts, including D. Kapua Sproat, Director of Ka Huli Ao Center for Excellence in Native Hawaiian Law and the Environmental Law Clinic at the University of Hawai'i at Mānoa's Richardson School of Law, to develop a framework for this important work.
2. Ethnohistorical Research – gathering relevant cultural and historical information on the Wai'oli Lo'i Kalo Irrigation System, as well as the surrounding area and resources; and analyzing mo'olelo (oral histories), mele and oli (songs and chants), 'ōlelo no'eau (poetical sayings), inoa 'āina (place names), historical maps, photographs, documents, and relevant archaeological reports.
3. Community Ethnographic Interviews – conducting ethnographic interviews with topic area experts and cultural practitioners.
4. Report Compilation – compiling accompanying figures and narratives, and crafting recommendations.

Project Area – The Wai‘oli Lo‘i Kalo Irrigation System

Environmental Setting

This Project Area is located on the Island of Kaua‘i, along its north-facing coast, in the moku (traditional Hawaiian land division similar to a district)¹ of Halele‘a. There are four ahupua‘a or traditional Hawaiian land divisions that frame Hanalei Bay. From the mountains of these ahupua‘a, four perennial waters flow their lengths and empty into Hanalei Bay, making up the Hanalei Bay Watershed:

1. Hanalei River
2. Wai‘oli Stream
3. Waipā Stream
4. Waikoko Stream

The ahupua‘a of Hanalei, Wai‘oli, Waipā, and Waikoko share similar environmental landscapes: sandy shores along Hanalei Bay giving way to low dunes. Immediately inland of the dunes are irrigated lo‘i kalo that stretch into the upper valleys, though they span a shorter distance in the shallower valleys on the west. There is great variation in how far inland the upper valleys extend. Hanalei, the easternmost ahupua‘a, extends over 13.5 stream miles from its mouth to the base of Wai‘ale‘ale. Wai‘oli extends over 3.85 miles from its stream mouth to the base of its wai hālau (mountain source): Nāmolo-kama Mountain. Waipā extends a little over 2 miles from its stream mouth to the base of Mamalahoa. Waikoko, the smallest, and westernmost ahupua‘a, stretches a mere 0.75-0.80 miles from its stream mouth to its source along the ridge separating Lumaha‘i and Waikoko.

Wai‘oli Lo‘i Kalo Irrigation System

The Project Area for the purposes of this report follows the path in which the water flows through the Wai‘oli Lo‘i Kalo Irrigation System. The Project Area begins ma uka, in Wai‘oli Stream, 1.8 stream miles from the mouth at Hanalei Bay. Water from the Wai‘oli Stream enters the system here, at the mānowai. A māno wai or mānowai is interchangeable with māno, which is defined as:

n. Dam, stream or water source, headwaters, place where water is obstructed for distribution in channels; *fig.* source of water and of life.²

n. Artificial head of a stream of water; place where water is assembled for distribution through channels; *fig.* the heart.³

A mānowai is also the word used to define the physical heart. It is revealing that the term used to describe the organ that pumps blood through our veins is the same to describe the origin source of any ‘auwai system called a mānowai.

¹ There are five (5) moku on Kaua‘i.

² Pukui 1986: 239.

³ Andrews 1922: 419.

An apt metaphor, the mānowai is the source of water for the entire Wai'oli Lo'i Kalo Irrigation System. As the heart of this system, the mānowai guides water from Wai'oli Stream into a channel 1.8 miles upstream of its mouth. A mere 0.38 miles downstream from the mānowai is the po'owai. From the po'owai, water is split into two paths. The first path returns water to Wai'oli Stream at the first ho'i (return or out-take) of the system and the second path allows water to flow parallel to the stream along the main 'auwai. Close to 0.46 miles down this 'auwai from the po'owai (and approximately 0.84 miles from the mānowai) is the main Wai'oli split. At this split, the waters divide to flow north, into the Wai'oli side of the system and east, towards the Hanalei side of the system.

From the main 'auwai entering the Wai'oli coastal plain, smaller 'auwai branch out, flowing in and out of lo'i kalo before returning to the Wai'oli Stream at various ho'i that mark the terminus of the system. Eventually, the waters from the mānowai flow back into Hanalei Bay. If the mānowai is broken, destroyed or blocked; if it falls into disrepair; if a large flood occurs; or if the rights are lost to collect water at that crucial part of Wai'oli Stream, the entire 'auwai system would dry up. Much like a failed heart that can no longer pump blood, if the mānowai fails or is not permitted, there is no water and, thus, no life.

Kalo (*Colocasia esculenta*), taro

Although kalo is cultivated across the Pacific, Hawai'i is the only place where kalo achieved agricultural dominance and became the primary staple crop of a people. In Hawai'i, kalo is pounded (ku'i) into pa'i 'ai (pounded but undiluted taro) using a papa ku'i 'ai (poi board) and a pōhaku ku'i 'ai (poi pounder). Kalo nourished the bodies of the earliest Kānaka Maoli, and it became a traditional cultural food source. The practice of 'ai pono, the preparing and eating of Native Hawaiian traditional and customary foods, continues today. These foods include many made with kalo: poi, pa'i 'ai, kūlolo, laulau, and lū'au. Of the kalo plant, one can eat the lau (leaf), the 'i'o (corm), and even the stem (hā).



Figure 10. Photograph of kalo fields, Wai'oli ahupua'a, Hihimanu in the background.

In the Native Hawaiian pantheon, kalo is more than a plant or a source of nourishment. Hāloa is the elder brother of Kānaka Maoli and holds a special place in the mythological history of Native Hawaiians. There are several origin stories of Kānaka Maoli, but the story of Hāloa is less biblical than others, and perhaps older.⁴ The akua (god) of the heavens, Wākea, and the akua of the earth, Papa, were with child, and Papa gave birth to Ho'ohōkūkālani, a daughter. Ho'ohōkūkālani became hāpai (pregnant) but her first child, Hāloa, was stillborn. Ho'ohōkūkālani mourned and her tears watered the earth where she buried her child, Hāloa. From that very spot grew a plant, named Hāloanakalaukapalili, the first kalo plant.

Lau-Kapalili. Lau-kapalala.
Tremble leaf. Broad-leaf.⁵

Ho'ohōkūkālani became hāpai again; this child lived, and he too was named Hāloa, in memory of his elder brother. Hāloa went on to be the progenitor of the Hawaiian people and Hāloanaka, the progenitor of kalo.

Through this mo'olelo, Kānaka Maoli and every kalo plant share a mo'okū'auhau, a genealogy, through the line of Ho'ohōkūkālani. It is no wonder that the 12-15 month cultivation of this plant is a traditional and customary Native Hawaiian practice. More than one farmer has spoken of the kalo growing in their lo'i as their children.

I maika'i ke kalo i ka 'ohā.
The goodness of the taro is judged by the young plant it produces.⁶

To honor their kūpuna (ancestors), Hāloa, and to feed their own children, Kānaka Maoli built “complex irrigation ditches to extract (and return) water from permanent streams and closely controlled water flow and circulation within the fields to control stagnation, temperature and prevent disease.”⁷ In almost every windward lowland valley with a perennial water source, kalo was cultivated, until the irrigated lo'i (wetland field) agricultural system that sustained it evolved into a uniquely Native Hawaiian cultural landscape.

Cultivation practices of kalo farmers – both of long ago and today – are rooted in the cultural practice of kilo (observation). At least two of the kalo farming families in Wai'oli observe the moon and plant according to the Hawaiian Moon Calendar, kaulana mahina. In this practice, there are moons for harvesting, moons for planting, and moons for weeding. Irrigated lo'i kalo farming requires the observation of kalo, the seasons, weather, as well as the maintenance of the irrigation system, from ma uka at the mānowai, to the ho'i along the stream, to the muliwai at the stream mouth. Kalo farmers recognize the need to maintain balance throughout the entire system to grow healthy kalo.

The Wai'oli Lo'i Kalo Irrigation System is an extremely interconnected Indigenous Hawaiian agroecosystem⁸ that stretches across the coastal plains of Wai'oli and Hanalei, and is situated

⁴ *Moolelo Hawaii Kahiko: Ka Moolelo o ko Wakea ma Noho ana ma Kalihi – Ka Laa ana o keo Ahua Ulu o Kameha'ikana*, Ka Nai Aupuni, 22 June 1906; *Moolelo Kahiko No Hawaii, Mokuna III, Ka Moolelo o ko Wakea*, Ka Hoku o Hawaii, 9 April 1929.

⁵ These were the names given to the leaves of the very first kalo plant, which according to legend was named Hāloa. Kalo leaves are sometimes referred to poetically by these terms. Pukui, No.1952, 1983: 211.

⁶ Parents are often judged by the behavior of their children. Pukui, No.1232, 1983: 133.

⁷ Kurashima et al. 2019.

⁸ Kurashima et al. 2019.

behind the dune system that stretches from the mouth of Wai'oli Stream to the base of Papalihala. The majority of the Project Area elevation is at sea level to 10 feet above mean sea level (amsl). The elevation of the po'owai is at ≤ 50 feet above mean sea level and the mānowai is between 100-125 feet amsl (GDSI data set, Kaua'i 50-foot contours). The remainder of the 'auwai, the lo'i, and all ho'i are situated within 0-10 feet amsl.

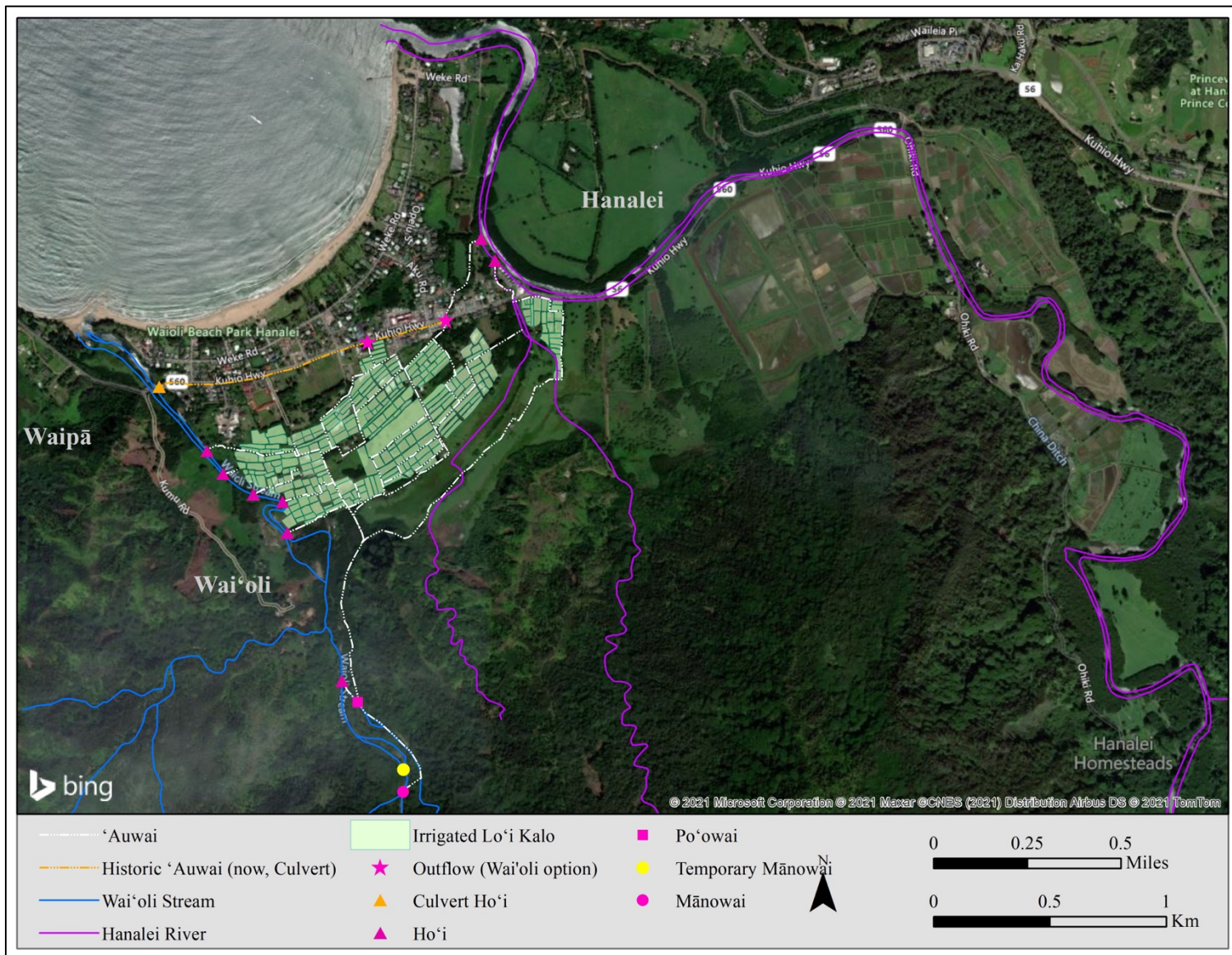


Figure 11. The Project Area, showing the Wai'oli Lo'i Kalo Irrigation System as reconstructed from historical research, community interviews and GIS data.

Archaeological Context

This portion of the report generally discusses previous archaeological studies along or beyond the boundaries of the Project Area to better understand the larger settlement patterns, history, and cultural landscape of the area.

No archaeological work has been conducted within the irrigated fields of the Wai‘oli Lo‘i Kalo Irrigation System. A chronological summary of archaeological work conducted within and nearby the Project Area is presented in the table below. Some archaeological work has been conducted along Kūhiō Highway, in the coastal sand areas seaward of the Wai‘oli Lo‘i Kalo Irrigation System. This seaward archaeological work consists of discrete projects or inadvertent discoveries associated with private home development or public works projects (e.g., pipelines, roadwork, etc.).

The archaeological reports in the coastal sand areas have recorded iwi kūpuna (ancestral remains) along the coastal dunes, which is consistent with where people would have lived and buried their ‘ohana (family members). This corresponds with the pāhale, per Māhele claims, which were the dominant land use in the sand dunes seaward of the Project Area and Kūhiō Highway.

Table 1. Previous archaeology in Wai‘oli ahupua‘a and the surrounding area.

Reference	Location	Type of Study	Results and Comments
1976 Neal (KHS)	North shore Route Hanalei bridge – Hā‘ena	NRHP Nomination Form	
1979 Cleghorn	Hanalei Refuge	Arch Reconnaissance	
1979 Hammatt & Folk	Wai‘oli Mission Hall	Arch Excavations	
1980 Schilt	Hanalei Refuge	Arch Investigations	
1980 Kennedy	Wai‘oli	Arch Reconnaissance	
1991 Kennedy	Hanalei	Arch Data Recovery	
1993 Shapiro, Shapiro, & Cleghorn	Hanalei Refuge	Arch site records from arch field investigations	
1993 Shapiro	Hanalei Refuge	AIS post field summary	
2014 Runyon, Shideler & Hammatt	Hanalei (town)	AIS	
2017 Hazlett & Dega	Wai‘oli-Hanalei	Draft – Arch Monitoring Plan	
2017 Hazlett & Dega	Wai‘oli-Hanalei	Arch Assessment	
2020 McMahan	Hanalei	Arch Field Inspection	
2020 McMahan	Hanalei	“Ka Pa‘akai Analysis”	

Formation of Traditional Irrigation Systems across Hawai'i

Because of the absence of archaeological study specific to Wai'oli, project staff surveyed manuscripts and reports beyond Wai'oli Valley, in neighboring Hanalei as well as other traditional irrigation systems similar in scale, production, and geographic setting to Wai'oli. This is far from a complete review of the development of irrigated kalo cultivation. The purpose of this research, rather, is to better estimate when irrigated lo'i kalo cultivation developed in Wai'oli.

There is no agreement in the archaeological community today on a definitive early settlement date in Hawai'i. The most likely dates for settlement are between AD 300-600 and AD 800-1000.⁹

The traditional irrigated kalo system at European contact usually consisted of lower valley and upper valley patterns. Canals or 'auwai that branch out to multiple lo'i (walled fields) are characteristic of wetland plains in the lower valleys, with water draining back into the valley stream. In upper valleys, there are descending terraces with water flow commonly from an upper valley tributary stream or spring into the uppermost terrace, and then flowing terrace to terrace and back into the stream. The chronology of the formation of these systems is not fully known in most areas of the islands.

All researchers agree that there would have been kalo cultivation in the wetlands of lower valleys during initial settlement of the islands, but likely not in walled irrigated fields. There are dated kalo soils in the lower valley wetlands of Wai'anae, Waikiki, and Honouliuli on O'ahu in the AD 1000-1100 range, which suggest more extensive wetland planting on the leeward side of O'ahu and probably some type of water control, and perhaps walled fields. Kalo evidence within walled fields (root stains, field soils, etc.) has been found in lower- and mid-valley floodplains from several major islands on both windward and leeward sides with dates ranging from AD 1200s-1400s (Kailua on O'ahu, Wailau on Moloka'i, Waipi'o on Hawai'i). A range of dates for upper valley terraces in Maunawili in Kailua and Luluku in Kane'ohe on windward O'ahu span a range of AD 900s-1200s, with Luluku possibly earlier, and one would expect contemporaneous, if not earlier, walled fields in the lower valley wetlands of Kailua and Kane'ohe.

Researchers have not established a complete chronological development of wetland to irrigated fields in any prime early sites throughout Hawai'i. One example is in Waipi'o, Hawai'i Island, where dating of fields found that irrigated fields were present in the mid-valley floor in the AD 1200s-1400s and that the side valley terraces of Hi'ilawe dated in the AD 1600s, suggesting side valley terracing came later than that on the valley floor. Because this sampling did not include the seaward portions of the valley floor behind the coastal dune, it is unknown when this area was put into walled irrigated fields. The researchers noted that this was a wetter area, and thus may have converted to fields with canals later than the mid-valley areas or at the same time.

Early Settlement in Halele'a

Hanalei Bay is likely to have been an early settlement area on Kaua'i. "As with windward O'ahu, the windward coast of Kaua'i would have been a favorable environment to early settling parties,

⁹ Kirch 1979; Cordy 2000; Cordy unpublished manuscript (pending, 2021).

and future work in this region will likely turn up additional indications of lengthy occupation.”¹⁰ Early Kānaka Maoli arriving at Hanalei Bay would have found an optimal environment – high rainfall for rain-dependent crops, wetlands for kalo, and sandy beaches and calm seas for easy access to marine resources. After landing on shore, arriving peoples would have most likely started to establish their “transported landscapes,”¹¹ immediately tending to the animals and plants they had brought with them on the canoe. Kalo would have been one of these important early plants, but would not have been planted in large irrigated field systems at that time, which would come later.

In early settlements, housing along with tree crops and probably rainfall-dependent crops would have been placed along the bay, with kalo in the adjacent wetlands of Hanalei and Wai‘oli, or nearer to the base of the mountains if the seaward-most part of the coastal plain was too wet.¹² In the early years as the population grew, it was likely that more houses appeared on the sandy shore and possibly some up on the dry slopes right behind the wetlands.¹³ For the upper valley of Hanalei, a date range of AD 600s-900s has been determined from deposits under later irrigated kalo soils, suggesting earlier slash-and-burn cultivation and some form of housing just at the beginning of the upper valley, but not a complex irrigation system.¹⁴ If correct, this date would suggest that irrigated wetland kalo was not yet spread into the upper valley of Hanalei, but people were farming near the front of the upper valley less formally. Based on settlement patterns across Hawai‘i, it can be assumed that the inland coastal plain of Wai‘oli would have likely had an established lo‘i kalo system before those in upper Hanalei Valley.

Though the cultural landscape in Wai‘oli and greater Halele‘a would have taken time to establish after early settlement, it is fair to assume that the Wai‘oli area would have been an optimal early settlement area and that most of the coastal wetlands of Wai‘oli were in lo‘i with water coming from canals by AD 1200s-1400s (if not earlier). Still, the exact chronology is not known at this time. The Māhele documentation detailed in the next section on Ethnohistory, specifically the Native Testimony in support of Land Commission Awards, establish lo‘i use from the 1500s.

Soils and Flooding

Wai‘oli has some of the most productive soils for wetland kalo agriculture in the entire State of Hawai‘i, and have supported an extensive irrigated system of lo‘i kalo in the Wai‘oli and Hanalei floodplains for hundreds of years.

¹⁰ Kirch 1985.

¹¹ Kirch 1989.

¹² James W. Gay, *Plain of Waioli, Situated on the Island of Kauai*. Register Map 927, October 7, 1873.

¹³ Griffin et al. 1977.

¹⁴ Schilt 1980.

Table 2. Table of Study Area soils.

Munsell Symbol	Soil Description	Farmland	Erosion
HmA	Hanalei silty clay loam, 0 to 2 percent slopes	Prime farmland if protected from flooding or not frequently flooded during the growing season	Not highly erodible land
HnA	Hanalei silty clay, 0 to 2 percent slopes	Prime farmland if protected from flooding or not frequently flooded during the growing season	Not highly erodible land
Mta	Mōkūle‘ia clay loam, poorly drained variant	Not prime farmland	Not highly erodible land
MZ	Marsh	Not prime farmland	Not highly erodible land
W	Water > 40 acres	Not prime farmland	Not highly erodible land

These flood prone soils are necessary to support the intensive wetland cultivation that characterizes the Wai‘oli Lo‘i Kalo Irrigation System. Harold Baker’s 1975 study *Agricultural Lands of Importance to the State of Hawaii* provides an appraisal of farmland based on soils across the State (Table 2). Forty-five years later, Baker’s report is still used to categorize and assess soils; it is a companion download to the soils shapefile layer on the Hawai‘i Statewide Geographic Information System (“GIS”) Program website.¹⁵ Baker’s value for prime farmland, however, is measured through the lens of intensive farming. It is curious that such fertile soils would get a conditional farmland classification as prime farmland only “if protected from flooding or not frequently flooded during the growing season.”¹⁶ The very nature of the Wai‘oli Lo‘i Kalo Irrigation System prevents frequent and seasonal flooding. The mānowai is designed to break away during large flood events, preventing inundations of the agricultural system. This flood control mechanism has been in place for centuries in Wai‘oli – well before the State of Hawai‘i or Territory of Hawai‘i farmland typology evolved.

From an agricultural perspective, the cultural cultivation of kalo requires adaptability and a community of practice to maintain over 6.15 miles of ‘auwai. Adaptability is important for a system like Wai‘oli’s, which is situated in a floodplain. Annual rainfall in the Project Area averages about 118.22 inches/year (3,000 mm).¹⁷ Rainfall, however, can vary greatly throughout the year. In addition, in the uppermost reaches of Wai‘oli Valley at its wai hālau, Nāmolo-kama Mountain, the average rainfall in a year has been recorded at 236-275 inches.¹⁸ Extreme weather events in 2018 caused massive damage to the Wai‘oli mānowai, generated landslides along Makaihuwa‘a, the ridge separating Waipā and Wai‘oli, and sent floodwaters across the coastal plains of Wai‘oli and Hanalei, into Hanalei Town. As mentioned previously, the mānowai, the

¹⁵ State of Hawai‘i, Office of Planning GIS Program.

¹⁶ Baker 1975.

¹⁷ Giambelluca et al. 2013; State of Hawai‘i Office of Planning GIS data.

¹⁸ Giambelluca et al. 2013; State of Hawai‘i Office of Planning GIS data.

intake at the top of the system, is designed to fail under large flood events, as is the po'owai; this way, torrential waters aren't forced into the system, possibly destroying the main ditch and the system of 'auwai and fields below.

Although many have referred to the April 2018 flood as a 100-year flood or a 500-year flood, it was actually a 143-year flood. A similar rain event occurred in Wai'oli in May 1877, and was recorded in the following account in a Hawaiian language newspaper (nūpepa).¹⁹

Ka Nupepa Kuokoa: 2 Iune 1877	Ka Nupepa Kuokoa: 2 June 1877
<p>Ma ka lā 16 o kēia mähina, he kuāua ko'iko'i kai hā'ule iho ma nā Mauna uliuli o Hanalei.</p> <p>A ua 'ike 'ia aku ka piha pono o nā awāwa i nā wai e hiolo mai ana ma ke alo o nā pali, a i ka puka 'ana mai o kēia wai i kai, ua hōlapu a'ela 'o ia i nā hale, a me nā 'Āina kokoke i ka lihi kahawai, a ua pa'a pū kekahi mau 'āina i ka lepo, ke a'a me nā paukū lā'au. He nui nō nā waiwai i pohō ma muli o kēia pilikia 'ike mua 'ole 'ia.</p> <p>Eia nā mea i lilo loa aku i ka wai, Pua'a, Moa, Kao, Lio, a me kekahi mau waiwai 'ē a'e, he mau ka'a Hoki kekahi, a he mau ka'a hali ko kekahi, a me nā hale.</p> <p>He nui ka pohō o ka po'e mahi Laiki.</p> <p>'A'ole i ho'olu'ulu pono 'ia ka nui o kēia pohō, 'akahi nō a pili pono kēia inoa iā Hanalei ka ua loku o Hanalei, ka ua loku 'ia ke hele ala a noho pono nā pōhaku a me nā pihā a i loko o nā lo'i kalo. 'A'ole 'o ia wale he pali kekahi ua hiolo 'ia.</p> <p>'Ane'ane piha ka 'Eka i kahi a kēia pali i hiolo ai kona mau lepo. He mau lono kai lohe 'ia mai. Aia ma Anahola kekahi ha'awina o kēia ulia pō'ino. Me ka mahalo.</p> <p style="text-align: right;">R. Pu'uiki</p> <p style="text-align: center;">Hanalei Kaua'i Mei 19, 1877</p>	<p>On the 16th of this month, a large rain bank fell on the dark mountains of Hanalei.</p> <p>And we saw the valleys filling with water that tumbled down the face of the cliffs, and when the water came out toward the ocean, it spread over houses, and on the lands close to the edge of the rivers, and some places were covered with dirt, rocks and large pieces of wood. There was a lot of property that was destroyed because of this disaster that had never been seen before.</p> <p>Here are the things that were completely lost in the flood water; pigs, chickens, goats, horses, and some other kinds of property, some mule carts, and some peoples haul carts, as well as houses.</p> <p>There were a lot of losses for those farming rice.</p> <p>The amount of loss has not been truly summarized, we have just come to understand this name associated with Hanalei, Hanalei in the torrential rain, when torrential rain flows the rocks and other detritus materials end up inside of the taro fields. That was not all, a cliff also tumbled down.</p> <p>The acreage where this cliff fell was filled by its dirt. These are just some things I heard.</p> <p>In Anahola there were also some other things that came from this disaster. With thanks.</p> <p style="text-align: right;">R. Pu'uiki</p> <p style="text-align: center;">Hanalei Kaua'i May 19, 1877</p>

¹⁹ R. Puuiki, *Ka Wai Kahe Nui ma Hanalei*, Ka Nupepa Kuokoa, 2 June 1877. Translated by Devin Kamealoha Forrest.

Although Pu'uiki's account of the May 1877 flood event does not explicitly state that the landslide occurred in Wai'oli, but it can be inferred based on the annotations of the map in Figure 11. This map was made in 1893, and annotations next to the landslide identified two dates: 1875 and 1877. According to exhaustive research in the nūpepa, Pu'uiki's article was the only reference found to date that refers to a major cliff collapse event in the Wai'oli/Hanalei area. It occurred along the slopes of Makaihuwa'a and changed the course of the Wai'oli Stream, altering the riparian zone, and rendering some lo'i un-farmable (too wet). This landslide was recorded on more than one historic map.²⁰

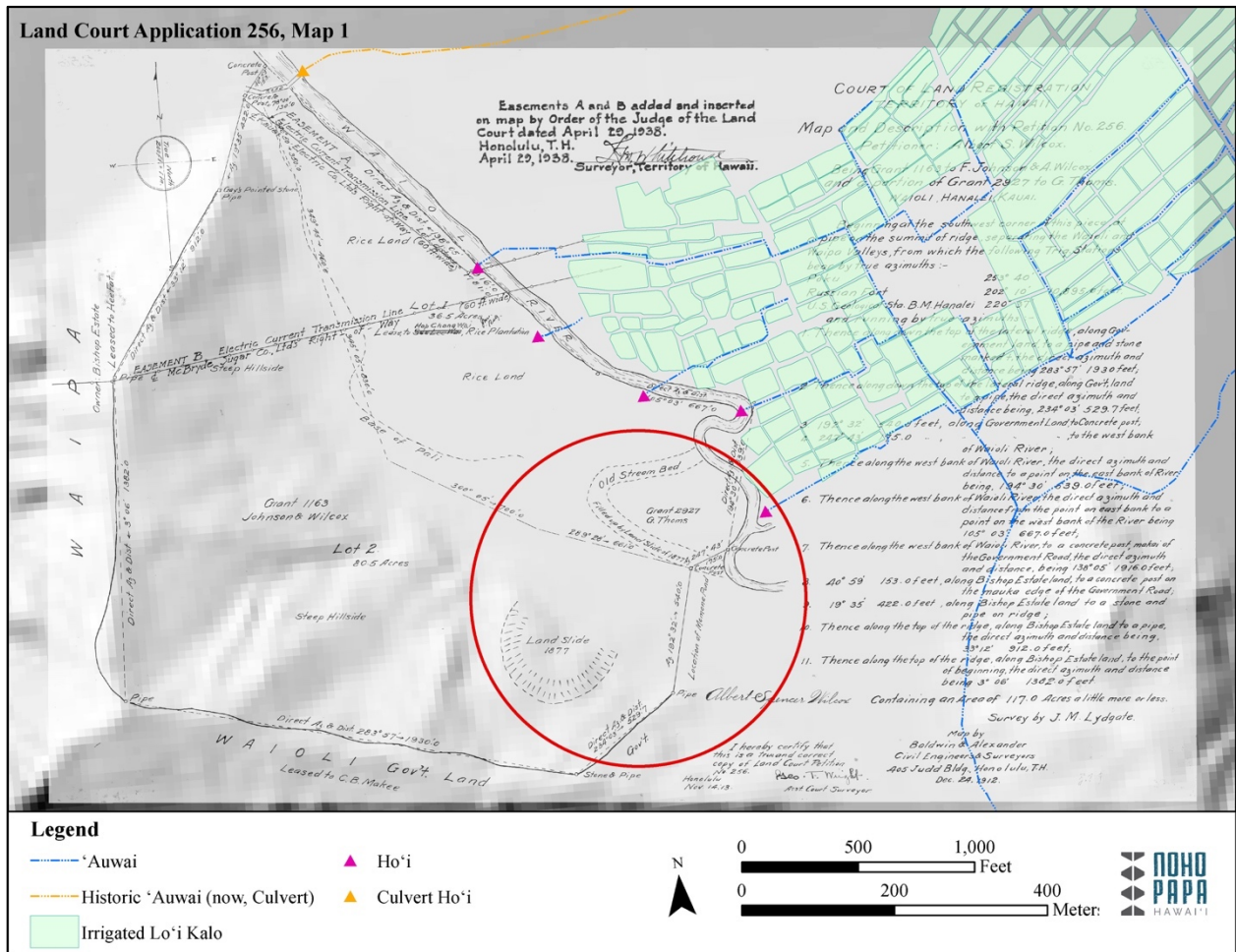


Figure 12. Land Court Application M256, Map 1, situating the Wai'oli Lo'i Kalo Irrigation System with the 1877 landslide and stream course alteration.

In 1877 and again in 2018, intense flooding damaged the Wai'oli Lo'i Kalo Irrigation System and the communities who depend on it. Despite this, both the system itself and the people have managed to adapt and persevere. Given the parallels between these two events, it can be reasonably assumed that there were other massive floods in the past. The coastal plains of Wai'oli and Hanalei, though incredibly fertile and abundant, are harsh environments, prone to

²⁰ Walter A. Wall, *Waioli Kauai*, Register Map Number 1680, 1893; Baldwin & Alexander, Land Court Application 251, Map 1, December 1912; J. M. Lydgate, *Portion of Waioli Kauai*, Register Map Number 2625, May 1922.

flooding and heavy rain in normal times, and intermittent but catastrophic torrential rains, landslides, and floods.

In sum, the Wai‘oli Lo‘i Kalo Irrigation System was designed as the most optimal agricultural system for the Wai‘oli plain given the settlement patterns, soils, and rainfall in this area.

Ethnohistory – From Time Immemorial

Methods

The research team examined a variety of repositories and resources to develop a general description of the natural, cultural, historical, and archaeological background of the Wai‘oli Lo‘i Kalo Irrigation System. Project staff gathered information about the natural landscape by reviewing County, State, and Federal GIS data, atlases, maps, scientific reports, reference books and archaeological investigations. Staff compiled inoa ‘āina, mo‘olelo, oli, and ‘ōlelo no‘eau from both Hawaiian and English language sources in books, newspapers, online databases, and archives. Staff also collected historical accounts of the Wai‘oli ahupua‘a from primary and secondary documents including records, journals, newspapers, and previous reports from various state and private collections such as the Bernice Pauahi Bishop Museum (“BPBM”) Archives, the State Historic Preservation Division (“SHPD”), and Kaua‘i Historic Society (“KHS”). The research team gathered historical land documents and Māhele data from the Buke Māhele, Boundary Commission Records, and the Biennial Report of the Commissioners of Crown Lands, 1894, and retrieved historic maps from the State of Hawai‘i’s Department of Accounting and General Services (“DAGS”) online database. Last, project staff compiled archaeological information from previous archaeological reports and studies available from SHPD. The digital archival repositories utilized include: Ulukau, AVA Konohiki, Hawai‘i Office of Planning GIS repository, Papakilo Database, Kīpuka Database, various Hawaiian language newspapers, and others.

Place Names – Nā Inoa ‘Āina

The thousands of place names recorded and still used today provide a glimpse of how nā po‘e kahiko (people of old) understood the landscape of Hawai‘i. A place name may explain a commemorative event, describe an important person or the physical environment, reveal the function of the land, or do all of these things at once. When explaining the concept of mana that is instilled in a name, Pūku‘i writes:

Once spoken, an inoa took on an existence, invisible, intangible, but real. An inoa could be a causative agent, capable of marshaling mystic elements to help or hurt the bearer of the name. And so went the belief, the more an inoa was spoken, the stronger became this name-force and its potential to benefit or harm.²¹

Wai‘oli literally translates as “joyous water.” It is the land division, a stream, and a channel, encompassing an area of 3,350 acres. The upper portion of Wai‘oli contains three massifs: Māmalahoa, Nāmolokama, and Hīhīmanu. Māmalahoa is in the west, perhaps named after the wife of Kāne; Nāmolokama (“interweaving bound fast”) in the south, which is known for its

²¹ Pukui, Haertig & Lee 1972: 94.

abundant waterfalls and Hihimanu (“sting-ray”) because of its ray-like appearance, that encompasses the back valley of Wai’oli.²²

The lower portion of Wai’oli is bounded to the east by the kalo lands of Kuhimanu (“direction of the birds”), which abuts Kamōkoleaka (“red hued ridge”) a ridge that connects to Hihimanu bordering and branching into the adjoining Hanalei ahupua’a. On the western border, dividing the ahupua’a of Wai’oli from the ahupua’a of Waipā, is a ridge paralleling Wai’oli River named Makaihuwa’a (“eyes for the canoe prow”) which according to Wichman, is the site where menehune fishermen built a platform and placed large torches, creating the first lighthouse in Hawai’i.²³ On Makaihuwa’a is the ‘ōhi’a grove of Kūpākoili, which extends from Wai’oli into the adjoining ahupua’a of Waipā. The wood was used in ancient times to create farming implements and in more recent history, to create a lānai and party area for a visit from King Kalākaua in 1874.²⁴ The grove started to shrink in size in 1913 and very little evidence of the grove exists today.²⁵

In addition to these ancient place names and boundaries, Wai’oli has names that stem from its connection to initial missionary settlement in the early 19th century. For instance, Betelema/Betelehem, founded in 1820 by Whitney, was a religious community that helped William Alexander expand the Wai’oli mission station.²⁶ Another mission-influenced place name is a kukui grove named Kālema, “Salem,” which is where William Alexander would hold church services prior to the construction of the mission meeting house.²⁷

²² Wichman 1998: 136.

²³ Wichman 1998. Akina, however, claims that the menehune in fact built the entire ridge in a single night as a way to “hookaulana mau i ko lakou inoa menehune” or “ensure the fame of the menehune people.” Akina 1913: 18.

²⁴ *Ka Huakai a ka Moi Kalakaua i Kauai*, Nuhou, 24 March 1874.

²⁵ Kamahela, *Ka Ike hou ana o ke Kamahela i ka Mokupuni o Kauai*, Ka Nupepa Kuokoa, 5 December 1913.

²⁶ N. Keoahu, *Waioli Kauai Ian 23, 1835*, Ke Kumu Hawaii, 15 April 1835.

²⁷ *Papa Hoike i na Kula o Waioli*, Ka Nonanona, 15 March 1842; *Ka Anesona Moolelo no Kauai*, Ka Nupepa Kuokoa, 25 May 1865.

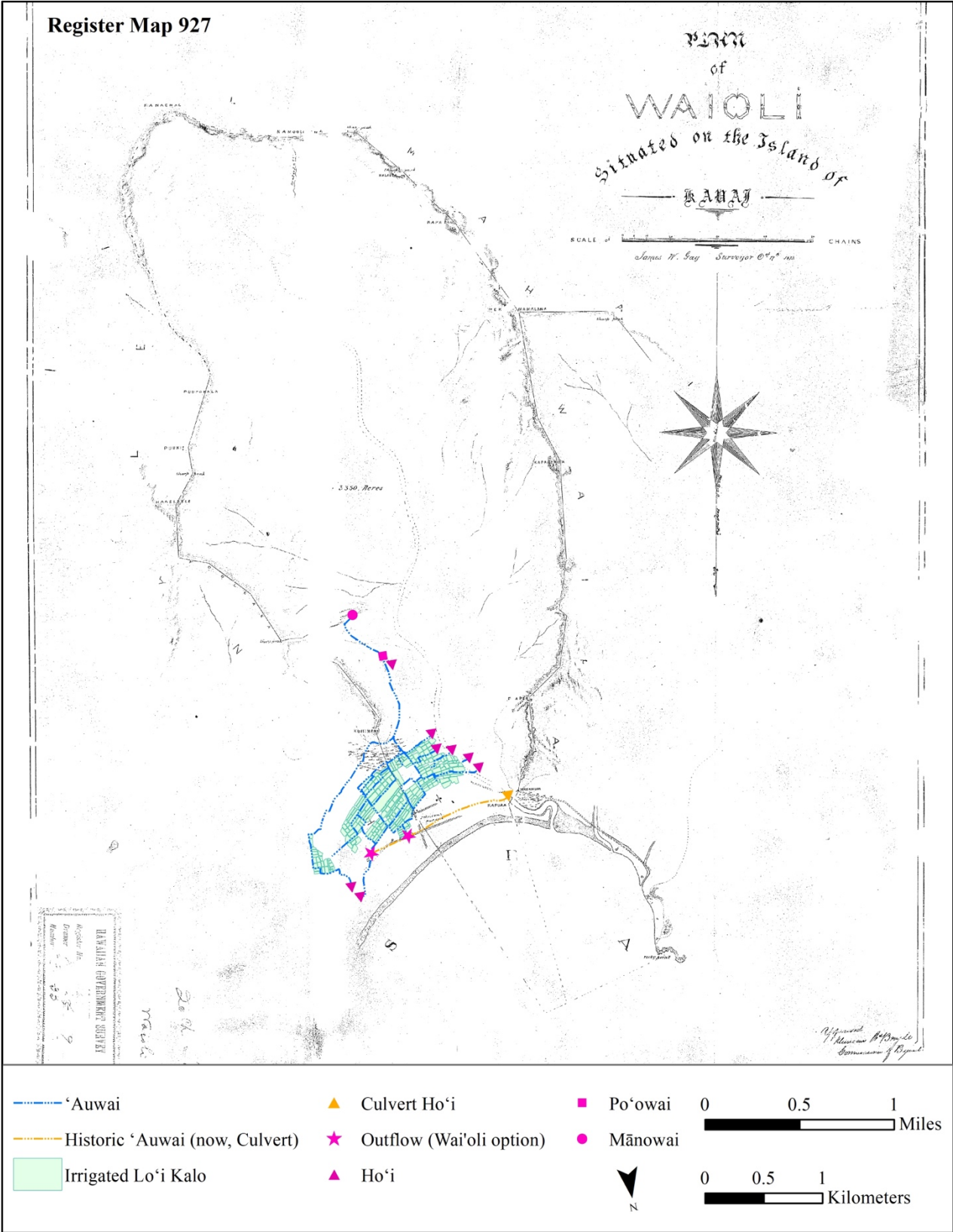


Figure 13. Register Map 927 depicting location of Wai'oli Lo'i Kalo Irrigation System.

Register Map 1833

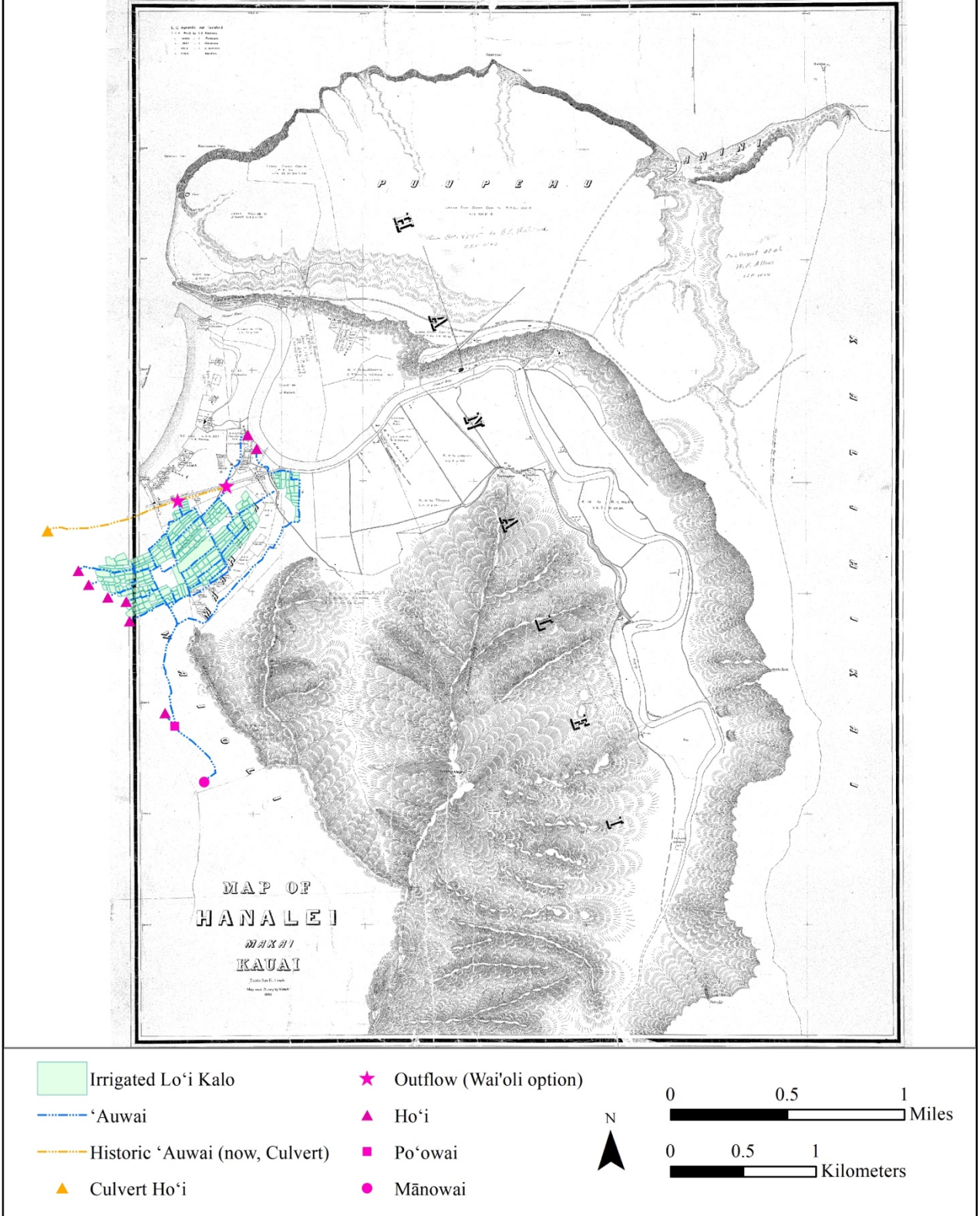


Figure 14. Register Map 1833 depicting location of Wai'oli Lo'i Kalo Irrigation System.

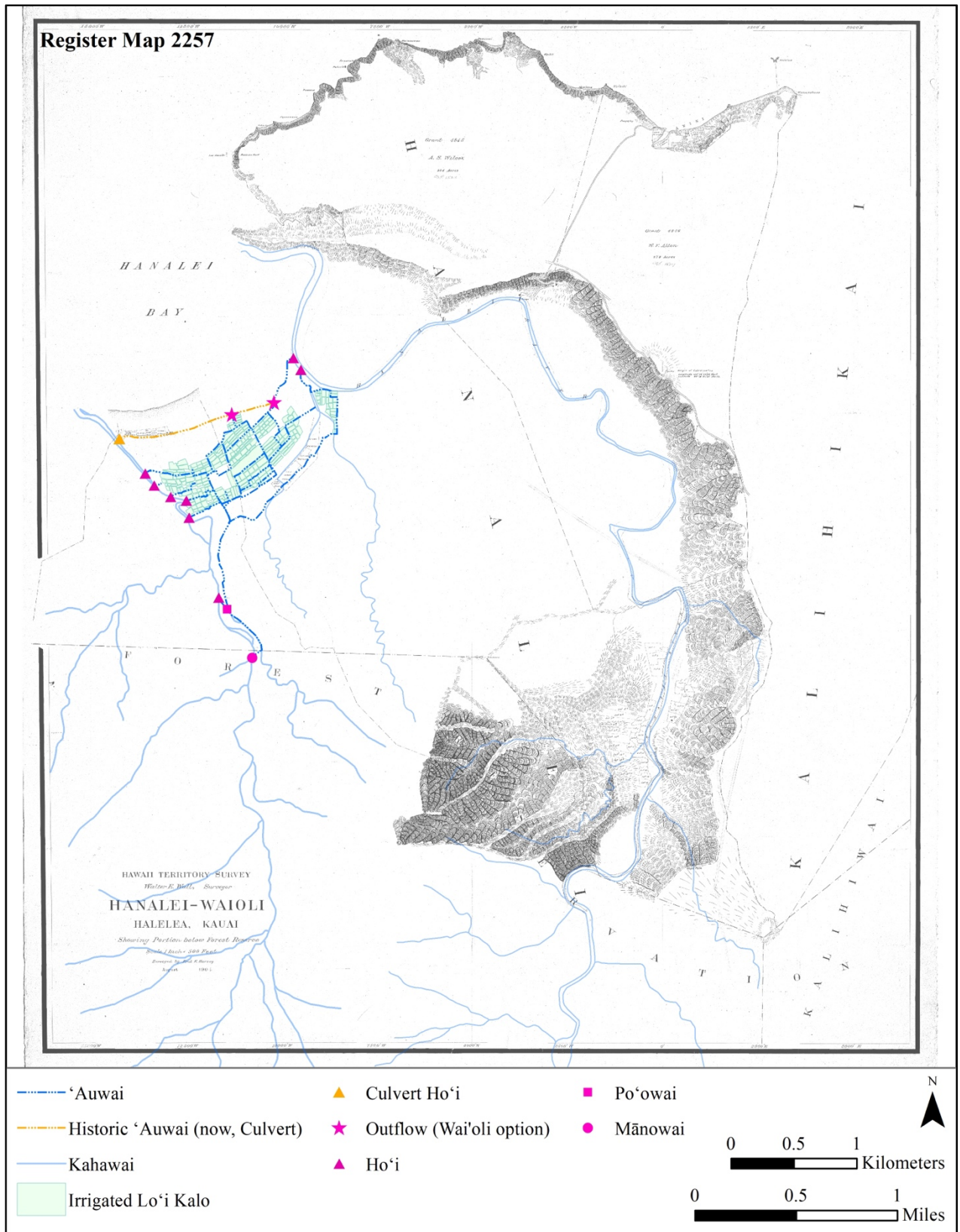


Figure 15. Register Map 2257 depicting location of Wai'oli Lo'i Kalo Irrigation System.

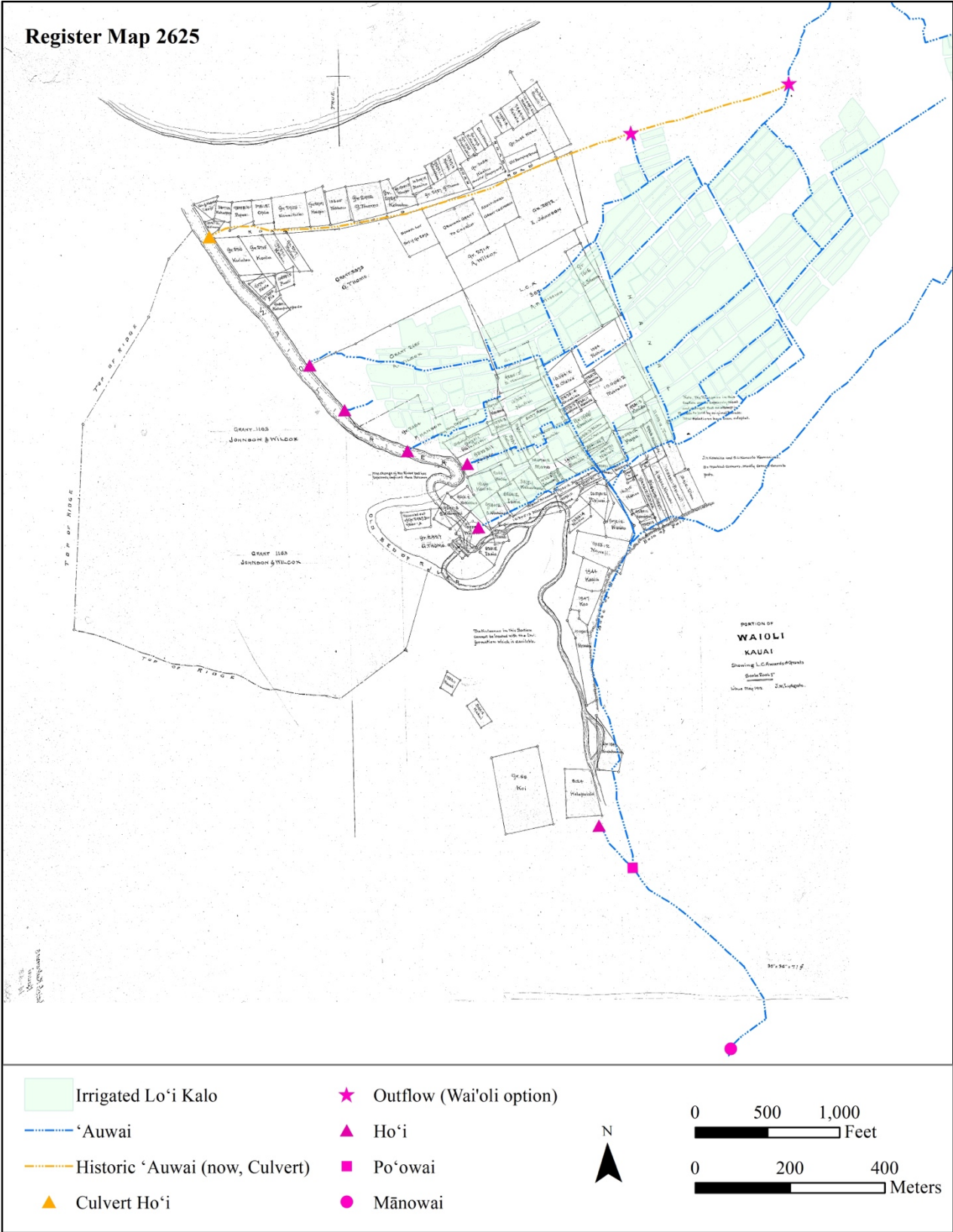
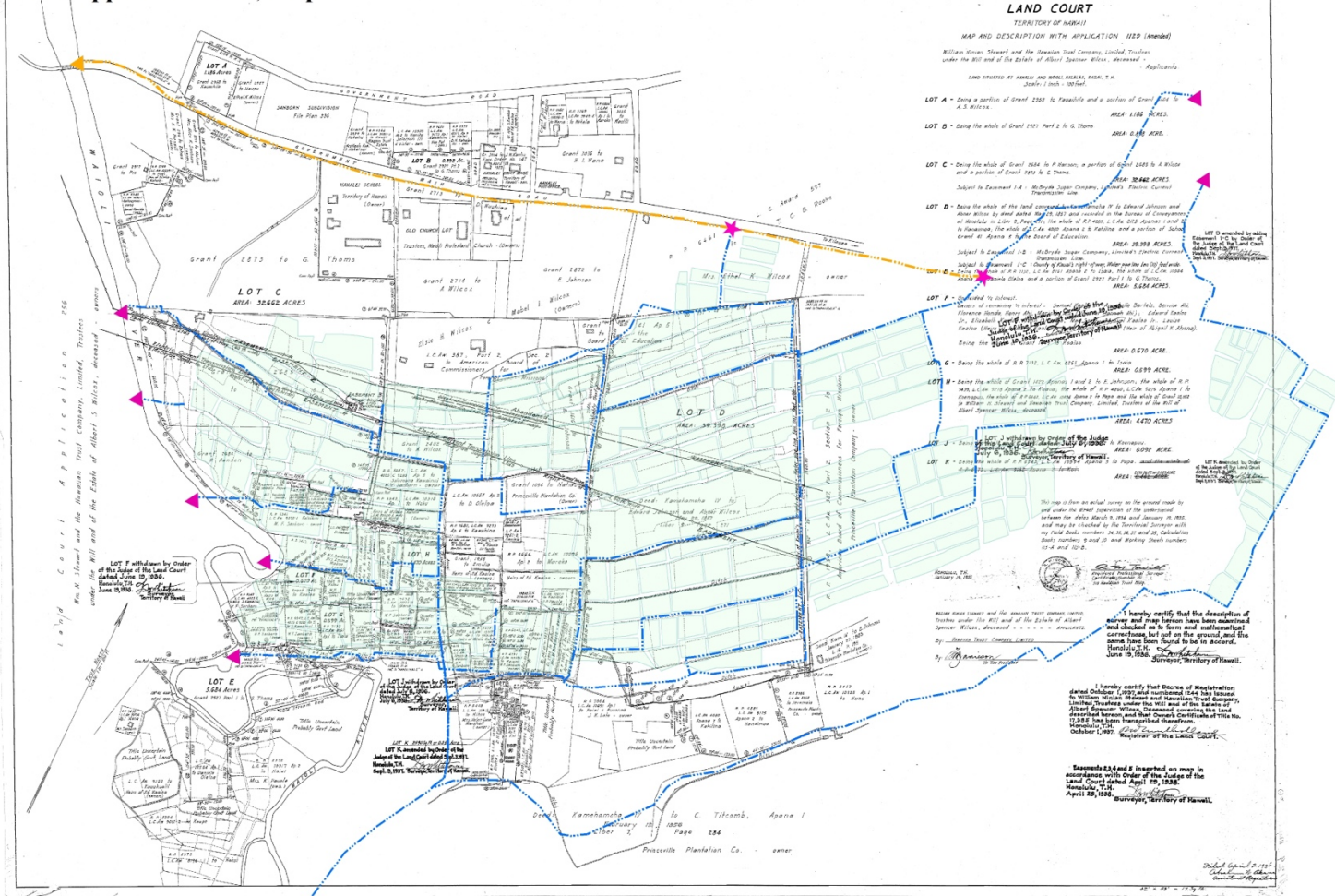


Figure 16. Register Map 2625 depicting location of Wai'oli Lo'i Kalo Irrigation System.

Land Court Application 1129, Map 1



	'Auwai		Ho'i
	Historic 'Auwai (now, Culvert)		Outflow (Wai'oli option)
	Irrigated Lo'i Kalo		Culvert Ho'i

0 500 1,000 Feet

0 200 400 Meters

Figure 17. Land Court Application 1129, Map 1 depicting location of Wai'oli Lo'i Kalo Irrigation System.

Ka Wā Kahiko

Hawaiian oral traditions have been passed down from one generation to the next for hundreds of years, and have been written and recorded in contemporary times. There is no written record of Wai‘oli prior to the advent and proliferation of writing in the Hawaiian Islands. Hawaiian oral traditions, however, such as full mo‘olelo, mele, and oli, started to be documented and distributed in the mid-1830s via the nūpepa.²⁸ These mo‘olelo and mele provide a glimpse into the early settlement of Kaua‘i as well as life in Wai‘oli and the surrounding Halele‘a moku.

Nā Mo‘olelo a me Nā Ka‘ao

The terms mo‘olelo and ka‘ao (legend) have been used interchangeably to refer to legends or historic tales, with ka‘ao sometimes referring to a fictional legend or fanciful tale. Pūku‘i describes the tradition of storytelling as “a principal source of entertainment while simultaneously providing instruction in the many interwoven aspects of life – ancestry, history, religion, human relations, crafts, and the natural world.”²⁹ Before Hawaiian became a written language in the 1820s, cultural knowledge was perpetuated through various forms of oral repetition and passed down from generation to generation through mele, hula, kū‘auhau (genealogy), ka‘ao, or mo‘olelo.³⁰

Mo‘olelo, like mele, are also very valuable in offering a more descriptive account of the evolution of an area. One of the oldest nūpepa articles identifies Kauhane as the chief of Hanalei during the reign of Lono.³¹ The article does not include an in-depth narrative, it only notes that Lono’s rule over Kaua‘i was just and peaceful. Two of the most noted residents of Wai‘oli were Pīkoiaka‘alalā and Puapualenalena.³² Pīkoiaka‘alalā was born to his father ‘Alalā and his mother Ko‘uko‘u. Pīkoi’s parents were accomplished pana‘iole, rat shooters, who passed this skill on to their son. Ko‘uko‘u gave birth to seven keiki akua, supernatural children, before finally giving birth to Pīkoiaka‘alalā and his sister Kau‘iomānoa, who were born in human form. During his childhood, Pīkoi would often compete with other pana‘iole, no one being able to best him except Puapualenalena, a supernatural dog belonging to a prominent family in Wai‘oli. Pana‘iole was both a sport and a profession, as the mo‘olelo explains, and it is because of Pīkoi’s skill that he is called throughout the islands to shoot mischievous creatures that are pestering various ali‘i. Though rats and mice may seem like a common nuisance that can be easily remedied today, they were a very real problem in the Wai‘oli mission — Mrs. Alexander wrote in 1834 that they were numerous and enormous in size.³³

The mo‘olelo of Pīkoi and Lonoikamakahiki provide insight and strong inference that a Native population was living in the Wai‘oli area before the arrival of westerners in Hawai‘i. ‘Alalā and Ko‘uko‘u resided in and raised eight children in Wai‘oli. Their Pīkoi befriended a supernatural dog of another resident, leading to the strong inference that more than one family resided in the Wai‘oli area during that time. Especially because it is Pīkoi’s childhood acclaim that leads to the rest of his island travels.³⁴ In the mo‘olelo of Lonoikamakahiki and its mele, Lono and Kapaihi

²⁸ Nogelmeier 2003: 107.

²⁹ Pukui & Green 1995: xii.

³⁰ Kalākau & Daggett 1888.

³¹ *No Lono*, Ke Kumu Hawaii, 30 March 1836. This is a different Lono than that of Lonoikamakahiki from Hawai‘i Island.

³² S. Kauī, *He Kaaō No Pikoikaalala*, Ka Nupepa Kuokoa, 16 December 1865.

³³ Alexander 1834.

³⁴ S. Kauī, *He Kaaō No Pikoikaalala*, Ka Nupepa Kuokoa, 16 December 1865.

did not interact with people but would feed off the scraps or raw vegetables from Wai'oli while wandering in the cold uplands, meaning that there were others in the area.³⁵ The time period can be established based on the ali'i in the mo'olelo as well as other genealogical scholarship. According to Abraham Fornander and Esther Mo'okini, who researched ali'i genealogies, Kākuhihewa and Keawenuia'umi, who were main characters in both mo'olelo, ruled in the mid to late 1500s.³⁶

Nā Oli a me Nā Mele o Wai'oli

Mele and oli, while not being a full historical narrative, provide succinct descriptions of place, weather, and common day occurrences. These mele convey important ideas and happenings about the people, places, and events of their time.³⁷ Many of the mele use similar poetic references to the Wai'oli area, most referring to the amount of rain and the cold. These themes are so synonymous with the area that they are repeated from the earliest record in the nūpepa, through the literary apex in 1860, and until the end of the nūpepa in 1940.³⁸

The winds commonly associated with Wai'oli include Wai'ama'u³⁹ for the entire valley, Makaihuwa'a⁴⁰ ("eyes at the prow of the canoe") coming from the west, and Ualanipili ("rain that brings low the heavens") from Nāmoloakama. Common descriptive terms of Wai'oli in mele include: ko'eko'e (frigid cold), anuanu (cold), ua loku (torrential rain), ho'opala (to cause wilting), ho'o'iloli (to cause change), and many more. Abundant rain, water and cold are thematic in many of the mele relating to this area. A mele from the mo'olelo of Lonoikamakahiki, son of Keawenuia'umi, recounts his voyage to Kaua'i to escape his misdeeds on Hawai'i Island. Lono and his 'aikāne Kapaihiahilina, whom he befriends on Kaua'i, wander through Wai'oli where they eat raw plants and experience constant rains that are so heavy and persistent that it causes the lehua blossoms to wilt and change color.⁴¹

The mountains of Hīhīmanu, Nāmoloakama, and Māmalahoa are also known for their rain and waterfalls, adding to the abundance of water in the Wai'oli ahupua'a. Kaliko, the central waterfall of Nāmoloakama and the source of Wai'oli's water, is noted in mele as the po'owai, headwater. One mele notes, "kūmano ke po'owai a Kaliko," or a source of a multitude of water is the headwater of Kaliko, again speaking to the abundance of water that flows through the Wai'oli Valley and stream system.⁴²

Wai'oli in the Early Historic Era

The Wai'oli Lo'i Kalo Irrigation System at European contact (1778) would have been similar to that described and depicted in the Māhele records. The lo'i and 'auwai would have been in the

³⁵ *No Lonoikamakahiki*, Ke Auokoa, 19 January 1871.

³⁶ According to Abraham Fornander, Kākuhihewa was born around 1540 and was the 15th Ali'i'aimoku of O'ahu. Fornander 1880: 272-73. Esther Mookini puts Keawe's birth some time in the 16th century. *Translation Makes Hawaiian Treasure Accessible*, Honolulu Advertiser & Star Bulletin, 20 January 1991.

³⁷ Nathaniel B. Emerson states that "The most telling record of a people's intimate life is the record which it unconsciously takes in its songs. This record which the Hawaiian people have left of themselves is full and specific." 1903: 271.

³⁸ Nogelmeier 2003: 116.

³⁹ Kuapuu, *Ka Moolelo o Pakaa me Kuapakaa Home Rula Repubalika*, 15 March 1902.

⁴⁰ J. Poepoe, *Ka Moolelo o Hiiakaikapoliopole Ka Na'i Aupuni*, 22 June 1906.

⁴¹ *No Lonoikamakahiki*, Ke Auokoa, 19 January 1871.

⁴² Emerson 1907: 155.

same place in the early 1800s as they were in the mid-1800s, as would be the permanent houses (pāhale, kahuahale, kauhale), generally on the coastal dunes, but sometimes scattered among high points among the wetland fields⁴³ or dryland slopes. This section establishes a solid chronological timeline for the depth and breadth of the Wai‘oli Lo‘i Kalo Irrigation System.

As literacy rates in the Kingdom of Hawai‘i increased, so too did the number of nūpepa. These nūpepa announced important government news, featured political commentary, and also documented everyday life throughout the Kingdom. An article about a new law could be followed by an article about a new garden plot in a neighbor’s yard with the sweetest vegetables. Some of these articles relating everyday life were sometimes serials done over many years, and give us a glimpse into the evolution of an area.

One of the first articles pertaining to Wai‘oli was in *Ke Kumu Hawaii* entitled, *No ke Emi Ana o Na Kanaka*, in which a Kaua‘i island census taken in 1835 showed the decline in population.⁴⁴ This article was submitted by the mission to address possible mitigating action to deal with the decline. This article was written by W. P. Alexander, a missionary who founded the Wai‘oli Mission in 1834, fourteen years after the arrival of missionaries in the islands in 1820.

Mr. Alexander not only wrote articles for the nūpepa, but also kept records of life in Wai‘oli through his letters, journals, and yearly station reports. When Alexander arrived, he noted that the Wai‘oli’s mission was “well supplied with fish, fowl, bananas and melon etc.” A year after Alexander’s arrival, an article expressed how lush and fertile the land in Wai‘oli was, as well as the ease with which everything grew due in part to the pure clean waters.⁴⁵

From the founding of the mission in 1834, letters, reports, and nūpepa articles continued to document the agricultural wonders of the people in Wai‘oli. In the early years of the mission, Alexander connected his property to the main stream through an ‘auwai system to water the crops on his homestead. These crops supplemented what he was receiving or trading with the Native population.

During the early years of Alexander’s tenure, the Bible was being translated into ‘ōlelo Hawai‘i. The Native people in Wai‘oli were so eager for the written word that, according to Alexander’s account, they could be seen farming into the evening, with the glow of their campfires lighting the mountains, so that they could farm enough pia (Hawaiian arrowroot) to buy books from the missionaries.⁴⁶ The land is so abundant that Alexander bemoaned the nearly 100 barrels of yams that he could not dispense of, and attempted to have them sent to the mission in Honolulu.⁴⁷ He also sent calabashes of oranges, tamarinds, and sometimes paddles, all of which he acquired from his own farm or from the Native people trading for books.⁴⁸

The agricultural benefits of the valley were also used by the mission in its efforts to increase education amongst its congregants. In 1837, when the school in Wai‘oli expanded, it required its students to work a parcel of land in Wai‘oli to fund their teachers. Testimony recorded by the

⁴³ Such as the pāhale of several kuleana lands awarded in 1851: LCA 10316 ap2 to Nuku, LCA 9070 ap1 to Kokokaia, and LCA 9833 ap2 to Pepee.

⁴⁴ W. P. Alexander, *No Ke Emi Ana o Na Kanaka*, *Ke Kumu Hawaii*, 14 October 1835.

⁴⁵ N. Keoahu, *Waioli Kauai Ian 23, 1835*, *Ke Kumu Hawaii*, 15 April 1835.

⁴⁶ Alexander 1934: 187.

⁴⁷ Alexander 1934: 185.

⁴⁸ Alexander 1934: 186.

mission documented that the school had 4-5 acres of cultivated farmland dedicated to that use, some of which was lo'i.⁴⁹

From the mid-1840s into the 1850s near the end of the Māhele, Wai'oli experienced agricultural expansion and an increase in foreign crop production. New crops included coffee on the mountainsides closer to the center of Hanalei Valley, indigo in some of the kula areas, and plants to feed the new silk-worm production. These new crops were successful for a time, but would not survive beyond the 1860s.⁵⁰ At this point in Wai'oli's history on into the 1890s, only a few sources recorded observations of farming in the area relating to kalo cultivation. Nūpepa and other records instead tended to focus on the transfers and conversions of larger tracts of land around the Project Area, to new owners or into different uses.⁵¹

⁴⁹ Foreign Testimonies, no. 387: 37.

⁵⁰ *No ka Hele ana o Polepe i Kauai*, Ka Nonanona, 3 March 1843; Coffee Times, The History of Coffee in Hawaii, no. 79: 3; Palmer 1913.

⁵¹ *Olelo Hoolaha*, Ka Leo o ka Lahui, 5 September 1889; *Hoolaha Hooko Moraki*, Ka Nupepa Kuokoa, 25 November 1893; Palmer 1913.

Table 3. A Wai'oli timeline, through a selection of nūpepa articles.

Inoa Nūpepa Nūpepa Name	Mea Kākau Author(s)	Po'omana'ō Source	Lā Date	Mana'ō Hō'ulu'ulu Notes
Ke Kumu Hawaii	N. Keoahu	Waioli Kauai Ian 23, 1835	15 April 1835	13 homes have been built by David Papohaku for the settlement of Betelehema. The land is very fertile and all things grow easily and all the flowers bloom because there is such clean water. There are many deaths on the island as well as people attempting to burn down the mission house.
General Meeting of the Sandwich Island Mission		Station Reports pg. 12	May and June 1839	The congregation has planted seven acres of sugar cane to help fund the building of the meeting house.
Ka Nonanona		He Ipu Pu!	15 March 1842	Wai'oli is a very fertile place to grow all kinds of plants. Mr. Ioane has grown one of the largest pumpkins.
Ka Nonanona		Papa Hoike i na kula o Waioli	15 March 1842	A feast was made for the performance of the school at Wai'oli under the kukui grove called Salema on the bank of Wai'oli River.
Ka Nonanona		Ka Ahaolelo Misionari	9 July 1844	Wai'oli Select school started by Johnson, the students work/farm for their supplies/food. They are also supported by the congregants.
Ka Nonanona		Laau Kanu	15 October 1844	Planting coffee is successful in Wai'oli.
Ka Hae Hawaii	John U. Kuapuu	Nu Hou Ma Waioli	20 May 1857	Cannons recovered from the Ha'aheo wreckage from April 1824.
Ka Nupepa Kuokoa		Ahahui Mahiai o Waioli Kauai	16 November 1861	October 30, farmers of Hanalei, Anahola and Wai'oli came together to form a Farming Organization whose goal is to find ways to make farming more successful because of the decline of whaling, leaving people without enough money for their taxes. They want to try rice and tree fern wool and other plants. A copy of their constitution is posted.
Ka Hoku o ka Pakipika	A.S. Nuuanu (Waipa)	Pilikia! Pilikia ka Lahui Hawaii!	24 February 1862	Divorce/Adultery rates are 2/3 in Wai'oli.

Inoa Nūpepa Nūpepa Name	Mea Kākau Author(s)	Po'omana'ō Source	Lā Date	Mana'ō Hō'ulu'ulu Notes
Ka Hoku o ka Pakipika	J.W. Kapuailiau	Hoike Kulahui a me ka Ahaaina ma Waioli	29 May 1862	A lanai and school were built and a feast was prepared for a show by the congregation school. Grass from the riverbanks was used for roofing and the place was decorated with Native and foreign plants of the area.
Ka Nupepa Kuokoa		Na Mea Hou o Hawaii Nei	18 April 1863	Price of poi increasing, perhaps because most people are farming rice.
Ka Nupepa Kuokoa		Ka Anesona Moololo No Kauai	25 May 1865	A brief history of Wai'oli Mission starting in 1834 under a kukui grove. At the time of this article there were 421 congregants. The author sees the abundance of this area and that the residents are growing all types of food plants.
Ka Nupepa Kuokoa	E.J.	Make Emoole!	26 August 1865	Kauai dies from a landslide while digging an irrigation ditch to run Mr. Thom's sugar mill in Waipā.
Ka Nupepa Kuokoa		Maloo loa o Hanalei, Kauai	14 July 1866	All the lands in Hanalei and the sugar plantations are dry from two months of no rain. The lands closest to the ocean are especially dry.
Ka Nupepa Kuokoa		Hele Kaapuni Ana Ia Kauai	31 October 1868	Author visits the mission at Wai'oli. Over 200 congregants come to services all heralded by the Wai'oli church bell.
Ka Nupepa Kuokoa	S. P. Ahiona	Palapala Hoike Hana mawaena o na Pake ma ka Mokupuni o Kauai	24 July 1869	Ahiona meets with Chinese who live in Wai'oli to evangelize. 70 come to services at Wai'oli Hui 'ia and he meets with some at their stores in Wai'oli.
Ka Leo o ka Lahui		Olelo Hoolaha	5 September 1889	Tai Lee Wai restricting access to his rice farm in Wai'oli from 6pm on and in the mornings only those that are allowed may cross through.
Ka Nupepa Kuokoa		Hoolaha Hooke Moraki	25 November 1893	Re-auction of mortgaged rice land in Wai'oli. 45 acres to Ah Fat from George Wilcox from January 1888.
Ka Nupepa Kuokoa	Kamahele	Ka Ike hou ana o ke Kamahele i ka Mokupuni o Kauai	19 December 1913	Hanalei Valley is filled with rice fields.

Wai‘oli Changes in Land Tenure – The Māhele

The Māhele records of the 1840s and 50s provide a wealth of information about Wai‘oli and its agricultural system, including a baseline for the systems’ extent. Through Native Registers (“NRs”), Native Testimonies (“NTs”), Foreign Testimonies (“FTs”), and Land Commission Awards (“LCAs”), Wai‘oli land claimants and other witnesses who provided testimony, delineate the scope and use of the land during their or their ancestors’ land tenure in Wai‘oli.

Kuleana are a type of Land Commission Award claimed by Kānaka Maoli tenants during the Māhele. Native tenants who were seeking to claim their kuleana would submit testimony to explain the extent of their land claim, which would then be recorded in a Native Register; a witness would support a claim, which would then be recorded in the Native or Foreign Testimony. Typically, the Native Register included how many ‘āpana (land parcels) the applicant was claiming, what type of property, and what, if anything, was being cultivated at the time. Historically, there were at least 41 separate kuleana ‘āpana that consisted of lo‘i kalo and 13 kuleana ‘āpana that referred to the ‘auwai in its metes and bounds.⁵²

The Native Register would sometimes detail from whom the applicant derived his or her interest (i.e., who gave the claimant the right to cultivate those lands), such as a konohiki (head manager of an ahupua‘a) or ali‘i, as well as a year or time period. Some would give a period relating to when an ali‘i was in power, typically in the form of “I ke au iā” or “during the time of” followed by the name of the ali‘i. For example, the NR for LCA 8196 to Hakui notes,

*E ho‘ike imua o oukou no ko‘u kuleana I make known before you my interest [in this land]
mai ka wa mai ia Kaikioewa a hiki i keia la from the time that Kaikioewa ruled until today*

Kaikioewa died in 1839, and was a contemporary and kuhina (advisor) of Kamehameha I (1758-1819).⁵³ The NR 9080 to Kahooponopono, whose kuleana includes lo‘i and parts of the ‘auwai, explains that his kuleana is “He kuleana kahiko mai ko‘u” or “His kuleana is an old one” and also that “Mai ka hiki ‘ana mai o na misionari oia ka MH 1820 a hiki i anei ko‘u noho ana” or “he has been there since the arrival of the missionaries in 1820 until now.” Other similar descriptions of kuleana that are “kahiko” (old) or “mai mua loa mai” (from long before) are described in the Native Testimonies and Native Registers; these references would pre-date the Kamehameha dynasty.⁵⁴

Kaumuali‘i, also a contemporary of Kamehameha I, is referenced many times in these documents as he was the ali‘i nui of Kaua‘i during that period. For example, the NR for LCA 9276 for Kiolea notes, “Penei ke kuleana ana mai a Kaumualii mai a hiki i ka makahiki 1848,” translated as “Such is the interest in this land from Kaumuali‘i until the year 1848.” Kaumuali‘i, who died in 1824, was the mō‘ī of Kaua‘i and negotiated a treaty with Kamehameha I during his campaign to unite the islands under one rule. Similarly, the NR for LCA 9275 to Koenapuu explains, “Penei ke kuleana ana mai a Kaumuali‘i mai a ia keia manawa” or “Such is my interest from Kaumuali‘i until now.” As yet another example, the NR for LCA 11059 to Timoteo proclaims, “I ka manawa ia Kaumualii o Kaua‘i nei, mai ko‘u mau makua mai a hiki mai ia‘u i keia wa ka pili ana o keia wahi me au,” translated as “During the time of Kaumualii’s rule on Kaua‘i, from my parents until me during this time, is my connection with this place.” It is

⁵² Tong 2019.

⁵³ Tong 2019.

⁵⁴ Kamakau 1961: 55.

reasonable to conclude that if lands in Wai'oli were given during the reign of Kaikioewa and Kaumuali'i, both contemporaries of Kamehameha I who lived through and experienced "contact" with Captain Cook in 1778, that the mānowai, po'owai, and 'auwai system required to support the lo'i kalo claimed by those Native tenants were also in place prior to western contact.⁵⁵

Wai'oli and Rice

Though the nūpepa, mission reports, and journals describe the abundance of Wai'oli and the success of the agricultural system, farmers began to feel the hardship from the decline of whaling in the 1860s.⁵⁶ This coincided with the discovery of a new type of rice crop, which led to an increased demand to convert lo'i kalo into rice.⁵⁷ In 1861, the farmers created an 'Ahahui Mahi'ai (Farm Association) to explore new cash crops such as the new rice cultivar.⁵⁸ The kalo lands eventually transitioned, like much of Kaua'i, into rice or sugar cultivation, which caused a shortage and decrease in the consumption of kalo and poi as well as an increase in poi prices in 1863.⁵⁹ Through the late 1860s and into the 1880s, the lands of konohiki and other large landowners in Wai'oli transitioned into rice, which is a trend that occurred across Halele'a.⁶⁰ Some Wai'oli residents, especially those farming kuleana land, stayed in kalo.

1893 Overthrow – Present

Post-1893 overthrow and into the 1900s: Hawai'i's cultivation of rice began to decline due in part to competition from California's rice production, as well as problems with pests.⁶¹

1940s: In Wai'oli, there was a return to kalo production for those lo'i that had been converted to rice earlier.

1972: In an interview by Larry Kimura on the Ka Leo Hawai'i broadcast, Rachel Mahuiki, an elder of the Halele'a area, spoke about how all people in the Hanalei area, both foreign and Hawaiian, returned to farming kalo, though primarily the older and adult children of the older generation. The younger generation had not taken up kalo because it was too difficult.⁶²

1984: In the August OEQC Bulletin, the Hawai'i State Department of Land and Natural Resources, Division of Water and Land Development announced proposed repairs and improvements to the "East Wai'oli Ditch" as a negative declaration, that is, a "determination made by proposing agencies that certain proposed actions will not have significant effects on the environment and therefore do not require EISs [Environmental Impact Statements]."⁶³ Improvements to the system included reconstructing the lower intake, the po'owai, and repairs to the "lower system" (ma kai of the po'owai). According to the OEQC Bulletin, the mānowai, the "upper intake is the true diversion on Wai'oli stream and it is not being renovated."⁶⁴ At this

⁵⁵ Tong 2019.

⁵⁶ Haraguchi 1987.

⁵⁷ Haraguchi 1987: xiii.

⁵⁸ *Ahahui Mahi'ai o Waioli Kauai*, Ka Nupepa Kuokoa, 28 November 1861.

⁵⁹ *Na Mea Hou o Hawaii Nei*, Ka Nupepa Kuokoa, 18 April 1863.

⁶⁰ Monsarrat, Map of Rice Plantation Kalihiwai, Hanalei, Kauai, November 1885.

⁶¹ Haraguchi 1987: xv.

⁶² Ka Leo Hawai'i HV 24:14, 1972.

⁶³ OEQC Bulletin, Vol.1 No.14, August 23, 1984.

⁶⁴ OEQC Bulletin, Vol.1 No.14, August 23, 1984.

time, between the po'owai and the main ditch feeding irrigated kalo fields on the Wai'oli side of the system, the flume and trestle were replaced and permanent pebble trap structures were installed as overflow controls to prevent breaches in the main ditch. The DLNR Division of Water and Land Development recorded these improvements at the boundary of the taro fields as necessary to ensure water flow to "some of the most productive plots in the State."⁶⁵

Late 1980s: Kalo farmers filed Declarations of Water Use with the Commission on Water Resource Management; during this time of heightened development, kalo farmers sought to ensure that the practice of irrigated kalo cultivation continued in Wai'oli.⁶⁶

2015: The Hawaiian Islands Land Trust ("HILT") acquired two conservation easements on almost 40 acres of wetland kalo in Wai'oli. Donated by Gaylord and Carol Wilcox and their daughters Nicole Pedersen, Darcie Gray, and Eliza Wilcox, the conservation easements placed permanent restrictions on this important active farm land, protecting it from future development and degradation. The easements not only ensured the land could not be developed, but also identified certain conservation values such as agricultural resources, cultural and historical values, wildlife habitat, and scenic beauty, which will prevent it from being compromised or threatened by future uses of the land.

2018: Close to 141 years after the last recorded massive flood in the area, a record 24-hour rainbomb dropped 49.69 inches of rain on the north shore of Kaua'i.⁶⁷ Resulting floods swelled north shore rivers and streams, inundating the valleys and coastal plains of Wai'oli, Hanalei, Waipā, Waikoko, Lumaha'i, and Wainiha.

⁶⁵ OEQC Bulletin, Vol.1 No.14, August 23, 1984.

⁶⁶ Strauch, Ayrton. Field Investigation Report for Wai'oli, FI2019020901, Commission on Water Resource Management, Feb. 2019; Kaona, Kobayashi, Masada, Miike, Mitsui, Omo, Spencer, Reyes, Tai Hook, Tasaka, Watari, Yagihara, Registrations of Stream Diversion Works and Declarations of Water Use, DLNR-CWRM, 1989.

⁶⁷ Arndt et al. 2018.

Appurtenant Rights

The lo'i kalo in Wai'oli are appurtenant, riparian, and traditional and customary Native Hawaiian uses of water and public trust purposes, which have some of the highest levels of protection under Hawai'i's Constitution and Water Code, HRS chapter 174C. The purpose of this section is to explore the appurtenant rights of the Wai'oli Valley Taro Hui.

Project staff selected, surveyed, and translated Māhele documents to establish the locations and some of the earliest written records of lo'i in Wai'oli. Although not always explicitly stated in each document, these lo'i are lo'i kalo, as this is often emphasized in the use of metes and bounds describing an applicant's "kalo lands." At the time of the Māhele, commercial rice had not yet encroached into this area; no mention of rice was noted during our survey, only kalo.

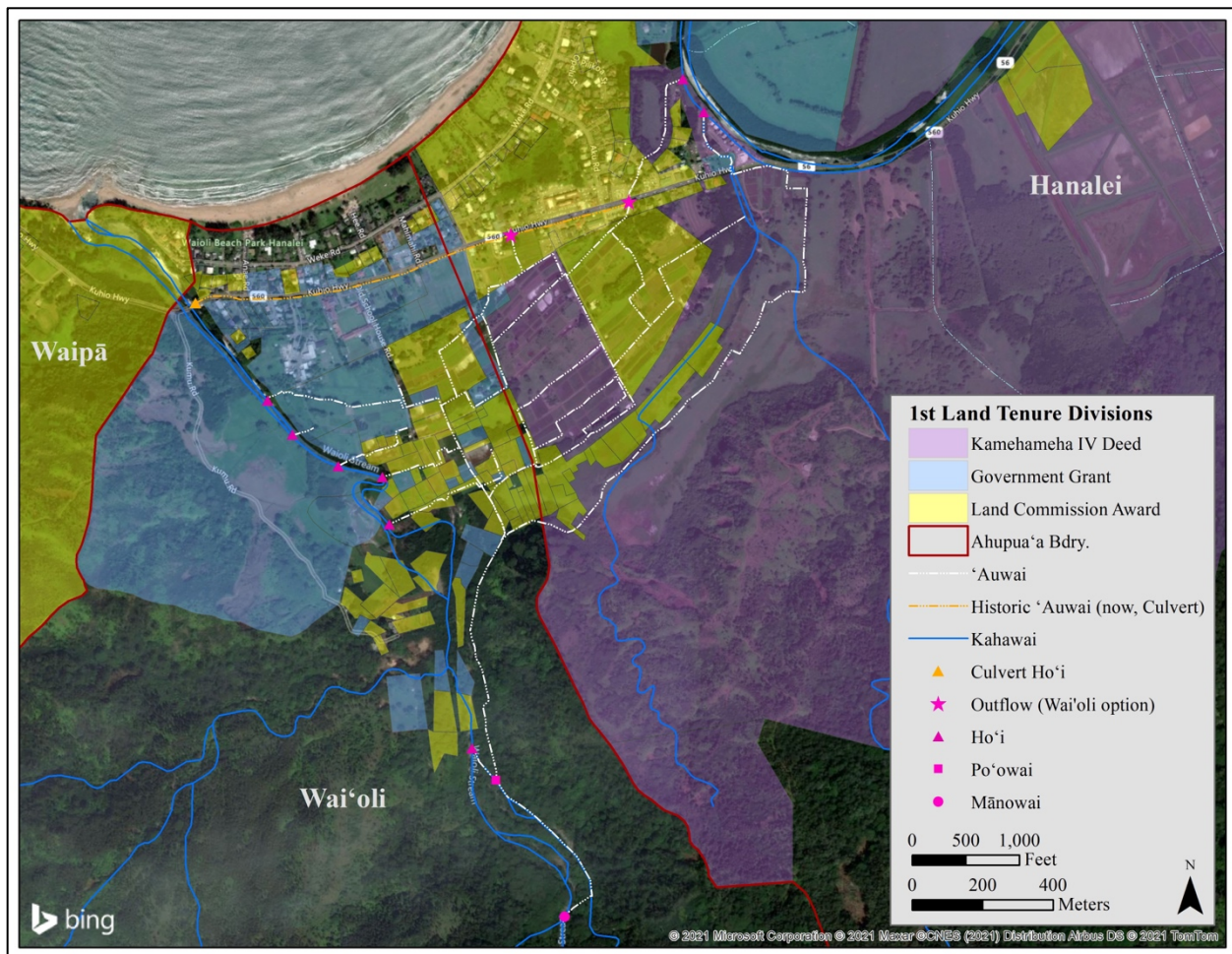


Figure 19. Map depicts the Project Area over the locations of the first land tenure divisions along the Wai'oli-Hanalei coastal plain at the time of the Māhele.

Following the Māhele, the Wai'oli ahupua'a was retained by the Government whereas the neighboring Hanalei ahupua'a was retained by the Crown, excepting kuleana, Grants, and Kamehameha Deeds. Within the Wai'oli Lo'i Kalo Irrigation System, there are LCAs, Government Grants, Crown lands and a few Kamehameha IV Deeds. Although many of these lands were cultivated and lived on by the same families for generations, it was after the 1840

Constitution, and during the Māhele, that distinctly Kānaka Maoli, hybridized, fee-simple land tenure was established. The Hawaiian Kingdom enjoyed a phenomenal literacy rate early in history, and the detail and breadth of government documentation reflect this. A great many surveys, claims, documents, and testimonies were generated for all of the land parcels that were sold, awarded, exchanged, or gifted between 1840 and 1893.⁶⁸ Table 4 provides details about the provenance of these different land types.

Table 4. Table of Hawaiian Kingdom land types as formally acknowledged and conveyed by the Hawaiian Kingdom Government.

Land Type	Dates	Notes
Land Commission Awards	1848-1855	LCAs as awarded during the Māhele. LCAs comprise less than 1% of land in Hawai‘i and are often split into two types; 1) konohiki awards, those awarded to the ali‘i, and 2) kuleana awards, those awarded to the native tenants, or maka‘āinana. ⁶⁹
Government Grants	1846-1893	Land Grants taken from the Government body of land; includes Royal Patent Grants, Public Works Grants and School Grants.
Kamehameha Deeds	1848-1865	Lands sold from the Crown inventory by Kamehameha III & IV up until Crown lands became inalienable by the 1865 Act.
Government lands	1840-1893	Those lands managed by the monarch and the Government as the public domain.
Crown lands	1848-1893	Managed by the monarch via the Board of Commissioners of Crown lands, as personal property, made inalienable by the 1865 Act, passed on to sitting monarchs, not to lineal descendants. ⁷⁰

In the ahupua‘a of Wai‘oli there are forty-one (41) Royal Patent Grants; grants of land sold from the Government body of land (prior to the illegal overthrow). There are fifty-five (55) Land Commission Awards documented in the Buke Māhele for Wai‘oli ahupua‘a.⁷¹ A 2019 Office of Hawaiian Affairs (“OHA”) report found that forty-one (41) kuleana awards had at least one ‘āpana that was lo‘i, although that survey was not exhaustive.⁷² Based on a thorough review of these and other documents, a significant majority of LCAs have more than one ‘āpana; some, up to six.

To refine the document survey, project staff indexed the earliest land documents within the footprint of the Wai‘oli Lo‘i Kalo Irrigation System, and then further narrowed the study sample for the purposes of this report and in the interest of time. This section focuses on a portion of the Wai‘oli Lo‘i Kalo Irrigation System that falls within Wai‘oli ahupua‘a. Although not a complete inventory of appurtenant rights within the whole system, this sampling provides a clear picture of established lo‘i distribution and related water uses at the time of the Māhele and into the present.

⁶⁸ Excepting the Crown lands which were held in the Crown inventory until they were made alienable and sold post-overthrow, Iaukea 1894.

⁶⁹ Chinen 1958.

⁷⁰ Van Dyke 2008. The body of the Crown lands was about 1,000,000 acres during the Kingdom period. In a time of shifting roles, the Crown, by managing these lands, retained some of its position and obligation as ali‘i of old.

⁷¹ One of these LCA claims is crossed out in the Buke Māhele, at least two LCAs have duplicate helu (two numbers for the same award), and of course most LCAs have multiple ‘āpana, ranging from 1-6 parcels.

⁷² Tong 2019.

We created a table of land use based on information found within the following primary source archival documents:

- Buke Māhele (Land Commission Awards)
- Native Register
- Native Testimony
- Foreign Testimony
- Royal Patent notes of survey (original legal metes & bounds for LCAs)
- Government Grants

Using ESRI ArcGIS software, project staff compared a map of the Hui's potential lo'i today with shapefile layers of LCAs, Government Grants, etc. The result is a geospatial color coded map of modern Hui lo'i depicting traditional land use: a map of Wai'oli land with appurtenant rights.

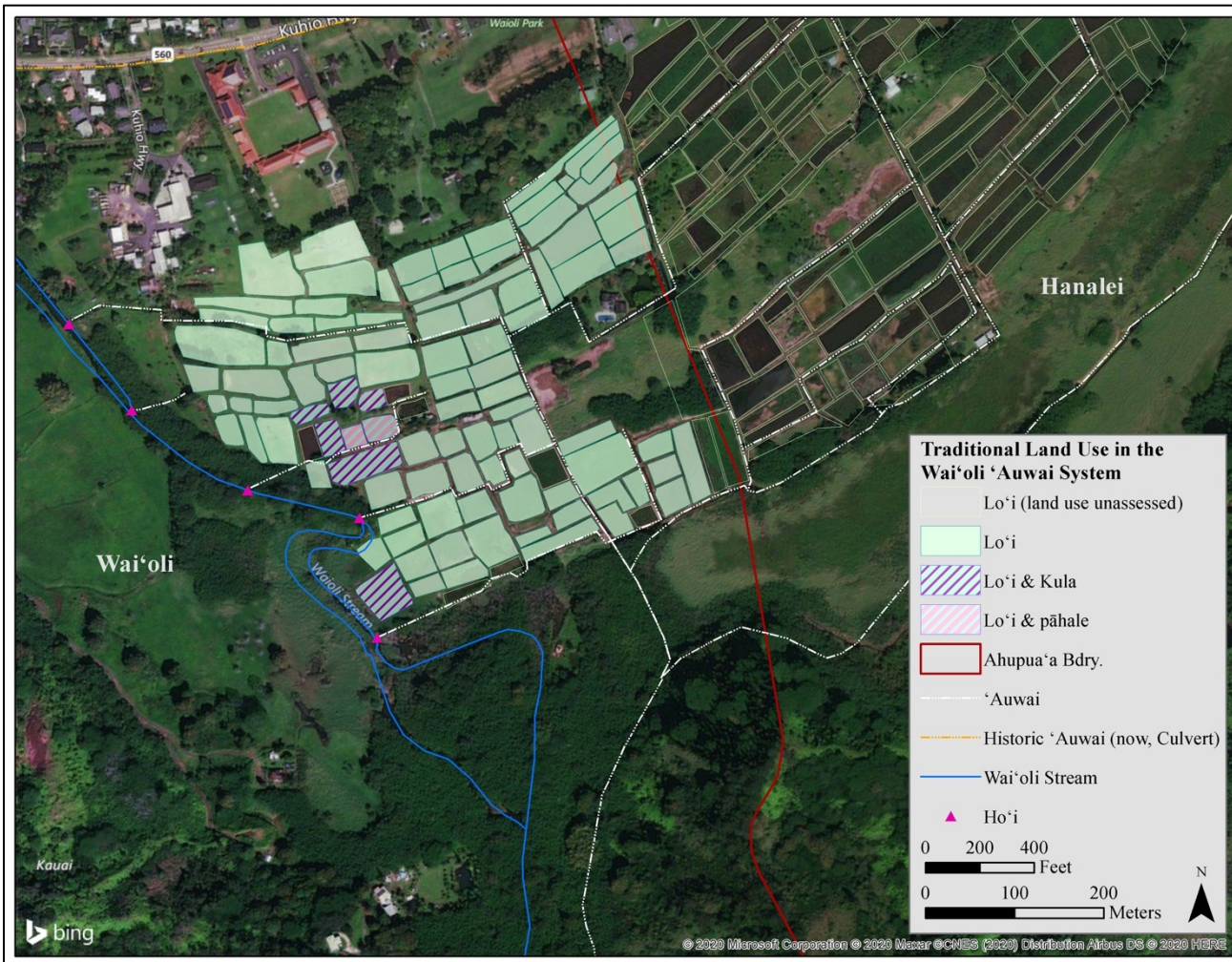


Figure 20. Depicts appurtenant right land use over modern lo'i in Wai'oli ahupua'a.

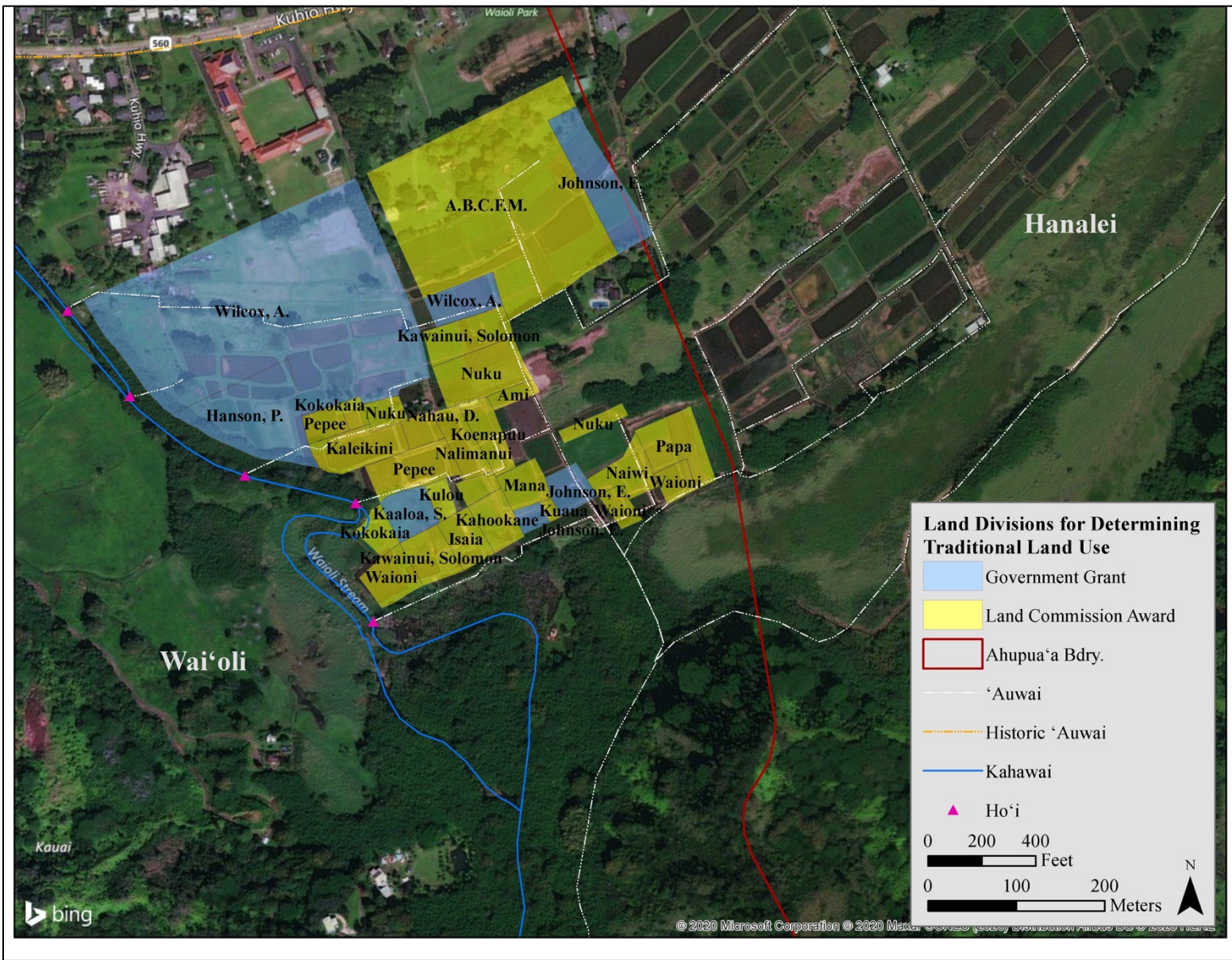


Figure 21. Depicts the LCAs and Grants researched to determine appurtenant rights for irrigated kalo.

Table 5. Selected parcels within the Study Area with solely lo'i land use.

TMK	Land Type	Awardee/ Grantee	Reference Date	Land Use	Source
455006009	Grant	Hanson, P.	1857	lo'i	Gr2685
455007030	LCA	Helepalala	1844	1 lo'i named Waiiau	LCA, NR, NT,
455007004	LCA	Isaia	1851	2 lo'i	LCA, NR, NT,
455007016	Grant	Johnson, E	1854	the lo'i of Johnson	Grant, neighboring LCA (Kahookane)
455006008 (por)	Grant	Johnson, E	1855	"kalo lands"	neighboring LCA (A.B.C.F.M.) "surrounded by kalo"
455007010	Grant	Kaaloa, S	1856	2 lo'i	Grant
455007003	LCA	Kahookane		the lo'i [4] named Uhikiko	LCA, NR, NT
455007018	LCA	Kahooponopono	1820	2 lo'i starting at the 'auwai and the lo'i of Nalimanui	LCA, NR, NT
455006007	LCA	Kawainui, Solomon	1851	1 lo'i	LCA, Gr2402
455007005	LCA	Kawainui, Solomon	1840	1 lo'i named Koele	LCA, NR, NT
455007016	LCA	Koenapuu	1848	kalo, beginning at the lo'i of Mana	LCA, NR, NT
455007009	LCA	Kokokaia	1851	lo'i	LCA
455007016	LCA	Kuaua	1841	1 lo'i named Kamanui (ap1 is along the highway in Hanalei)	LCA, NR, NT
455007011	LCA	Kulou	1846	1 lo'i beginning at the lo'i named Paele	LCA, NR, NT
455007016	LCA	Mana	"...ever since until now 1848"	1 lo'i named Kaumaunui	LCA, NR, NT
455007014	LCA	Nahau, D.	1851	1 lo'i starting at the corner of Kaleikini's lo'i	LCA, NR
455007032	LCA	Naiwi	1851	1 lo'i	LCA
455007015	LCA	Nalimanui	1848	1 lo'i in Waiiau	LCA, NT
455006006	LCA	Nuku	1830	1 lo'i named Puhaunui	LCA, NR
455007021	LCA	Nuku	1830	1 lo'i	LCA, NR
455007016	LCA	Papa	1834	3 lo'i bordered by the lo'i of Pipiwai, Koi, Naiwi, Mareko	LCA, NR, NT
455007013	LCA	Pepee	1847	1 lo'i named Kuloko	LCA, NR, NT
455007029	LCA	Waioni	1833	lo'i in the 'ili of Ukiuki	LCA, NR
455007033	LCA	Waioni	1833	lo'i	LCA, NR
455007016	LCA	Ami	1843	2 lo'i in Kalema	LCA, NR

Table 6. Selected parcels within the Study Area with mixed land use, lo'i and other undetermined uses.

TMK	Mahele Land Type	Awardee/ Grantee	Reference Date for Lo'i	Land Use	Source
455006003	LCA	Nuku	1860	lo'i & pāhale	LCA, NT, Gr2625
455006001	LCA	Kaleikini	1851	kalo & dry-land area	LCA, NT
455006022	LCA	Pepee	1860	lo'i & pāhale	LCA, Gr1616 (c1860), Gr2684 (c1860)
455007006	LCA	Waioni	1833	ap2 lo'i & kula	LCA, NR
455006002	LCA	Kokokaia	1860	lo'i & pāhale	LCA, Gr1616
455006008	Grant	Wilcox, A	1857, 1860	"kalo lands" & kula	LCA387, LCA9070
455006008	LCA	A.B.C.F.M.	1855, 1857	lo'i & house/Mission "bounded by kalo" "along kalo patch" "kalo corner"	Gr2403, 2625

Calculating Acreage

There are thirty-two (32) Māhele-era parcels used as a sampling to establish rights to water (Table 5 and Table 6): five (5) Government Grant parcels, and twenty-seven (27) LCA parcels,⁷³ totaling roughly 45.82 acres.

Of the land parcels depicted in Figure 20 and Figure 21, we have established twenty-five (25) as being in solely lo‘i, or in kalo, in the early-mid 1800s (Table 5). Here are a total of 16.953 acres of solely lo‘i land use (Table 7). The additional seven (7) mixed use parcels inventoried in Table 6 are slightly more complicated for calculating acreage in lo‘i during the 19th century. The first five (5) kuleana parcels indicated a mixed use of lo‘i and pāhale or lo‘i and kula. For those, project staff generally subtracted at least 0.25 acres for the pāhale and/or kula portions.

A Government Grant (Grant 2685) to A. Wilcox (Table 6), was in kalo with some kula, but the extent of either was not established. The estimated acreage for the Wilcox Grant (Table 6), was calculated by gathering information relating to: 1) total acreage when the fee was created, 2) details on land use based on neighboring parcels, and 3) mapping onto the current field system to get a real world unit for measurement⁷⁴ (Figure 20). First, the original grant describes its boundary and approximate acreage as 15.5 acres. Second, details on the property’s use were available in neighboring LCAs and Native Testimonies. As was typical with these awards, several large neighboring awards to Grant 2685 reveal the use on lands on their boundaries (such as LCA 9280) as in lo‘i, in kalo, “kalo lands,” surrounded by kalo, etc.⁷⁵ Additionally, three (3) small LCAs describe their northern boundary as having kula.⁷⁶ Figure 20 depicts these kula lands on the map, they total 0.52 acres. Project staff summed up the remaining modern lo‘i fields, which are 10.5 acres. This is a reasonable estimate for lo‘i based on the extent of the ho‘i (including one farther ma kai at the bridge), the proximity of ditches to these lands, as well as testimonies explaining that there were lo‘i bounding their properties near or in the outer sections of the parcel. The research team notes that the system is equipped for more lo‘i than are in kalo or fallow rotations today. Moreover, when calculating the extent of cultivation, this property did not likely have a homestead on it, as the houselot for A. Wilcox was still on mission property in the ma kai section of the kalo lands where it stands today. Therefore, this extensive research yields a reasonable calculation of 10.5 acres of lo‘i, 0.52 acres of mixed kula, and a remaining 4.48 acres of mixed use within the Wilcox Grant. Mixed use could include lo‘i, kula, or other purposes.

The seventh parcel (Table 6) an LCA to the American Board of Commissioners for Foreign Missions (“A.B.C.F.M.”), includes a large lot that has mixed use of lo‘i, farming, and activities associated with the mission. The acreage for LCA 387 ‘āpana 2, to the A.B.C.F.M. was calculated using the same reference materials and methods as for Grant 2685. The A.B.C.F.M. LCA measures around 10.75 acres. Project staff know that the lot consisted of extensive lo‘i and included bounding ‘auwai because of the descriptions from the Grant document itself, LCA387:2, neighboring parcels, and historic maps.⁷⁷ Based on research into the mission,

⁷³ Three (3) LCAs from Wai‘oli ahupua‘a were found in the Buke Māhele, but were unlocated on maps. Project staff were not able to determine if these awards were near the ocean or within the Wai‘oli Lo‘i Kalo Irrigation System. They are: LCA 1001 to Levi, LCA 7670 to Kalili, and LCA 10659 to Puali.

⁷⁴ Many of the fields have changed little, some have merged or been separated, or the kuāuna have widened, but the field shapes and distributions align to the existing ‘auwai and still serve as a good measurement tool.

⁷⁵ Grant 2684, Grant 2403, and LCA 387:2.

⁷⁶ LCA 1031:2, LCA 9070:1, LCA 9833:2.

⁷⁷ Grant 2402, Grant 1616, and Grant 2685, RM 1680.

however, we know there was a church, out buildings, and other uses. We used the modern lo'i fields and calculated a total of 5.75 acres of lo'i and 'auwai. The remaining 5.00 acres is a conservative estimate for undetermined use, which could have also included more lo'i and 'auwai depending on the mission's needs.

Based on the research and mapping detailed above, we have determined that of the lands surveyed and depicted, these are the totals for land use:

Table 7. Analyzes the acreage for lo'i land use using the acreage of LCAs and Government Grants, which could have corresponded to locations of 'auwai as established in 1893 by RM1680.⁷⁸

Total Acreage	Acres in Lo'i	Land Use	Notes	# of Parcels
16.953	16.953	Solely lo'i	Lands with just lo'i land use as established above and based on LCA & Grant acreage	25
0.903	0.153	Lo'i and pāhale	Subtracting 0.25 acres/parcel for pāhale	3
1.712	1.212	Lo'i and kula	Subtracting 0.25 acres/parcel for kula	2
10.5	10.5	Lo'i	In Wilcox Grant 2685	1
0.52	0	Kula		
4.48	0	Other undetermined use		
5.75	5.75	Lo'i	LCA 387:2 A.B.C.F.M.	1
5.00	0	Other undetermined use		
~45.82	~34.57			32

This data yields a conservative estimate for lo'i in cultivation at the time of the Māhele on the parcels surveyed in this study (Figure 20, Table 5, and Table 6), as it is possible that the 4.48 of other undetermined uses in Wilcox Grant 2685 and the 5.0 acres of other undetermined uses in the A.B.C.F.M. LCA could have included more lo'i. In conclusion, in the study area in the Wai'oli ahupua'a alone, not including its sister watershed of Hanalei, at least **34.57 acres** were in lo'i kalo cultivation in the early-mid 1800s, with all the rights and access to water needed to irrigate those fields. Even with this reasonable figure, we note that the 1990 Hawai'i Stream Assessment identified Wai'oli Stream as one of only six throughout Hawai'i that historically supported more than fifty (50) acres of kalo.

Mānowai, Po'owai, and 'Auwai

In addition to looking at archival Māhele records, project staff examined historic maps to survey additional documentation of the 'auwai system. In 2019, research by the Office of Hawaiian Affairs' Specialist Wahine'aipōhaku Tong identified twelve kuleana LCAs that referenced this 'auwai.⁷⁹ The Wai'oli Lo'i Kalo Irrigation System is first depicted in part within surveys for Māhele documents between 1851-1852. Then, 42-60 years later, ahupua'a level maps were made by the Hawaiian Government Survey,⁸⁰ which depicted features of the Wai'oli Lo'i Kalo Irrigation System in relation to the larger landscape.

⁷⁸ Undetermined use area would have almost certainly contained portions of 'auwai and lo'i lands, but this is a conservative estimate based on existing data.

⁷⁹ Tong 2019.

⁸⁰ Hawaiian Government Survey was founded in 1870.

Table 8. Kuleana Land Commission Awards in Wai‘oli that are comprised of lo‘i and mention ‘auwai (from Tong 2019).

LCA No.	Awardee	Date	Description	Description
8037	Ami	1851	“Akahi loi”	“e pili ana i ka auwai ”
8261	Isaia	1851	ap1 “alua loi”	ap1 “e pili ana i ke auwai o Kaupaia/Kaupana”
9072	Keolo	1852	ap2 “aina kalo” ap3 “ehiku loi”	ap2 “E hoomaka ana ma ka auwai o Waioli”
9079	Kahookane	1851	ap1 “Na loi”	ap1 “e pili ana i ka auwai Kaupana”
9080	Kahooponopono	1851	ap2 “alua loi”	ap2 “E hoomaka ana ma ka auwai ” “e pili ana i ka auwai ”
9273	Kawahine	1852	ap3 & 4 “akahi loi”	ap3 “e hoomaka ana ma kahi auwai ” ap4 “e pili ana i kahi auwai ”
9275	Koenapuu	1851	ap 1-3 “akahi loi”	ap1 “e pili ana i kahi auwai ” ap3 “e pili ana i ka auwai o Waioli”
9276	Kiolea	1852	ap2 “aina kalo”	ap2 “e hoomaka ana ma kahi auwai ”
10096	Mareko	1851	ap2 & 4 “alima loi”	ap3 “e hoomaka ana ma ka auwai ” [apana was cancelled]
10308	Nalimanui	1852	ap1, 4, 5 “akahi loi”	ap1, 5 “e hoomaka ana ma ka auwai ”
10308	Nalimanui	1851	ap1, 4, 5 “akahi loi”	ap 1 “e hoomaka ana ma ka auwai o Waioli” ap5 “e hoomaka ana ma ka auwai ”
10959	Waioni	1851	ap2, 3 & 4 “akahi loi”	ap3 “e hoomaka ana ma ka auwai ”

The importance of placing the ‘auwai system in time, and in the same footprint as it is today, not only reaffirms, but proves the general cultural understanding that lo‘i are wetland fields, and that lo‘i kalo, wetland taro patches, were fed by these ‘auwai. Further, these ‘auwai would, in turn, have been fed by a po‘owai from a mānowai on a nearby stream; based on geography, it would have clearly been on Wai‘oli Stream.

The earliest map depiction of part of the system is from 1873 on Register Map 927 (Figure 22).⁸¹ Even though faint, one can make out the main curve of the ‘auwai system; it is in the same dotted line that defines the stream, curving around the base of Kamoo Koleaka. No other details were drawn of the system, this depiction of the main ‘auwai before the main split is the earliest outside of Buke Māhele claims.

An early Hawaiian Government Survey map, covering an area that ends within a few dozen feet of the po‘owai, notes the age of the integrated systems in Wai‘oli lo‘i kalo. Register Map 1680 (circa 1893) clearly depicts the main ‘auwai coming from the exact same location it does today, along the base of Kamoo Koleaka (same segment as on RM 927).⁸² This map even depicts the main split where the ‘auwai divides, with one branch flowing into the Wai‘oli ahupua‘a side of the system, and the other branch flowing into the Hanalei ahupua‘a portion of the system. The 1893 map and the GIS map are so similar, reflecting a system that has been in place for almost 130 years since the date that the map was made (Māhele documents establish an earlier date).

⁸¹ Gay 1873.

⁸² W. A. Wall, *Waioli Kauai*. Register Map 1680, 1893.

(Figure 24). This map establishes that the Hui's system is itself a traditional and customary Native Hawaiian resource and practice.

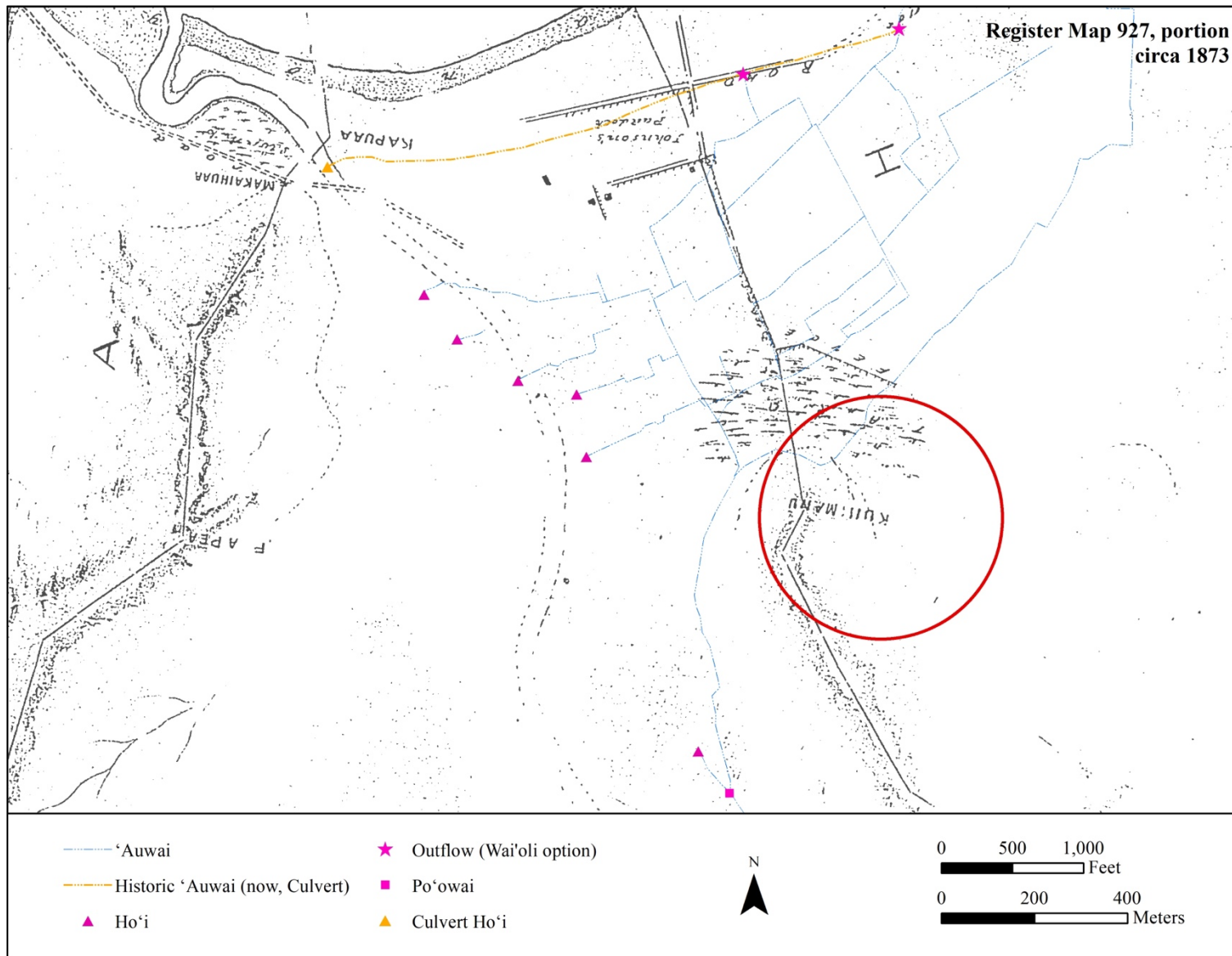


Figure 22. Detailed portion of Register Map 927, circa 1873. The red circle shows where a portion of the main 'auwai flows along the base of the ridge.

Register Map 1680

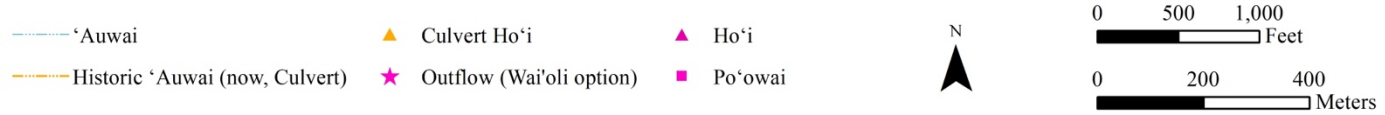
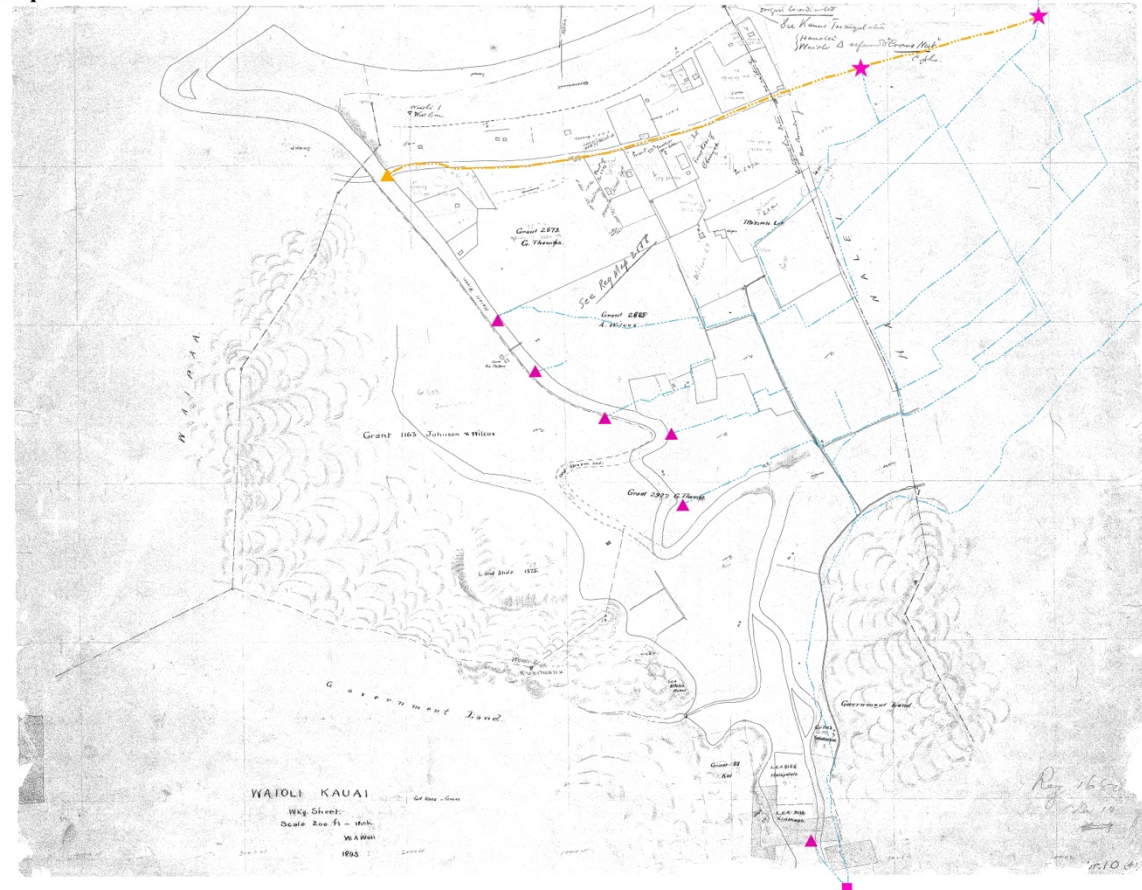


Figure 23. Register Map 1680, circa 1893, depicting the modern Wai'oli Lo'i Kalo Irrigation System over the same system depicted in 1893. Note that the 'auwai layer was not warped to fit this map, this is an accurate geospatial overlay

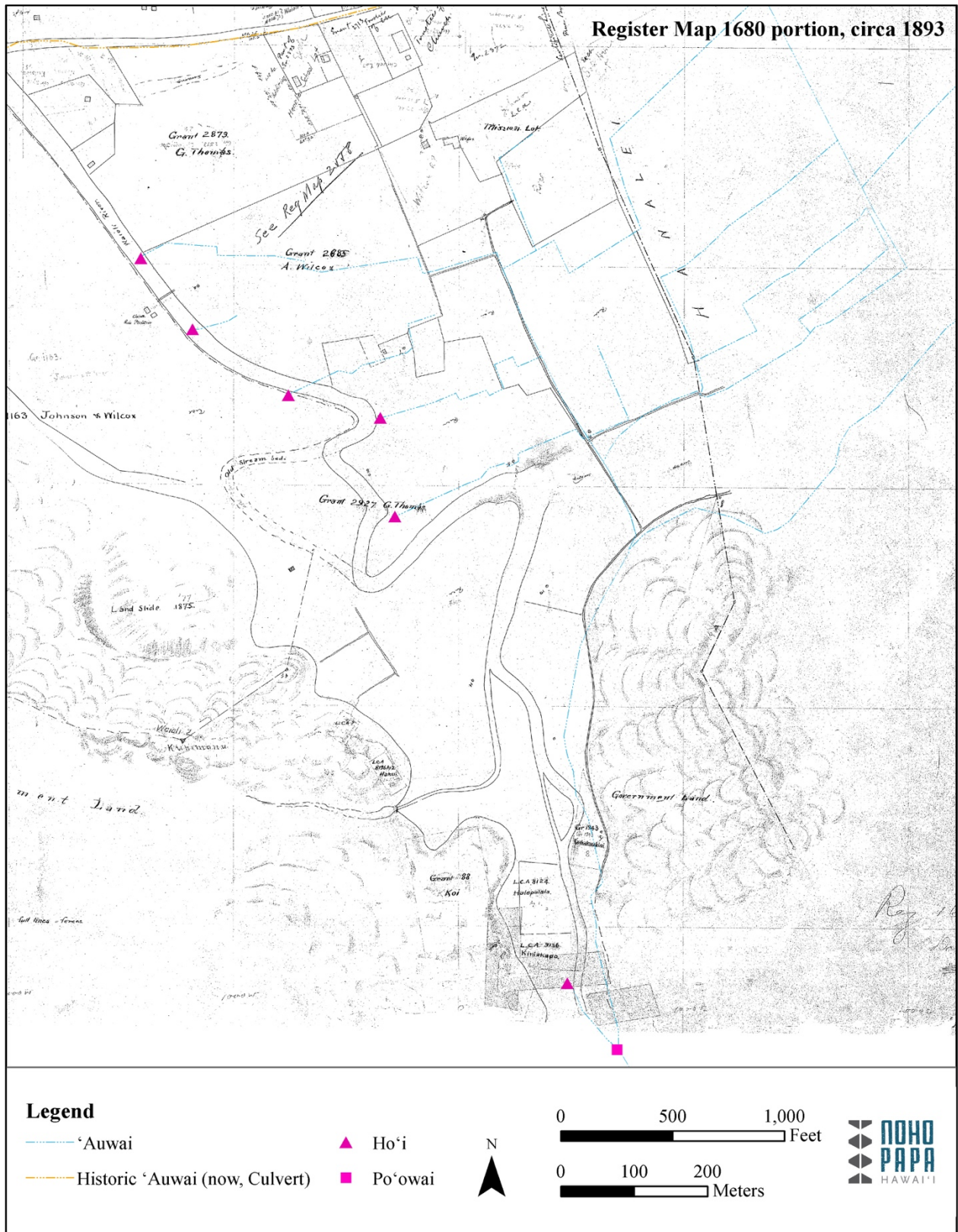


Figure 24. Portion of Register Map 1680, circa 1893, depicting the modern Wai'oli Lo'i Kalo Irrigation System over the same system depicted in 1893. Note that the 'auwai layer was not warped to fit this map, this is an accurate geospatial overlay.

Summary of Appurtenant Rights

Research for this section was based solely on primary source archival materials in English and ‘ōlelo Hawai‘i and the use of ESRI ArcGIS software to contextualize the geospatial locations of historic maps and land features.⁸³

Based on this research, project staff determined that, *at minimum*, 34.57 acres of the Wai‘oli Lo‘i Kalo Irrigation System was in lo‘i between 1830-1860, with all the rights and access to water necessary to irrigate those fields. The documentation provided is contemporaneous with the use of lo‘i on these various parcels today.

Historic maps establish that the ‘auwai system was partly surveyed and depicted 147 years ago, then in greater detail 20 years later. Using ESRI ArcGIS software to georeference old maps to their real world geospatial locations, project staff clearly established that the ‘auwai system has changed little over the last 127 years. In fact, these extremely early depictions confirm the existence of the mānowai and po‘owai per the extent of the ‘auwai system. When coupled with Māhele claims (discussed above), this attempt to quantify appurtenant rights to a sample acreage is reasonable based on an exhaustive survey of Māhele and other data.⁸⁴

All of this underscores the extent and interconnectedness of the Wai‘oli Lo‘i Kalo Irrigation System at the time of the Māhele. Comparing Figure 20 and Figure 24, it is remarkable how little the system has changed over the last 170 years. The Hui’s continued use of water from Wai‘oli Stream is grounded in both traditional and customary Native Hawaiian, riparian, and appurtenant rights, which have the highest protection under that law, as well as historic and contemporary instream and in-watershed use.

⁸³ Project staff did not attribute kalo or lo‘i use without examining multiple records. All cases of possible mixed use were noted and discussed in detail above.

⁸⁴ By the published date of Register Map 1680, the Office of Hawaiian Government Survey had only been in existence for 23 years.

Ethnography – Traditional & Customary Native Hawaiian Beliefs, Practices, and Resources

Methods

With the goal of identifying and understanding the importance of, and potential impacts to, Native Hawaiian historic and cultural resources and cultural practices of Wai‘oli, project staff conducted ethnographic interviews with community members who are knowledgeable about the Project Area. Utilizing a multi-phase study between August and October 2020, the ethnographic process consisted of identifying appropriate and knowledgeable individuals, reaching out to them with an invitation to participate, conducting oral history interviews in person, summarizing the digitally recorded interviews, analyzing the oral history data, and preparing a summary of findings (Summary of Community Ethnography).

Scoping for this project began with contacting knowledgeable individuals recognized as having genealogical, cultural, and/or historical connections to the project ahupua‘a and knowledge of watershed management, lo‘i kalo farming, and other traditional and customary Native Hawaiian practices, especially within the Project Area. Project staff selected participants who met one or more of the following criteria: 1) were referred to Nohopapa Hawai‘i; 2) possessed genealogical ties to the Project Area or vicinity; and/or 3) were considered Native Hawaiian cultural practitioners. Nine (9) individuals were contacted to participate, eight (8) individuals participated in the consultation process, and one (1) could not participate due to scheduling issues. Project staff then called and emailed individuals with a Community Contact Letter (Appendix D) to inform them of the project, followed up by telephone, and then met with individuals in person to discuss the project.

During the study, project staff learned that interview participants obtained their knowledge about the project ahupua‘a from three primary sources:

1. Knowledge and information passed on within the ‘ohana from one generation to the next.
2. Knowledge obtained from individuals outside their ‘ohana such as teachers, cultural practitioners, and kūpuna.
3. Knowledge gathered through personal observations and practices (such as knowledge acquired through cultural work and practices within the Project Area).

All of the individuals interviewed acquired their knowledge about Wai‘oli through personal experience or observations and from older family and community members who shared with them personal, historical, and/or genealogical information about Wai‘oli and the Wai‘oli Lo‘i Kalo Irrigation System.

The study utilized semi-structured interviews that followed a general script covering a pre-determined list of topics while allowing for open-ended discussion. The interviews were conducted in a “talk story” format to allow for a more informal dialogue and free-flowing sharing. Project staff utilized information gathered during the initial phases of archival research and scoping to construct the open-ended interview questions. The primary themes guiding the interviews included:

- ‘Ohana and individual connections and relationships to the area
- Mo‘olelo, place names, mele, oli, and hula
- Past and present cultural practices and protocols
- Knowledge of natural and cultural resources
- Traditional and historic land use and ownership
- Information about the traditional lo‘i kalo irrigation system
- Traditional and historic events affecting practice (‘auwai, rivers, storms)
- Concerns and suggestions regarding future management of this area
- What does water mean for kalo or kalo farming?

Project staff audio recorded each interview, and later transcribed and summarized some portions. Staff then sent the summaries to each interviewee for review, accuracy checks, and to confirm they were comfortable with the thoughts and information shared. Throughout the study, project staff remained committed to ensuring that the voices of community members were honored and respected, correctly heard, and properly conveyed.

Throughout the study, and particularly before any type of meeting or interview, project staff explicitly and carefully explained to all participants that involvement in the study was strictly voluntary. All participants completed a comprehensive informed consent process, which included receiving project background information, as well as the Participant Informed Consent Forms (Appendix E: Participant Informed Consent Forms), which notifies participants that they can choose to remain anonymous. After proper notification and discussion, some interview participants voluntarily provided verbal, written, emailed, and even texted consent for the researchers to use their mana‘o for this study. Throughout the project period, all participants had open access to the interviewer. All of the interviews were scheduled and arranged for the participant’s convenience, and none of the interviews or meetings were initiated until participants felt comfortable with the process. During the course of researching and conducting the ethnographic interviews, no sensitive or confidential information was revealed, and no confidential information was withheld from the current report.

Identification of Topic Areas

In Wai‘oli, many kūpuna and kama‘āina have maintained close connections to their ‘āina and have kept the stories and practices of their culture alive; continuing the cultivation of this Native Hawaiian cultural landscape since time immemorial. Ethnographic research for this report included conducting interviews with community members to record and acknowledge participants’ cultural and historical connections to the Wai‘oli Lo‘i Kalo Irrigation System.

The following sections include extended quotations from these in-person interviews as well as testimonies provided by some of our interviewees and other kalo farmers and submitted to BLNR in May 2019 and February 2020, organized by topic area. Four general themes emerged from the mana‘o shared during these interviews and from these testimonies: 1) Individuals’

Connections to the Wai‘oli Lo‘i Kalo Irrigation System; 2) Kalo Farming and the Wai‘oli Lo‘i Kalo Irrigation System; 3) Traditional and Customary Practices and Resources Dependent on the Wai‘oli Lo‘i Kalo Irrigation System; and 4) Concerns and Recommendations. The following sections explain these themes in greater detail.

Individuals’ Connections to the Wai‘oli Lo‘i Kalo Irrigation System

Project staff contacted nine (9) individuals regarding this CIA. Of the nine, eight (8) individuals participated in ethnographic interviews. The following section includes background information for each interviewee, including information on their ‘ohana and/or individual connections to Wai‘oli and Halele‘a, and their continuation of kalo farming.

Clarence Eli Kaona, also known as “Uncle Shorty,” was born in Honolulu and raised on Kaua‘i. He is a third generation kalo farmer in Wai‘oli Valley, 100% Native Hawaiian, and a member of the Wai‘oli Valley Taro Hui. He has been farming the same kuleana land in Wai‘oli since he was a young child. His grandfather farmed kalo in Hanalei Valley in the 1930s, and when he passed away, Uncle Shorty’s father took over and then acquired land in Wai‘oli Valley in the 1940s. Uncle Shorty went to Hanalei School and remembers walking from Hanalei up into Wai‘oli Valley to work in his father’s taro patch: “I’ll be 85 (years young) in November and all those years I’ve been working in the taro patch. This is the same kuleana that I continue to farm and that will be passed down to my daughter, JoAnne Kaona, and to the generations yet to come.” Uncle Shorty took over kalo farming from his father in 1987 and in 1989, filed a Declaration of Water Use with the Commission on Water Resource Management.

Diana Kahiki Spencer (“Aunty Diana” Kaona) is Uncle Shorty’s sister and was married to the late Charles Spencer. Like Uncle Shorty, she is 100% Native Hawaiian, was born on O‘ahu and raised on Kaua‘i, first living at Kalihikai and then moving to Hanalei with the family. Their mother, Miriam Puakina Nahulu, was born on Ni‘ihau and later adopted. Their father, David Kawika Kaona, was born on Hawai‘i Island, raised on Kaua‘i, and later started to farm kalo. For Aunty Diana and Uncle Shorty, growing kalo is a family tradition. Today, Aunty Diana has lo‘i kalo up in Hanalei Valley, about almost three acres where she continues to grind, plant, and weed.

JoAnne Kaona is the daughter of Uncle Shorty and a fourth generation kalo farmer. Her father has farmed their family kuleana along with a handful of other small parcels for decades. She is one of five children and is the only one who helps her father farm their lo‘i. For JoAnne, kalo farming defines her ‘ohana: “it is what we do.” She enjoys helping her father farm and has an appreciation for it as something special that they share together. Even in his 80s, her father still works hard as a kalo farmer and knows that the kuleana will fall upon her to ‘auamo (shoulder) when he is no longer able. She considers farming kalo her kuleana, a way to feed her community, and something that makes her happy. She explained, “After four generations of this work, it would be impossible for me to turn away from a practice that has been with my ‘ohana for so many generations. In fact, there is no other alternative for me, I just have to do it.”

Kimo Inanod was born on Kaua‘i, has lived in Wai‘oli Valley across from the Hanalei School his entire life, and is a fourth generation Native Hawaiian kalo farmer. Kimo is also an avid hunter, fisher, and gatherer, and regularly accesses the ma uka and ma kai reaches of the Wai‘oli Watershed to exercise traditional and customary Native Hawaiian rights and practices. He is intimately connected with this ‘aina and feels an obligation to ensure responsible use of this land and its resources. For Kimo and his ‘ohana, “this is about protecting and restoring our quality of life as Native Hawaiian practitioners and small family farmers.”

Lillian Watari grew up on the North Shore of Kaua‘i, living in Wainiha, then Kīlauea and currently in Wai‘oli. She shared “To say kalo farming has been a longstanding custom and tradition in our family would be an understatement. Growing up, I was the eldest of 5 children. As soon as we were physically able, we were out in the lo‘i helping our parents and grandparents maintain and cultivate the kalo. At such a young age, the commitment it takes to farm kalo was a burden I did not quite understand. Our lives revolved around the kalo’s needs. Our routine consisted of coming home after school, having enough time to grab a snack, and loading up the truck to head down to the lo‘i. Looking back now, the value of the lessons I learned working in the lo‘i is hard to put into words. I am proud of my family’s tradition of farming kalo and the person it has made me. It taught me the value of hard work and the importance of being able to spend time with nature.”

Lily Tai Hook (“Aunty Mieko”) was raised in Wainiha, later moved to Kīlauea and now lives in Kalihiwai. Her grandfather grew kalo in Lumaha‘i and her father (Allen Harada) also had lo‘i kalo in Wainiha. She has farmed kalo in many parts of the Halele‘a moku. Currently, she and her husband (Wilbert Tai Hook or “Ah Fook”) farm kalo up the river in Hanalei as well as within the Wai‘oli Lo‘i Kalo Irrigation System. These lo‘i are leased from Princeville Agriculture LLC. Just as she was raised in the kalo patch, her children were also all raised in the kalo patch.

Wilbert Tai Hook (“Ah Fook”) is married to Aunty Mieko. He has been planting kalo in Wainiha Valley since 1964 and now within the Wai‘oli Lo‘i Kalo Irrigation System.

Christine Kobayashi (“Aunty Chris”) and her ‘ohana have been living and farming in Wai‘oli Valley for three generations and over one hundred years. Her father was born in 1920 on the same land where she was born and raised and continues to farm today in Wai‘oli. Her father lived here and farmed throughout his life, as has Aunty Chris. When she was young, Aunty Chris would do simple tasks like pulling grass and harvesting. As her father got older, he spoke to her one day “realizing that there may be no one left to carry on and maintain our kalo farm. Though I never told him, it was at that very moment that I made the decision and commitment to take over the farm and carry on his legacy. I knew how much he and my mom had struggled to raise five children while farming, and I thought of all of his blood, sweat, and tears that had gone into clearing, preparing, planting, maintaining, and taking care of the kalo and the land. I thought: I can’t let all that he put into our farm be for nothing.” She currently farms about 3.5 acres of lo‘i.

In addition to the above named interviewees, eight (8) Native Hawaiian and/or kalo farming community members provided testimony to BLNR in May 2019 and February 2020. The information below describes their ‘ohana and/or individual connections to Wai‘oli and Halele‘a.

Demetri Rivera (“Dimi”) farms with Chris Kobayashi in Wai‘oli. Dimi farms about 5.13 acres of lo‘i, kuāuna (banks), and roads and has been farming kalo full-time for over 25 years.

Dwight Morishige is a third generation kalo farmer and has been farming in Wai‘oli Valley for over 40 years. He grew up in this community and learned how to grow kalo from his family, his father-in-law, and other farmers in this area.

Bobby Watari is a third generation kalo farmer and has been farming kalo full-time for the past 40 years. Farming kalo is Bobby’s life’s work and passion. He learned to farm from his father, who moved to Hanalei in the 1950s to farm kalo. Bobby cultivates the kuleana land that his family owns and leases other lo‘i from Wai‘oli Corporation. For Bobby, “Farming is so much more than planting and harvesting. We work hard to preserve the land for taro, and to steward

the lo'i kalo system that has been in place long before I started farming. In Wai'oli, we use a traditional Hawaiian water and lo'i system that researchers have documented as having been in place since before the arrival of Captain Cook in the 1700s. We are honored to be a part of the handful of farmers that continue this important practice – one that has been our way of life in Wai'oli for hundreds of years.” For Bobby, kalo farming is woven into his family life, “We enjoy and are proud of being able to farm as family. The vision I have of farming the same land with my wife, Lillian, stepson, Kaisen, and his kids gives me the strength needed to continue during these difficult times. Knowing our future 'ohana will have access to water and the access needed to maintain our water system would give me hope that they will be able to continue our family tradition of farming taro.”

Kaisen Carrillo comes from multiple generations of kalo farmers on both sides of his 'ohana. He is in his 20s, and a fifth generation Native Hawaiian kalo farmer in Wai'oli and Lumaha'i Valleys. He is one of only three farmers in Wai'oli younger than 35 years old. He shared, “I have just started my own family and I am raising my 3-year-old daughter to farm this land as well. I also have another child on the way [born in 2020] who I will also raise in the same way. They will be sixth generation Wai'oli kalo farmers.” He continues, “as difficult as things have been, I love what I do. This is my culture. It is what my family has been doing for generations. I feel a deep sense of pride and honor to 'auamo my kuleana and perpetuate this practice – especially now when many of my generation are becoming less interested in taro farming. To be honest, there are more lucrative ventures for some. But, what we do goes beyond monetary value; this is about kuleana. It is our way of life and we will continue to farm taro on these lands for as long as we are physically able.”

Nathaniel Temanu Tin-Wong is Native Hawaiian, comes from generations of farmers, and has family roots across Kaua'i. With a young 'ohana Hawai'i, he recently moved back to Wai'oli Valley to farm. He explains: “we strive towards a lifestyle devoted to exemplifying those values and traditions passed on to us by our ancestors: living with the land and farming kalo.” Although in relation to fellow Wai'oli Valley Taro Hui members, he is relatively new to farming, he understands the importance of growing kalo. He shared, “Farming kalo feeds not only my physical self, it feeds my na'au. My practice, as a kalo farmer, keeps me grounded, and without it, it is easy to get lost. I consider my practice and work important not only to my community, but to humanity as a whole.”

Reid Yoshida has had family in Hanalei for 125 years. His great-grandfather came to Kaua'i to work on the plantations and lived in Hanalei since the late 1800s. His grandfather was born in Hanalei in 1896, and Reid shared that he is fortunate enough to live in the same home that his great-grandfather finished building in 1933. In the 1920s, his great-grandfather started raising rice and then slowly started to plant kalo as a supplemental crop in the 1940s. By the 1950s, due to the competitive rice prices in California, he decided to leave that crop and move towards farming taro. For years, his grandfather continued to farm until his uncle eventually took over the farm. He described his childhood: “Growing up, I spent my time split between O'ahu where I went to school, and Hanalei where I spent my summer/spring breaks, long weekends, and holidays. Every time that I was in Hanalei, we always worked the farm. When my friends were out playing sports and going to the beach, we were either pulling grass, planting huli, or using the tiller to prep the fields.” Reid's family kuleana is the foundation for him continuing to farm kalo, “Many people have questioned my decision to walk away from my career as an engineer to farm taro, but I do it because it is gratifying. I do it because I am able to farm on the same land that my grandfather did and this gives me pride in what I do. I am carrying on my grandfather's legacy and it will not end with me; it will keep going.”

Sierra-Lynn Boro-Harada is a Native Hawaiian kalo farmer whose family has been farming kalo for generations. She was raised in the fields where she learned and grew to enjoy the culture of cultivating kalo, the various aspects of hard work, and how to have fun while working. Her dream is to carry on this tradition and lifestyle, and to teach her children and future generations of her family to love it as she does. She shares, “My love for farming is limitless – it is hard to put into words. The opportunity to love what you do, and do what you love, is an experience that I hold dear. It is priceless and I plan to continue my family’s tradition of farming here on the North Shore of Kaua’i.”

Wayne Tanji has been farming in Wai’oli Valley for over 30 years and currently leases 1.8 acres of land where, prior to the flood, he maintained seven (7) wetland kalo patches.

Kalo Farming and the Wai’oli Lo’i Kalo Irrigation System

This section documents the different aspects of Wai’oli Kalo Farming as shared by participants, specifically regarding 1) The Need for Flowing Water from the Wai’oli Lo’i Kalo Irrigation System and the Absence of Alternatives, 2) Changes to the Lo’i Kalo Irrigation System and Wai’oli Water Over Time, 3) The Importance of Maintaining the Wai’oli Lo’i Kalo Irrigation System, 4) Impacts of Heavy Rain and Flooding on the System and Lo’i Kalo, and 5) Supporting ‘Ai Pono and Sharing with the Community. These various facets of caring for the Wai’oli Lo’i Kalo Irrigation System demonstrate that this traditional system and the Wai’oli community are inextricably intertwined—that the system relies on the community to maintain it, and that the community depends on the system and the resources it supports to sustain cultural practices and put food on their dinner tables.

The Need for Flowing Water from the Wai’oli Lo’i Kalo Irrigation System and the Absence of Alternatives

The continuous flow of water is essential to grow wetland kalo. Without constant flowing water, this Native Hawaiian traditional and customary practice will be extinguished. Participants all noted that if they did not have enough cold, flowing water, their wetland kalo would not grow properly. Importantly, flowing water plays a vital role in maintaining the temperature of lo’i, which ultimately affects the growth and quality of the kalo. Participants shared their thoughts about whether there are other viable alternatives to the current ‘auwai system, and agreed that all other alternatives, including well water, would be impracticable. Moreover, stewarding this system – rebuilding the mānowai after floods and maintaining the ‘auwai – is part of these farmers’ Native Hawaiian traditional and customary practice of kalo farming in Wai’oli.

Kimo put it simply: “If you don’t have water, the taro isn’t going to grow. The grass is going to come out and overtake the crop. And you’re only going to have little bit taro or the taro is going to cook from the heat if there’s no water.” Wai’oli kalo is grown wetland because it is used for poi. This necessitates throughflow – having water flow into the lo’i and return to the river to carry heat away. Without “a constant flow of water . . . the water fill up and it just sits . . . and the water comes hot. So the taro matures faster. It won’t grow as good if you don’t have running water. Cold running water.” Kimo explained that water from the Wai’oli River is the lifeblood for both his lo’i kalo and his culture and way of life as a Native Hawaiian practitioner: “If something should happen to the Wai’oli ditch, there is no other source of water. That’s it right there. Pau.”

Demetri shared, “I know that you cannot farm wetland kalo without good, fresh, flowing water from the mountains. If there is a lack of water or inconsistent water, you will get lots of weeds growing and your kalo quality can be so bad, that sometimes, you just gotta plow under. If water

flow is low in the summer and the other hot months, the water is warm and the kalo will rot due to diseases and a poor environment. No sense plant.” Aunty Chris echoed the importance of maintaining optimal water temperature, “Taro wasn’t made to grow in hot, standing water or murky, mucky stuff.”

Aunty Diana reiterated the need for flowing water: “Water is the main thing we need. We need that Wai’oli water to flow steady.” She insisted there is no other alternative to flowing water from the mānowai. “As long as you have the water, that’s all you need, is water and your lima.”

Changes to the Lo’i Kalo Irrigation System and Wai’oli Water Over Time

Although the physical system itself has changed little over time, inhabiting the same footprint since at least 1893 (Figure 24), there was a period of about 50-100 years, when rice threatened to replace kalo in Wai’oli, and across Hawai’i. This shift never took hold in Wai’oli, and the Wai’oli Lo’i Kalo Irrigation System has been 100% back in kalo since the 1950s.

All of the interviewees mentioned at least one major shift in the system they could recall. No one remembered the main ditch or māno being in a different location, but Kimo did recall when a historic ‘auwai with a ho’i was later piped by the government, although it still runs to Wai’oli Stream (see Project Area maps). Aunty Diana remembered this same ‘auwai, when it was open, in front of the Hanalei School, “when get heavy flooding, the water is coming back the same place originally where it was.” Uncle Dimi has video from the 2018 flood and you can see the back flow of water flooding the side of the road where this old ‘auwai, now a drain, flows.

Several interviewees also noticed that the water has changed over time. For instance, Aunty Chris observed that “the water up mauka at the māno in the river is much warmer than it used to be when I was growing up as a kid” and described her efforts to make the water cooler by making her fields smaller. She also remembered that a drought sometime in the late 1980s or early 1990s caused diseases and rot in kalo plants because of warm water.

The Importance of Maintaining the Wai’oli Lo’i Kalo Irrigation System

Sustaining flow into and out of the Wai’oli Lo’i Kalo Irrigation System is essential to the health of the watershed and kalo. Participants all underscored the importance of maintaining the Wai’oli Lo’i Kalo Irrigation System, including the methods used to clean the different parts of the system and the potential effects of negligence. One collective theme throughout the farmers’ interviews was that maintenance of this system is a kākou effort.

Bobby shared, “Restoring and maintaining our existing lo’i kalo system is so critical, not only for my family’s livelihood and the livelihood of the other famers, but also to perpetuate our way of life and the community here in Wai’oli that we are all a part of. We use a mānowai, a traditional, Native Hawaiian breakaway dam, to take some water from Wai’oli Stream. That water flows through our ‘auwai, then into our taro patches, then back to either Wai’oli Stream or the lower reaches of Hanalei River. Like other taro farmers, we need throughflow, water flowing through our taro patches, but we don’t ‘consume’ water like most off-stream users because it goes back to the stream. All of our use is within the watershed where our water supply originates. So, any seepage, for example, also goes back to feed our water cycle in Wai’oli.” He continues, “Our responsible water use and efforts to maintain the watershed and stream system not only benefit us, but so many others. Having worked with these resources for generations, we take care of them and they take care of us. The maintenance work we do on the lo’i kalo system is not only

essential for productive crop yields, but it also ensures a healthy watershed and stream. Regular maintenance is critical to prevent blockages that might result in flooding.”

Uncle Shorty and Aunty Diana discussed how the farmers have always worked together to clean the ditch. Aunty Diana shared that hand clearing is the best method because “[t]here’s no road or anything. You have to walk along the side of the river” and that “[w]hoever owned property would go up because they used the same water. The water comes from the same place, the same ditch, and so all the farmers go up and work together.”

Kimo shared how farmers cleaned different sections of the ditch system, “To me, there’s a lower section and the upper section. The lower section, where everybody gets their immediate water. Usually like for me, I would clean from where my pipe intake stay, I would clean so far up, like to where Aunty Chris’ guys one cuts off. Me and my uncle usually clean all that probably 20 to 30 times a year. You just go and dig the silt out, cut the hau roots and stuff.”

Aunty Lilian, Ah Fook and Aunty Mieko agreed that when cleaning and maintaining the ‘auwai, the most difficult part is clearing the hau bush roots growing into the sides of the ‘auwai.

Aunty Chris stressed the necessity of cleaning the ditch regularly, “...the ditch system will deteriorate [if we don’t maintain it] and we have to take care of it. We got to go up there, take care of the invasive [species].” She also shared her experiences cleaning the ditch and the importance of maintaining tradition, “...it’s best if whoever shares that particular portion, that they help and they do it. I think in the old days, that’s how the system worked before. Going up to clean, they would clean at least couple times a year. It was a given all the way to the māno. You look at the pictures of how productive this place is, but we need to take care of it, you know? It might be just a few families that do this, but it’s part of the culture of this place.”

Impacts of Heavy Rain and Flooding on the System and Lo’i Kalo

In addition to regular maintenance of the irrigation system, the Hui also comes together in times of heavy rain and flooding to check on and repair the system, on which they all depend.

Demetri shared, “As a Hui, we have been maintaining the mānowai, po’owai, and ‘auwai on a regular basis and especially during times of emergencies, which happens to be every time there is a big rainfall. In the winter months, we brace ourselves for big rains and storms, hoping that there won’t be any more flooding. The 2018 flood, however, was really unlike any other rainfall event we’ve seen. We need to restore the māno, clear the stream of debris, and fix the ‘auwai quickly, so that we will have enough water to start planting again. Other farmers in our Hui are also not getting as much water as they currently need, and summer is almost here. Having low water flow will further limit the amount farmers can plant and produce.”

Uncle Shorty talked about the devastation of the 2018 flood, “In all of my years here in Wai’oli, I have never seen a flood like that. The damage was devastating. It ruined my equipment and tools, most of the banks that border my patches, and the ‘auwai. The ‘auwai needs further maintenance and restoration. The mānowai that feeds the ‘auwai was completely destroyed. This led to a lack of water that has suffocated our ability to continue farming at the capacity needed to feed our families.”

JoAnne also shared about the effects of the 2018 floods on the entire ‘auwai system, “After the 2018 floods, our mānowai, po’owai, and entire ‘auwai system were completely devastated. Our river changed course and some suspect that it was due to a thousand-year flood event. Of the 3.5

acres of kalo that my ‘ohana normally farms, we are now able to farm only 2 acres. A year after the floods, and for the first time in my father’s decades of farming, he was not able to produce any kalo. This was due to many factors, including a shortage of water due to damage to our mānowai and ‘auwai, equipment ruined by the floods, and debris and silt clogs in our lo‘i. Nevertheless, we Wai‘oli farmers have persevered together through all of these challenges because of our kuleana to our community and our love for farming.”

Aunty Chris shared that they are not on a regulated water system which is often unpredictable and that flooding impacts their lo‘i and future use, “So there’s these two fields that are down there that we never farmed long time purposely because we had to throw both fields away. It was impacted from the floods. We would harvest and then the thing was so loli. Because it got flooded. It’s almost like being a farmer, it’s hard to keep taking the same risks as we get older and older.”

Supporting ‘Ai Pono and Sharing with the Community

Kalo is the staple food of a traditional Hawaiian diet, and making and eating poi is a cultural practice. The farmers all support the perpetuation of ‘ai pono, or the eating of traditional foods, by sharing and giving kalo away as well as sending it out to be made into poi in the neighboring ahupua‘a of Waipā, across Kaua‘i, and the pae ‘āina. Participants shared their experiences preparing, eating, and sharing kalo.

Aunty Diana highlighted the need for kalo and the different ways it can be prepared, “That’s our staple food. We need poi. We need taro. One thing about taro, you can cook it anyway you like. You can eat by itself. You can bake it. . . We make stew. I make patties. I grate them and then I put condensed milk and then I put meat and then deep fry it. That’s my father’s recipe.”

All participants shared about the many varieties of kalo grown in Wai‘oli over the years, and described their favorite varieties. For instance, Aunty Meiko and Ah Fook favor the Kāi variety; Aunty Lilian hopes the Kaua‘i Lehua and Pi‘iali‘i varieties come back. Aunty Chris grows over 20 Hawaiian varieties “to see how they grow in this environment in the field, in the lo‘i. And you can just see side by side growing them, which ones are strong and which ones don’t seem to be too strong, but we just keep growing it to see, give them a few seasons to grow and see what comes out of it.” The table below is an inventory of some of the kalo varieties grown by the Hui at the time of this study.

Table 9. Inventory of kalo varieties cultivated by the Wai'oli Valley Taro Hui.

Hawaiian Kalo Varieties	Non-Hawaiian Varieties
1. Elepaio Hauliuli	25. Bun Long
2. Eleele Makoko	26. Faa Fausi
3. Eleele Naioea	27. Iliuaua
4. Kapaaloa	28. Paakala
5. Kaiala	29. Palau var.
6. Kaikea	30. Number 6
7. Kaiuliuli	
8. Lehua Maoli	
9. Lehua Palaii	
10. Lau loa Eleele Omao	
11. Lau loa Palakea Eleele	
12. Lau loa Palakea Papamu	
13. Lihilihimolina	
14. Manalau loa	
15. Manaulu	
16. Manini Kea	
17. Manini Owali	
18. Manini Uliuli	
19. Maui Lehua	
20. Nihopuu	
21. Paakai	
22. Piko Keokeo	
23. Uahiapele	
24. Moi	

They also highlighted the importance of sharing and feeding the larger community. For instance, Aunty Lilian allows people to pick kalo leaves from her lo'i for special events and Aunty Diana enjoys giving kalo away to family and people visiting from other islands. "It wasn't to make money. We just help people. It was fun." Aunty Chris described the "balance between growing food for ourselves and supplying good kalo to small poi millers who make poi or pa'i'ai for their communities; to 'āina-based programs on different islands who teach and bring together many young children; and to students and families who do traditional ku'i with their traditional food. It has been a heartfelt honor to have been part of this and we hope to continue to be a source for these friends and others."

Bobby also spoke about giving to the greater community, "We feed our community by supplying this staple to small non-profits like the Waipā Foundation and others throughout Hawai'i. My son Kaisen also provides lū'au leaf so local families can again make laulau and other Hawaiian food."

Dwight shared, "This community has always been close and centered around kalo cultivation. Kalo is a very nutritional food that we grow right in our own town. Culturally, it is important for our younger generation to continue farming."

JoAnne echoed that sentiment, "Farming kalo teaches us how to act; it teaches us how to mālama our 'āina. In my work at the Waipā Foundation, a non-profit in the neighboring ahupua'a, I work with children and teach them about aloha 'āina, sustainability, natural resource management, and traditional and customary Native Hawaiian practices. I see it as an opportunity for me to instill a

sense of kuleana in this younger generation to take the teachings of our kūpuna and apply them to our practices today.” She continued, “A mission of the Waipā Foundation is to create a healthier community by educating our people about an Indigenous diet while also keeping it affordable. One way to maintain this is by ensuring that our community has local kalo and poi to eat. The Waipā Foundation gets 90% of our kalo from the Wai‘oli farmers, including my father. The Foundation processes kalo and poi at our certified kitchen with volunteer labor and provides pa‘i‘ai for our community, at or below cost. For example, Waipā’s pa‘i‘ai price for kūpuna is \$1 per pound.” Last she shared, “Within the greater scheme of things, I see my own kuleana as helping to sustain a healthy lifestyle for our entire community, from keiki to kūpuna. We in Hanalei, and more particularly the farmers in Wai‘oli, have been blessed to be able to farm kalo on ‘āina that has been stewarded in this same way for many, many hundreds of years. The ‘āina is well-suited for wetland kalo cultivation and the ‘ohana who have been farming, like my own, for multiple generations, have taken on this kuleana to ensure that accessibility to our lāhui’s most basic and essential food is met. This heavy kuleana is a burden to carry, especially when our water needs are not met.”

Native Hawaiian Traditional and Customary Practices and Resources Dependent on the Wai‘oli Lo‘i Kalo Irrigation System

Participants detailed important resources and cultural (e.g., subsistence) practices reliant upon them in the Project Area. In addition to kalo, participants identified the type of resource(s) collected, their location in relation to the Wai‘oli Lo‘i Kalo Irrigation System, and the practices and methods associated with those resources or the protocols observed. The most prevalent subsistence practices in Wai‘oli mentioned during the interviews include 1) Fishing, 2) Hunting, and 3) Gathering. Note that while religious or spiritual practices were not a focus of this study, they persevere. For example, some gather fresh water for ho‘okupu (offering) and others mentioned the importance of pule (prayer). Apart from established traditional and customary Native Hawaiian practices, because many endemic and endangered manu (birds) are also dependent on the Wai‘oli Lo‘i Kalo Irrigation System, participants also shared their 4) Manu Interactions.

Table 10. Inventory of traditional and customary practices and resources dependent on the Wai'oli Lo'i Kalo Irrigation System.

Traditional Cultural Practice	Cultural Resource	Area/Location in Wai'oli System	Shared by
Lawai'a (Fishing)	'o'opu	'auwai	Kimo Inanod
		in stream	Diana Spencer
	wī	in stream / ma uka	Kimo Inanod
	prawn	'auwai and in stream	Kimo Inanod, Diana Spencer
	'ōpae	muliwai (stream mouth)	Kimo Inanod, Diana Spencer, Joanne Kaona
	'anae (mullet)	stream	Kimo Inanod, Diana Spencer, Shorty Kaona, Ah Fook Tai Hook
	Samoan crab		Ah Fook Tai Hook, Kimo Inanod
	hinana	muliwai	Kimo Inanod
Gathering & Lawai'a	'ohe (bamboo) to make trap	ma uka	Diana Spencer
Gathering	pōhaku to make papa ku'i 'ai	ma uka along stream	Diana Spencer, Shorty Kaona
	wai, for ho'okupu, i.e. for Makahiki	ma uka	Nathaniel Temanu Tin-Wong
	maile		Kimo Inanod
	mokihana		
Gathering & Lā'au Lapa'au (Hawaiian medicine)	'ōlena	ma uka & along lo'i kūauna	Diana Spencer, Christine Kobayashi
	koali	Wai'oli	Kimo Inanod
	kukui	ma uka	Kimo Inanod, Diana Spencer, Shorty Kaona
	noni	ma uka & along kuāuna	Kimo Inanod, Diana Spencer, Christine Kobayashi
	nī'oi	along kuāuna	Christine Kobayashi
	lā'i (ti leaf)	along kūauna & Wai'oli	Christine Kobayashi, Lilian Watari, Mieko Tai Hook, Kimo Inanod, Diana Spencer
Lei	palapalai	ma uka	Lilian Watari
	nā'ū (native gardenia)		Mieko Tai Hook
	hāpu'u		
Mea'ai	pepeiao	along kuāuna	Mieko Tai Hook, Lilian Watari
	'uala		
	mai'a		
	'ulu		
	kō		Christine Kobayashi
Hunting	pua'a	ma uka	Kimo Inanod, Glenn Kobayashi (per Christine)

Fishing Practices

Participants detailed a wide range of traditional and customary fishing practices within Wai'oli. They also documented the change in fishery resources and practices over time, including where species occur (or occurred), what was caught where, and in what quantities. It is worth noting that the Hui recently drafted a community-based watershed management plan in partnership with DLNR to better steward and restore these ma uka and riparian cultural resources.

Kimo shared about his family practice of catching 'o'opu in the 'auwai and river. He recalled seeing hinana "down at the river mouth" when he was young and observing an abundance of baby 'o'opu with his grandparents. When asked about present day 'o'opu fishery and fishing practices he noted, "'O'opu definitely not as much as before in this river [Wai'oli]. Definitely. From when I was young until now there's a definite depletion of that. And really I don't think, here in the Wai'oli system, it's from overfishing. Because there's not too many guys that go in this river." When asked about other fishing practices in certain parts of the river, Kimo shared, "We used to go to the river mouth and catch the transparent 'opae. We would catch mullet, Samoan crab, all in Wai'oli River." When asked about any differences in fish populations over time, Kimo also said, "I would say maybe the lower section from the ocean, maybe up to the bridge, might be overfished. You know what I mean? I mean Samoan crab is actually invasive so get plenty people do that kind of stuff. Mullet, always get plenty. I don't really think too many people eat mullet, āholehole, and that kind of stuff."

Aunty Diana also reminisced about catching 'opae and 'o'opu and making kahe, which is "like a ramp made with bamboo. When the water goes over, it goes through the bamboo and the fish get stuck on the bamboo." Aunty Diana said today, "Now no more that kind of fish anymore. Now its tilapia, not 'o'opu. Now there's prawns and no 'opae. It's not like how it used to be before."

Aunty Lilian shared that the ditch once had an abundance of 'opae, but now "You can hardly find 'opae." Another practice she shared was "only take enough to eat. Don't take and then waste."

Hunting Practices

Hunting in Wai'oli is focused on the feral Hawaiian mountain pig. Pig hunting is a cultural practice for at least two kalo farming families in Wai'oli, and is also an important part of how the kalo farmers manage the Wai'oli Watershed and control the invasive ungulate population. Both participants explained that they never sell the meat, only share it with their families and others, as was taught to them.

Kimo described hunting and gathering in Wai'oli Valley during his childhood, "From when I was probably 10, 11, I started to hunt with my grandpa and my dad guys back here [mauka Wai'oli]. But basically, only get mountain pig back here for hunt in Wai'oli. My grandpa was the first, then my uncle and my dad, and then me. So third generation for hunting."

Aunty Chris shared about hunting pigs, a practice her brother continues today and her father used to do before he passed. Aunty Chris values hunting because the pigs have a negative impact on the lo'i; she explained that pigs love kalo, especially the Hawaiian varieties. "The pigs come, you lose your whole crop. You wait six, seven, eight months or however long. And then it's all taken away overnight." In trying to prevent pigs from ruining crops, Aunty Chris says they hunt them or set traps on their land.

Gathering Practices

Participants described gathering cultivated and uncultivated resources in ma uka portions of Wai'oli and along the kuāuna for a range of practices, including lā'au lapa'au, making lei, and subsistence. They also documented previous generations' practices and the change in gathering activities and resources over time.

For example, Kimo shared about plants his 'ohana would gather in Wai'oli Valley, including maile, kukui, and koali. He shared that his grandmother would gather “[f]rom the taro patch, on the banks. Used to have and she used to go pick. The noni leaf my grandmother used to put same thing like for boils or if I get something infected, they would use that. The kukui nut when you get sick, they put them in your mouth. The sap.”

Aunty Diana also described gathering kukui and noni for lā'au lapa'au up ma uka and how “every Saturday my mother used to give us kukui.” She recalled growing ti, or lā'i, near their lo'i when she was young and that her father grew other lā'au for food and medicine, “My father used to have a garden up there [Wai'oli]. He planted some vegetables. Beans, onion . . . lemongrass, 'ōlena, noni.”

Aunty Chris shared about the different plants she cultivates, along with their uses, along the kuāuna banks between the Wai'oli Stream and the whole lo'i kalo system, including noni, nī'oi, 'ōlena, 'uala, and kō.

Aunty Lilian and Aunty Meiko also plant and use ti from Wai'oli. They also grow mai'a (banana) and 'ulu (breadfruit) on the kuāuna. Up ma uka Aunty Lilian gathers palapalai to make lei and Aunty Meiko also looks for hāpu'u, nā'ū (baby gardenia), and pepeiao.

Manu Interactions

Habitat loss and degradation have perhaps been the most pervasive threats affecting many endemic bird populations across Hawai'i. As participants shared, many of these endemic birds (some of which are federally listed endangered or protected species) frequent their lo'i within Wai'oli. These manu rely on the Wai'oli kalo fields for habitat, utilizing the alternating stages of watered and fallow kalo fields during a season of cultivation. The many fields that make up the Wai'oli Lo'i Kalo Irrigation System can be considered pu'u honua (refuge) for several endangered endemic Hawaiian waterbirds.

The nēnē, or native goose, is not a waterbird, but is a federally protected species. From the kalo farmers' perspective, the nēnē are so abundant within this area that they are almost considered pests; like the mountain pig, nēnē like to eat kalo. For example, Kimo sees so many endemic manu at his lo'i kalo, he joked about how many there are, “You get Hawaiian stilt, every day. Nēnē goose, every day. The coot ['alae 'ula], every day. The 'auku'u, I see it every day. Koloa duck, every day. They're not endangered. They can take them off the endangered list, for sure.” More seriously he said, “they live there. Or they make their route through my lo'i and what not.”

Aunty Diana, JoAnne and Uncle Shorty have all observed nesting nēnē, 'alae 'ula, and 'ae'o within the Wai'oli Lo'i Kalo Irrigation System.

Aunty Chris had a nesting pair of 'ae'o in one of her lo'i kalo this year, two hatchlings successfully fledged and have been seen in the nearby patches of two other kalo farmers.

Ah Fook also emphasized the abundance of birds in the area and their reliance on this habitat, “I don’t care where you plant taro, the birds are going there. Where get water, they like and they know what kind of fish; and [koloa] ducks around.”

Concerns and Recommendations

Potential Impacts of No Water or Tampering with Water

Participants shared their thoughts about the potential impacts of not having any or enough water and of others tampering with the current water system. For the farmers, any threat to water flowing into the mānowai and through the irrigated lo’i kalo system is a serious concern.

Reid expressed the difficulties in recovering from the 2018 floods, “After the devastating floods in 2018, our small taro farming community has struggled. The damage to our water system has created a lot of stress and has left many of us wondering if there is even a future for taro farming in Hanalei. Immediately after the flood, our water supply was completely cut off. Luckily, we were able to restore some flow to our system, which allowed us to continue farming, but in no way was the volume close to what it was during pre-flood conditions. Over the last couple of years, we have continued to have weather events that cut off the water supply because the overall system was so heavily damaged. This has compounded problems as the low water flow has made it hard for me to replant as much as I would like, which in turn makes it even harder to recover from the April 2018 flood.”

Kimo also described what could happen if the system was shut down or “if the State would stop it, I would say within two, three weeks, maybe a month, your crop is dying. Probably 70% would be lost because all your young ones [kalo] up to like six, seven months would either be total loss or the younger ones would probably be total loss, if you cannot get water. ... [it] would probably take two years or three years to restart and to get back to normal. If water would stop even for that long.”

Uncle Shorty, Aunty Diana, and JoAnne shared their thoughts about the potential impacts of not having enough water. Aunty Diana warned that without sufficient water, the grass would start growing. “The kalo needs water. They get dryland kalo, too. But the kalo still needs water. Without water, you won’t be able to have good taro.” JoAnne summed up the importance of water in Wai’oli succinctly: “No water, no farming. No farming, no food.”

Both Kimo and Aunty Diana talked about one event, 20 or more years ago now, when someone tried to tap the main ‘auwai directly, which cut off the farmers’ water. To fix it the taro farmers hauled in materials and hand dug and patched the system. Kimo recalled that when the system was tampered with, there was a big flood which “blew out our whole ditch. So if guys do that illegally or try and tap in without doing it properly, stuff like that can happen again.”

Ensuring the Community’s Cultural Identity Perseveres

Several participants observed rapid changes in the community in recent years, especially the stresses of tourism and development on traditional ways of life, like kalo farming.

JoAnne shared, “we were blessed to have been afforded a lifestyle that allowed us to enjoy the luxuries of knowing the amenities of our ‘āina. I see the kids that I work with every day and they are consumed with technology and have little opportunity to experience our ‘āina like I did while growing up. Our Hanalei is not the same anymore; I don’t recognize the same safe community

that I grew up knowing, and often feel frustrated because our town has become so crazy and inundated with faces that are not kama‘āina. The shops and restaurants that cater to tourists sit only a few dozen feet across the road from illustrious lo‘i kalo, which give our Wai‘oli its joyful name.”

Nathaniel also highlighted that “Despite the rapid changes in our community on Kaua‘i with regard to tourism and the slow, but steady, change in demographics, it is important for me that [others] know that ‘we are still alive’ and that ‘we are still here.’”

Bobby noted that “Our network of farms is also under threat from people who want to use the land differently. Wai‘oli is so beautiful and we have so many who bought land in our community and are now trying to build illegally. It’s dangerous when they are building illegally upstream from our lo‘i because they contaminate the water that feeds our fields and the larger community.”

Kimo observed that “Kaua‘i’s North Shore has changed dramatically in recent years, and [our] sleepy farming community has been transformed into a bustling tourist destination and construction zone.” While a long-term water lease will not repair the mānowai, lo‘i, or equipment devastated by the 2018 historic floods, it “will provide an important assurance and semblance of hope that we will be able to persevere into the future and maintain this way of life for our children and the generations yet to come.”

Aunty Lillian remarked, “we are resilient, and just want to be able to get back on our feet and continue to practice the culture we love in our small community. Hanalei has changed so much over the years. Yet, what holds together the identity of our community is the kalo farming that has been here since the beginning of time in these islands. It is a true testament to our community that we work together and help each other get through challenges like this. We are proud of who we are and what we do, and hope to continue to pass down this tradition to future generations.”

Summary of Community Ethnography

Participants in this study all share a deep connection to and love for Wai‘oli and kalo farming, many coming from generations of kalo farmers. All are committed to perpetuating this cultural practice, providing for the community, and farming the same lands as their kūpuna.

All participants expressed that the continuous flow of water in the Wai‘oli Lo‘i Kalo Irrigation System is absolutely necessary for the perpetuation of kalo farming and the many traditional and customary Native Hawaiian practices that depend on the maintenance of the system and the overall health of the watershed. We learn that this system is an intimately interconnected one, and because of this, has changed very little over the last several centuries. The farmers consistently restore the mānowai, clear the stream of debris, and fix the ‘auwai. This monitoring and maintenance is a vital part of their cultural practice; they actively mālama the watershed, and not just during and after storm events. Cleaning and maintaining the Wai‘oli Loi Kalo Irrigation System is a community practice; it is when families gather and share time, food, and fellowship.

Damage caused by the heavy rains and flooding in 2018 continue to impact the farmers’ ability to grow kalo. Lastly, all participants highlighted that they take pride in feeding the larger community and supporting ‘ai pono, either through sharing kalo with other ‘ohana or providing kalo to small community-based non-profit organizations.

Participants identified several historic and ongoing traditional and customary practices in Wai'oli, including fishing, hunting, and gathering. Many of the resources gathered are located not only within the Wai'oli Lo'i Kalo Irrigation System, but are also dependent on the healthy flow of the stream above and below the intake and out-takes. Other types of species dependent on this system, as shared by participants, include some federally listed endangered or protected manu who rely on Wai'oli's lo'i kalo for shelter, feeding, and breeding habitat.

Participants were concerned about sufficient water availability in the future, including the potential effects of not having any or enough water and of others tampering with the current water system. Because kalo farming is a communal system, tampering or removing water has the potential to harm everyone farming within this system, leaving folks without enough water, losing crops, and leaving the entire community without a food source. They also worried about their ability to continue kalo farming in Wai'oli without the water lease. Lastly, many participants shared concerns about the rapidly changing landscape in Hanalei, including stresses due to tourism and overdevelopment.

Summary and Recommendations

Wai'oli Valley and its Lo'i Kalo Irrigation System have a deep history of abundance; an abundance that flowed from the Wai'oli Stream and fed an intricate system of irrigated fields that have been cultivated continuously for hundreds of years. From 1834 to the present, the continuous flow of water through the Wai'oli Lo'i Kalo Irrigation System has been unusually well documented. A detailed survey of the body of the 'auwai system, in the same footprint as it exists today, was mapped 127 years ago.⁸⁵ A photograph from the slopes of Kamoo Koleaka shows the entire Wai'oli plain in irrigated kalo cultivation 128 to 130 years ago. The earliest depictions of water in the Wai'oli Lo'i Kalo Irrigation System appear on a map surveyed and drafted 147 years ago.⁸⁶ Surveyed depictions of the 'auwai and recorded descriptions and testimonies of lo'i kalo in the Wai'oli System, by Hawaiian farmers, date back 169 years.⁸⁷ The written history of Wai'oli and records of irrigated kalo extend back 185 years.⁸⁸ This research reveals not just the presence, but the abundance, of irrigated lo'i kalo cultivation for hundreds of years in this specific area.



Figure 25. Photo taken in 1890-1892 from Kamoo Koleaka, looking out across the Wai'oli Lo'i Kalo Irrigation System.⁸⁹

⁸⁵ W. A. Wall, Register Map 1680, 1893.

⁸⁶ James W. Gay, Register Map 927, 1873.

⁸⁷ Buke Mahele.

⁸⁸ N. Keoahu, *Waioli Kauai Ian 23, 1835*, Ke Kumu Hawaii, 15 April 1835.

⁸⁹ Photo Courtesy of Wai'oli Mission Collection, negative in possession of David Forbes, photo circa 1890-1892. Also in the Bernice Pauahi Bishop Museum archives collection, Kaua'i, Hanalei, pre-1900, folder 2, CP 96254.

This study documents the unique history of Wai‘oli and the many Native Hawaiian traditional and customary practices that depend on the Indigenous irrigation system, both to the Hui and the greater community.

Cultural Resources, Practices, and Beliefs Identified

This report identified numerous cultural practices that rely on the continued health of the Wai‘oli Lo‘i Kalo Irrigation System. Both the Ethnohistorical and Ethnographic research undertaken in this study have established that 1) wetland kalo is central to Native Hawaiian cultural identity, beliefs, and practices; 2) the management of the Wai‘oli Lo‘i Kalo Irrigation System is, in and of itself, a traditional and customary Native Hawaiian practice; 3) cold stream water from the mountains, constantly flowing through the system, is critical to the cultivation of wetland kalo as well as the traditional and customary Native Hawaiian practices that depend on it; 4) many lo‘i kalo were in cultivation at the time of the Māhele and retain appurtenant rights, which have a high level of protection under Hawai‘i’s Constitution and Water Code; and 5) the existing lo‘i kalo irrigation system is the best and only option for the cultivation of wetland kalo in Wai‘oli. Without a long-term water lease ensuring water flow to the lo‘i kalo, it would be incredibly difficult, if not next to impossible, for the Hui to continue growing wetland kalo in this area. For the first time in 400 years or more, a continued connection to place and practice would be severed.

Potential Effects of the Proposed Action

All participants concluded that the Proposed Action would produce significant beneficial impacts on Native Hawaiian traditional and customary practices as well as the natural systems and species that they are reliant upon.

The extensive research and community interviews conducted indicate that a “No Action” Alternative to the Proposed Action does not exist. There is no viable alternative to Wai‘oli Stream water, and the continuous flow of fresh water is necessary for the cultivation of kalo, which feeds the larger community. The No Action Alternative would therefore violate the State’s duties under Article XI section 7 to “assur[e] appurtenant rights and existing correlative and riparian uses” as well as under Article XII section 7 to “protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778[.]”

In sum, Nohopapa Hawai‘i recommends that a long-term water lease would enable Hui members to continue providing for the larger community through kalo farming, restoring the health of the stream and watershed, and perpetuating vital cultural practices, passing them on to future generations.

Kalo kanu o ka ‘āina. Taro planted on the land. “Natives of the land from generations back.”⁹⁰

⁹⁰ Pukui, No. 1447, 1983: 157.



Figure 26. Nathaniel Tin-Wong with his daughter Poliahu, planting her first huli.

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Appendix A: Guidelines for Assessing Cultural Impacts

INTRODUCTION

It is the policy of the State of Hawai'i under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

BACKGROUND

Prior to the arrival of westerners and the ideas of private land ownership, Hawaiians freely accessed and gathered resources of the land and seas to fulfill their community responsibilities. During the Māhele of 1848, large tracts of land were divided and control was given to private individuals. When King Kamehameha the III was forced to set up this new system of land ownership, he reserved the right of access to privately owned lands for Native Hawaiian ahupua'a tenants. However, with the later emergence of the western concept of land ownership, many Hawaiians were denied access to previously available traditional resources.

In 1978, the Hawaii constitution was amended to protect and preserve traditional and customary rights of Native Hawaiians. Then in 1995 the Hawaii Supreme Court confirmed that Native Hawaiians have rights to access undeveloped and under- developed private lands. Recently, state lawmakers clarified that government agencies and private developers must assess the impacts of their development on the traditional practices of Native Hawaiians as well as the cultural resources of all people of Hawaii. These Hawaii laws, and the National Historic Preservation Act, clearly mandate federal agencies in Hawaii, including the military, to evaluate the impacts of their actions on traditional practices and cultural resources.

If you own or control undeveloped or under-developed lands in Hawaii, here are some hints as to whether traditional practices are occurring or may have occurred on your lands. If there is a trail on your property, that may be an indication of traditional practices or customary usage. Other clues include streams, caves and native plants. Another important point to remember is that, although traditional practices may have been interrupted for many years, these customary practices cannot be denied in the future.

These traditional practices of Native Hawaiians were primarily for subsistence, medicinal, religious, and cultural purposes. Examples of traditional subsistence practices include fishing, picking opihi and collecting limu or seaweed. The collection of herbs to cure the sick is an example of a traditional medicinal practice. The underlying purpose for conducting these traditional practices is to fulfill one's community responsibilities, such as feeding people or healing the sick.

As it is the responsibility of Native Hawaiians to conduct these traditional practices, government agencies and private developers also have a responsibility to follow the law and assess the impacts of their actions on traditional and cultural resources.

The State Environmental Council has prepared guidelines for assessing cultural resources and has compiled a directory of cultural consultants who can conduct such studies. The State Historic Preservation Division has drafted guidelines on how to conduct ethnographic inventory surveys. And the Office of Planning has recently completed a case study on traditional gathering rights on Kaua'i.

The most important element of preparing Cultural Impact Assessments is consulting with community groups, especially with expert and responsible cultural practitioners within the ahupua'a of the project site. Conducting the appropriate documentary research should then follow the interviews with the experts. Documentary research should include analysis of Māhele and land records and review of transcripts of previous ethnographic interviews. Once all the information has been collected, and verified by the community experts, the assessment can then be used to protect and preserve these valuable traditional practices.

Native Hawaiians performed these traditional and customary practices out of a sense of responsibility: to feed their families, cure the sick, nurture the land, and honor their ancestors. As stewards of this sacred land, we too have a responsibility to preserve, protect and restore these cultural resources for future generations.

CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in

the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man-made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

1. Identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua'a;
2. Identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;
3. Receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;
4. Conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;
5. Identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
6. Assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Māhele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

7. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.
8. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.
9. Ethnographic and oral history interview procedures, including the circumstances, under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.
10. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.
11. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.
12. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.
13. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.
14. An explanation of confidential information that has been withheld from public disclosure in the assessment.
15. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.
16. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural

resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.

17. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call 586-4185.

Appendix B: A Bill for Environmental Impact Statements

A BILL FOR AN ACT RELATING TO ENVIRONMENTAL IMPACT STATEMENTS
[UNOFFICIAL VERSION] HOUSE OF REPRESENTATIVES H.B. NO. 2895 H.D.1
TWENTIETH LEGISLATURE, 2000, STATE OF HAWAII

A BILL FOR AN ACT RELATING TO ENVIRONMENTAL IMPACT STATEMENTS. BE IT
ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai'i's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit" in Hawai'i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawai'i Revised Statutes, is amended by amending the definitions of "environmental impact statement" or "statement" and "significant effect", to read as follows:

"Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be distinguished from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

“Significant effect” means the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State’s environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] welfare, social welfare[.], or cultural practices of the community and State.

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval. Approved by the Governor as Act 50 on April 26, 2000.

Appendix C: Act 50 [State of Hawai‘i 2000]

Act 50 [State of Hawai‘i 2000]. H.B. NO. 2895 H.D.1 was passed by the 20th Legislature and approved by the Governor on April 26, 2000 as Act 50. The following excerpts illustrate the intent and mandates of this Act:

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the “aloha spirit” in Hawai‘i. Articles IX and XII of the State constitution, other State laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

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Appendix D: Community Contact Letter



September 23, 2020

Welina mai me ke aloha,

On behalf of the of the Wai'oli Valley Taro Hui (WVTH), Nohopapa Hawaii is gathering community mana'o for inclusion in a Cultural Impact Assessment (CIA).

The CIA will document Hawaiian traditional cultural features and practices in the project area to inform the Environmental Assessment (EA). The primary purpose of this project is to summarize and give voice to some of the community's 'ike and mana'o; as a source to develop strategies, make informed decisions, and recommendations specific to the WVTH EA for a long term water lease.

The study area for these interviews is the Wai'oli Lo'i Kalo System; which begins mauka, where water enters the system at the mānowai, where it flows into the po'owai, through the 'auwai and lo'i kalo in the Wai'oli and Hanalei plain, to the terminus of the system at various ho'i along Wai'oli stream and Hanalei River (see attached maps).

The Wai'oli Valley Taro Hui is seeking a long-term water lease to continue water flow to the Wai'oli Lo'i Kalo System. This system of 'auwai pre-dates European Contact (1778) and has been in continual use since; it includes:

- 5.95 miles of 'auwai, ditches (Straunch 2019)
- Over 260 individual fields, totalling \leq 84-acres of farmable lo'i.
- One mānowai on Wai'oli Stream, ~1.8 miles upstream from its mouth.
- Six ho'i, two on Wai'oli Stream, and two on Hanalei River
- One storm drain outflow to Wai'oli Stream (formerly an open 'auwai) on the makai side of Wai'oli bridge.

We would like to engage with individuals, 'ohana, and organizations that have relationships to this specific wahi, to kalo farming and the 'auwai system in Wai'oli. In particular, we would like to gather information relating to:

- Personal relationships to this place personal, historical, or organizational.
 - Any mo'okū'auhau of 'ohana or 'āina you would like to share
- 'Ina Mauli Ola – natural resources and ecosystems & changes over time, as well as traditional management practices
 - Mauka to makai, wao kele and near shore.
 - River mouth observations
 - Changes in the waterways, ho'i, lo'i, mānowai.
 - Origins, modifications and maintenance of any historic 'auwai system improvements, gates, flumes, pebble traps, tunnel, new ditches, stone monuments, etc.
- Any mo'olelo, wahi inoa, oli, hula, mele, traditions, akua, 'ohana, or people associated with this place.
- Cultural protocols and practices (both traditional and contemporary) specific to this place.
 - Gathering practices: mauka, in stream, in 'auwai, near shore, riparian, mauka.



- All things kalo
 - growing, preparing, and eating kalo.
 - The shift from rice farming, back to kalo farming.
- Cultural preservation concerns and recommendations such as:
 - Educational opportunities
 - Restoration opportunities of cultural resources and practices
 - Continued practice
- Recommendations and/or concerns regarding the continued and future stewardship of the Wai'oli Lo'i Kalo System.
 - Any potential project impacts negative and/or positive
- Referrals to other 'ohana and individuals who are connected to the project area

Our community consultation team members, Dominique Cordy and Devin Kamealoha Forrest, will be contacting you shortly. We look forward to collaborating with you to document your mana'o for this Cultural Impact Assessment.

Dominique Cordy	(808) 346-1585	liveinthenaau@gmail.com
Devin Kamealoha Forrest	(808) 652-4336	dforrest@hawaii.edu

Me ka ha'aha'a,

Nohopapa Hawai'i, LLC

Appendix E: Participant Informed Consent Forms

NOHOPAPA

INFORMED CONSENT FORM

Aloha mai, Nohopapa Hawai'i appreciates your willingness to share your knowledge of the Wai'oli and the Wai'oli Lo'i Kalo System. The information you share with us will be used to guide and inform Nohopapa Hawai'i's Cultural Impact Assessment (CIA) for the Wai'oli Valley Taro Hui (WVTH). The CIA is a contributing component of an Environmental Assessment (EA) for a long term water lease application.

Nohopapa Hawai'i understands our responsibility in respecting the wishes and concerns of the interviewees participating in this study. Here are the procedures we promise to follow:

1. The interview will not be recorded without your knowledge and explicit permission.
2. You will have the opportunity to review the written transcript and summary of your interview. At that time, you may make any additions, deletions or corrections you wish.
3. You will be given a copy of the interview transcript and/or summary for your records.
4. You will be given a copy of this release form for your records.
5. You will be given a copy of any photographs taken of you during the interview.

For your protection, we need your written confirmation that (*circle* yes or no below):

1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
2. If a photograph is taken during the interview, you consent to the photograph being included in this study. Yes No

I, Christine Kobayashi, agree to the procedures
(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

Christine Kobayashi 9-30-20
(Signature) (Date)

Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

<https://mail-attachment.googleusercontent.com/attachment...UHSJHdr5WdcNJGwtpX1duhO67MOM0yQXJOWgHvMx3kIE> 9/26/20, 8:14 AM
Page 1 of 2



INFORMED CONSENT FORM

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For your protection, we need your written confirmation that (circle yes or no below):

- 1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
- 2. If a photograph is taken during the interview, you consent to the photograph being included in this study. No Yes

I, Clarence Kaona, agree to the procedures
(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

Clarence Kaona

(Signature)
Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

9-26-20

(Date)



INFORMED CONSENT FORM

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- 1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
- 2. If a photograph is taken during the interview, you consent to the photograph being included in this study. No Yes

I, JoAnne Kaona, agree to the procedures

(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

(Signature)

Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

JK
9/26/2020

(Date)



INFORMED CONSENT FORM

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- 1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
- 2. If a photograph is taken during the interview, you consent to the photograph being included in this study. No Yes

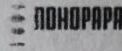
I, DIANA K. SPENCER, agree to the procedures
(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

Diana K. Spencer

(Signature)
Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

9-26-20
(Date)



INFORMED CONSENT FORM

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For your protection, we need your written confirmation that (circle yes or no below):

1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
2. If a photograph is taken during the interview, you consent to the photograph being included in this study. Yes No

I, Conrad Kim Inanoh, agree to the procedures

(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

Conrad Kim Inanoh

(Signature)

Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

9/28/20

(Date)



INFORMED CONSENT FORM

Aloha mai, Nohopapa Hawai'i appreciates your willingness to share your knowledge of the Wai'oli and the Wai'oli Lo'i Kalo System. The information you share with us will be used to guide and inform Nohopapa Hawai'i's Cultural Impact Assessment (CIA) for the Wai'oli Valley Taro Hui (WVTH). The CIA is a contributing component of an Environmental Assessment (EA) for a long term water lease application.

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For your protection, we need your written confirmation that (*circle* yes or no below):

1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
2. If a photograph is taken during the interview, you consent to the photograph being included in this study. No Yes

I, William Watani, agree to the procedures
(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

William Watani

(Signature)
Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

9/26/20

(Date)



INFORMED CONSENT FORM

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- 5. You will be given a copy of any photographs taken of you during the interview.

For your protection, we need your written confirmation that (circle yes or no below):

- 1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
- 2. If a photograph is taken during the interview, you consent to the photograph being included in this study. Yes No

I, Lily Tai Hook , agree to the procedures
(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

 Lily Tai Hook

(Signature)
Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

 9/26/20

(Date)



INFORMED CONSENT FORM

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- 1. You consent to the use of the complete transcript and/or interview quotes for the purposes of this study. Yes No
- 2. If a photograph is taken during the interview, you consent to the photograph being included in this study. Yes No

I, WILBERT TAIHOOK, agree to the procedures

(Please print your name here)

outlined above and, by my signature, give my consent and release of this interview and/or photograph to be used as specified.

26 sept 20

(Signature)

(Date)

Nohopapa Hawai'i, LLC nohopapa.hawaii@gmail.com

Summary of Draft EA Responses

The following represents a summary of all comments received during the Draft EA comment period. The complete written comment and response from the Hui are also included.

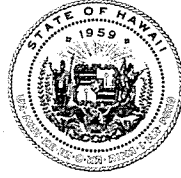
<u>Commenter</u>	<u>Response</u>
Department of Hawaiian Home Lands	Shares that DHHL conducted a virtual beneficiary consultation meeting regarding the Hui’s request for a water lease. Beneficiary participants unanimously voted to support 1) no reservation of water from Wai‘oli Stream; 2) a gratis rate for the Hui’s water license; and 3) educational opportunities in lieu of a licensing fee.
DLNR, Division of Aquatic Resources	No objections. Acknowledges many Native aquatic species present in the area. Recommends regular monitoring and surveying in order to ensure enough water is being maintained over the lease term; requests opportunity to review and comment on any potential future changes.
DLNR, Office of Conservation and Coastal Lands	No objections. Requests that the Hui correspond with OCCL to determine need for permitting for future maintenance/upkeep of Wai‘oli Stream.
Office of Hawaiian Affairs	Agrees with the anticipated finding of no significant impact and that the project will aid in the protection and maintenance of Wai‘oli Valley’s natural and cultural resources. Emphasizes that it is essential to consider the Hui’s DEA in the context of the intimate connection between Native Hawaiians and the ‘āina that sustains us both physically and spiritually. Appreciates the Hui’s efforts to coordinate with the State Historic Preservation Division (“SHPD”) and encourages future engagement with SHPD.
State Senate President, Ron Kouchi	Acknowledges the Hui’s efforts in addressing flood damage after the 2018 floods and the Hui’s intergenerational knowledge of Wai‘oli. Shares that a long-term water lease will allow the Hui to provide fresh water for lo‘i kalo and to pass on their generational knowledge to future generations.
Hawai‘i County Councilmember, Holeka Goro Inaba	Comments in support. Acknowledges kalo cultivation as a traditional and customary practice. Shares that the farmers of this ‘āina who have ensured sustenance for their ‘ohana and pae ‘āina deserve our support.
Bremer, Leah	Comments in strong support. Shares that supporting and maintaining lo‘i kalo is critical for sound and just natural resource management since it provides important cultural,

	ecological, hydrological, and economic benefits. Healthy lo‘i kalo are key to community resilience to climate change.
Chun, Hōkū	Comments in strong support. Shares that the Hui are pillars of the community and their work feeds and sustains the community. Hopes their work extends beyond Kaua‘i.
Deike, Alexa	Comments that Kānaka Maoli have stewarded water guided by principles of aloha ‘āina and that many would argue that the Hui should be exempt from the water lease and chapter 343 requirement.
EarthJustice	Comments that the Hui’s proposed water lease is unique in that it directly supports a protected public trust use of water (kalo cultivation) and is an integrated biocultural system. Includes legal framework and analysis of cultural and environmental benefits of the proposed long-term water lease.
Giambelluca, Thomas	Comments in support. Shares the the public interest is well served by the Hui’s work and a long-term water lease. Comments that traditional cultural practices that enhance resiliency to extreme events is among the best management options available to reduce flood impacts on Kaua‘i. Includes additional scientific resources and resources.
Hawai‘i Land Trust	Comments in support. Holds conservation easement in Wai‘oli Valley and shares that kalo cultivation is integral to the community’s identity on Kaua‘i. Hui’s collective stewardship provide reciprocated benefits for people and the environment.
Idle, Jessica	Comments in support. Comments that lo‘i is a critical resource for waterbirds and lo‘i kalo farmers – including the Hui – could play critical role for recovery of endemic waterbirds. Comments regarding predator control efforts and botulism.
Kua‘āina Ulu ‘Auamo (KUA)	Comments in support. Also supports long-term 65-year water lease gratis. Shares that the Hui is an invaluable resource of generational place-based knowledge and a critical part of caring for Hawai‘i’s natural and cultural resources in a responsible manner. Applauds DEA’s contextual insight around Kānaka Maoli worldviews, history, and language as a matter of contemporary and historic significance.
Mackenzie, Melody Kapilialoha	Comments in support. Shares that Hui’s practices have an integral role in Hawai‘i’s historical and present-day society and enjoy special constitutional and statutory protections.

McDonald, MJ	Comments in strong support. Comments that kalo cultivation is vital for community sustainability and Maoli cultural identity. Shares that Hui's place-based knowledge maintains Wai'oli and Hanalei Kalana's 'āina and its resources, but also ensures responsible use of wai.
McGregor, Davianna	Comments in support. Shares that a long-term water lease will have a significant positive environmental and cultural impact; sustain and affirm the public trust; and have a positive effect on the economic welfare, social welfare, and cultural practices of the Wai'oli Valley families and State of Hawai'i as a whole.
Saffery, Maya	Comments in strong support. Comments that the EA demonstrates Hui's commitment to the work of transforming land to 'āina through traditional and customary Native Hawaiian use of water from the stream. Shares that the Hui's cultural practice has benefitted the land and water of Wai'oli as well as the community it feeds.
Schlack, Emily	Comments in strong support. Shares that traditional and customary practices of Native Hawaiians are an incredible resource.
Sierra Club of Hawai'i	Shares that there is no one better qualified or more committed to steward these natural resources in perpetuity and that continued lo'i kalo farming/infrastructure increases climate resilience through flood mitigation and local food production.
Waipā Foundation	Comments in strong support. Shares that the Hui is a shining example of Indigenous excellence, traditional and customary practices, and is a model for the larger Hawai'i nei.

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

JOSH GREEN
LT. GOVERNOR
STATE OF HAWAII



WILLIAM J. AILA, JR.
CHAIRMAN
HAWAIIAN HOMES COMMISSION

TYLER I. GOMES
DEPUTY TO THE CHAIRMAN

**STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS**

P. O. BOX 1879
HONOLULU, HAWAII 96805

July 7, 2021

ref.: PO-21-191

Ms. Tricia Dang
Tridason LLC
P.O. Box 1361
Honolulu, Hawai'i 96807

Aloha Ms. Dang:

Subject: Draft Environmental Assessment for the Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation Project, Hanalei District, Kaua'i TMK: (4) 5-4-003:999, 5-5-005:999, 5-5-007:999, 5-5-008:999, 5-5-009:999, 5-6-002:999, and 5-6-004:009

The Department of Hawaiian Home Lands (DHHL) acknowledges receiving request for comments on the above Draft Environmental Assessment. DHHL offers the following comments.

DHHL has been working with the Department of Land and Natural Resources (DLNR) for the past few years on a number of efforts where DLNR is attempting to issue water licenses or leases under HRS 171-58. As part of the water leasing process under the statute, consultation with affected DHHL beneficiaries is required. DHHL conducted a virtual beneficiary consultation meeting on the Wai'oli Valley Taro Hui request for a water lease on November 10, 2020. Approximately 30 individuals participated in the virtual consultation meeting. Meeting participants were asked whether they supported the following staff recommendations regarding the water license:

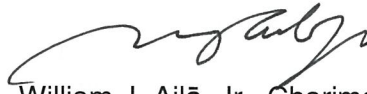
- No reservation of water from Wai'oli Stream for DHHL due to the distance between the stream and nearest DHHL tract of land;
- A gratis rate charged to the Wai'oli Valley Taro Hui for the water license;
- In lieu of a licensing fee, educational opportunities for beneficiaries will be provided by the Taro Hui;

Ms. Tricia Dang
July 7, 2021
Page 2

Beneficiaries attending the consultation were unanimous in support of the above staff recommendations. As such, DHHL is supportive of the proposed water license consistent with the above recommendations. A website link to the copy of the Beneficiary Consultation report on this matter that was submitted to the Hawaiian Homes Commission for its acceptance is included below as a reference.

Mahalo for the opportunity to provide comments. If you have any questions, please email dhhl.planning@hawaii.gov or via phone at (808)-620-9480.

Mahalo,



William J. Ailā, Jr., Chariman
Hawaiian Homes Commission

Enclosure:

Web link to HHC Meeting Agenda Item G-2 January 2021

<https://dhhl.hawaii.gov/wp-content/uploads/2021/01/January-19-20-2021-HHC-Packet-opt-1.pdf>



August 26, 2021

Department of Hawaiian Home Lands
Attn: William J. Aila, Jr., Chairman
P.O. Box 1879
Honolulu, Hawai'i 96805
Via email: dhhl.planning@hawaii.gov

Aloha mai e Chair Ailā and the Department of Hawaiian Home Lands,

Mahalo nui for submitting comments pertaining to the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation. Mahalo hou for your support of the proposed water license based on unanimous support from your beneficiaries.

The Hui appreciates the Department of Hawaiian Home Lands (“DHHL’s”) review of the DEA as well as DHHL’s Beneficiary Consultation process. The Hui is grateful that DHHL and its beneficiaries recognize the importance of kalo cultivation to the larger Kaua‘i community and support a gratis rate for a water license as well as educational opportunities for beneficiaries in lieu of a licensing fee.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)
Andrew Choy (andrew.h.choy@hawaii.gov)
Jonathan L. Scheuer (jlscheuer@gmail.com)

DAVID Y. IGE
GOVERNOR OF
HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: 7/7/2021

DAR # AR0084

MEMORANDUM

TO: Brian J. Neilson
DAR Administrator

FROM: Heather Ylitalo-Ward, Aquatic Biologist

SUBJECT: Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation

Request Submitted by: Wai'oli Valley Taro Hui, Inc. A. Uilani Tanigawa Lum

Wai'oli Valley, Kauai TMKs: (4) 5-4-003:999; (4) 5-5-005: 999; (4) 5-5-006: 999; (4) 5-5-007: 999;

Location of Project: (4) 5-5-008: 999; (4) 5-5-009: 999;

Brief Description of Project:

This Draft Environmental Assessment is presented to evaluate the potential impacts of a continued water lease on the property. The Proposed Action seeks approval for ongoing traditional and customary Native Hawaiian use of water from Wai'oli Stream for lo'i kalo cultivation. A long-term water lease (HRS §171, because water originates on State land) legally allows the continuation of the ongoing, historic and cultural use of Wai'oli Stream for traditional kalo cultivation. The Hui will submit a request for a long-term water lease after completing the required HRS chapter 343 environmental review process.

Comments:

No Comments Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: 

Date: Jul 7, 2021

Brian J. Neilson
DAR Administrator

DAR# AR0084

Comments

The DEA identifies many endemic and indigenous aquatic species in the project area. In the face of climate change and the changing aquatic environments around the state, DAR recommends that surveys be done periodically to show that the water diversion is still providing enough water to support the native biota over the 65 year lease (if granted).

Thank you for providing DAR the opportunity to review and comment on the Draft Environmental Assessment of the proposed project. Should any changes be made to the project, DAR requests the opportunity to review and comment on the changes.



August 26, 2021

Office of Conservation and Coastal Lands
Department of Land and Natural Resources
Attn: Brian J. Neilson, Administrator
Kendall Tucker, Aquatic Biologist-Permits and Environmental Reviews
1151 Punchbowl Street, Room 330
Honolulu, Hawai'i 96813
Via email: kendall.tucker@hawaii.gov

Aloha mai e Mr. Neilson and the Division of Aquatic Resources,

Mahalo nui for submitting comments pertaining to the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

The Hui appreciates the Division of Aquatic Resources’ (“DAR’s”) review of the DEA. With respect to DAR’s recommendation to conduct periodic surveys to “show that the water diversion is still providing enough water to support the Native biota,” the Hui will continue to conduct regular, informal observation and also hopes to seek funding to support additional surveys. The Hui agrees that the health of Native biota is of the utmost importance, especially in the “face of climate change and the changing aquatic environments around the state.” We would also note that the Hui’s wellbeing is also intimately intertwined with the health of Native biota in Wai‘oli Stream as well as the resources upon which they both depend. While the Hui does not anticipate any substantial changes to the project, we are happy to continue dialogue with DAR and provide the opportunity to review and comment on potential changes.

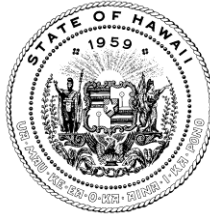
Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

DAVID Y. IGE
GOVERNOR OF
HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
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M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:RB

Correspondence: KA 21-158

Tricia Dang
Tridason LLC
808-542-9251

SUBJECT: Review of Draft Environmental Assessment (DEA) for the Wai‘oli Valley Taro Hui Long-term Lease for Traditional Lo‘i Kalo Cultivation Project Wainiha, Island of Kauai
TMKs: (4) 5-4-003:999, 5-5-008:999, 5-6-001:999, and 5-6-002:999

Dear Ms. Dang,

The Office of Conservation and Coastal Land (OCCL) has reviewed the Draft Environmental Assessment (DEA) for the above described project. The proposed project seeks approval for ongoing traditional and customary Native Hawaiian use of water from Wai‘oli Stream for lo‘i kalo cultivation. The applicant seeks a long-term water lease to legally allow the continuation of the ongoing historic and cultural use of the Wai‘oli Stream for traditional kalo cultivation. The water (Wai‘oli Stream and watershed) originates on state owned land and this land appears to be located both in the Protective and Resource subzones of the Conservation District.

The proposed action is to continue using water from the Wai‘oli Stream, directing water through the Lo‘i Kalo Irrigation System before returning it to Hanalei Bay. The applicant is seeking a long-term lease for this System. The DEA states that there is no expansion of use and that the throughflow water used for cultivation is not “consumed” in a typical sense but rather is returned to the stream. This kalo cultivation is led by a group of small-scale family farmers (Hui) who have lived and farmed in Wai‘oli for generations. Additionally, the DEA states that the proposed action does not propose any structures, infrastructure, or additional use of State land.

Per the DEA, stream activities that are associated with lo‘i kalo cultivation and appear to be located in the Conservation District are a stream gauge, two mānowai (one temporary), an ‘auwai, a po‘owai, and a ho‘i. All of these structures/elements are associated with the lo‘i kalo system and all are currently existing. The FEA notes that no stream gauges are active; the Wai‘oli Stream Gauge was active from 1914-1932.

The DEA states that the Hui has taken the initiative to formalize programmatic care of the larger Wai‘oli Ahupua‘a and Watershed. The Hui has also worked to request a County of Kaua‘i Grant to strategically clean Wai‘oli Stream. The Hui also seeks to submit proposals and grant requests to remove debris and damage caused by the 2018 floods.

Tricia Dang
Triadson LLC

KA 21-158

The project as described in the DEA does not appear to propose any land use in the Conservation District. Therefore, the OCCL has no objections to the proposed project as described.

The OCCL does note that the Hui does seek future maintenance and upkeep of the Wai'oli Stream and Watershed. At the time of future proposed maintenance/upkeep of the Wai'oli Stream, the OCCL requests that the Hui correspond with the OCCL to determine need for any permitting.

The Hawaii Revised Statutes (HAR), Chapter 13-5 known as the rules and regulations of the Conservation District is available on our website at dlnr.hawaii/occl.com. Should you have any questions, please feel free to contact Rachel Beasley at work cell (808) 798-6481 or email at Rachel.e.beasley@hawaii.gov.

Sincerely,

SAM LEMMO

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

C: Kauai County Planning Department
KDLO
CWRM



August 26, 2021

Office of Conservation and Coastal Lands
Department of Land and Natural Resources
Attn: Samuel J. Lemmo, Administrator
P.O. Box 621
Honolulu, Hawai'i 96809
Via email: sam.j.lemmo@hawaii.gov

Aloha mai e Mr. Lemmo and the Office of Conservation and Coastal Lands,

Mahalo nui for submitting comments pertaining to the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

The Hui appreciates the Office of Conservation and Coastal Lands’ (“OCCL’s”) review of the DEA as well as its acknowledgement that it has “no objections to the proposed project as described.” The Hui is happy to continue dialogue with OCCL to discuss potential permitting requirements as it relates to Wai‘oli Stream in the future.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)
Rachel Beasley (rachel.e.beasley@hawaii.gov)

PHONE (808) 594-1888

FAX (808) 594-1938



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
560 N. NIMITZ HWY., SUITE 200
HONOLULU, HAWAII 96817

July 8, 2021

State of Hawai'i, Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
ATTN: Ian Hirokawa
(808) 587-0420
Via E-mail: ian.c.hirokawa@hawaii.gov

CC: Wai'oli Valley Taro Hui
P.O. Box 1289
Hanalei, Hawai'i 96714
ATTN: U'ilani Tanigawa Lum
(808) 281-9802
Via E-mail: anelatan@hawaii.edu

CC: Tridason LLC
P.O. Box 1361
Honolulu, Hawai'i 96807
ATTN: Tricia Dang
(808) 542-9251
Via E-mail: info@tridason.com

Re: Draft Environmental Assessment for the Wai'oli Valley Taro Hui Long-Term Water Lease in the Hanalei District of Kaua'i

Aloha pumehana kākou,

The Administration of the Office of Hawaiian Affairs (OHA) provides the following comments on the Draft Environmental Assessment (DEA) for the Wai'oli Valley Taro Hui's (the Hui's) Long-Term Water Lease Application for a Traditional Lo'i Kalo Cultivation Project in Hanalei, Kaua'i. **OHA agrees with the anticipated finding of no significant adverse impact and further agrees that this action will in fact aid in the protection and maintenance of**

Wai‘oli Valley’s natural and cultural resources, while allowing the Hui to further perpetuate lo‘i kalo cultivation for generations to come.

OHA commends the steadfast efforts of the Hui to continue practicing their lo‘i kalo farming traditions and techniques, which have persisted notwithstanding the tremendous changes to Hawai‘i’s environment, economy, and political landscape that have occurred over the last two centuries. The Hui’s continued resilience and perseverance, as well as their ability to evolve and adapt to the changing governmental bureaucracies and requirements in pursuit of their ultimate goal – to continue traditional lo‘i kalo cultivation in the footprint of their ancestors¹ – provides inspiration and hope that our Native Hawaiian practices, knowledge, and values will continue to evolve and thrive well into the 21st century and beyond.

The proposed action that is the subject of this DEA is the issuance of a long-term water lease to the Hui for up to 13.5 million gallons per day of instream, throughflow water, to support up to 84-acres of existing lo‘i in Wai‘oli Valley. As evidenced through water declarations made in 1989 and the early 1990s, the proposed action would allow the Hui to continue utilizing the same amount of water necessary to cultivate the same fields that their families have stewarded for generations, using the same techniques passed down to them by their parents, grandparents, and great-grandparents. Notably, through their culturally grounded agricultural endeavors, the Hui’s members and their families have for over a century worked collaboratively also to protect and maintain the natural and cultural resources of Wai‘oli Valley.

OHA emphasizes that it is essential to consider the Hui’s DEA in the context of the intimate connection between Native Hawaiians and the ‘āina that sustains us both physically and spiritually. Specifically, the kalo is revered as the elder brother to Hāloa, the first Native Hawaiian, and this relationship gives rise to some of the core foundations of Native Hawaiian identity and worldview – the duties to mālama and aloha ‘āina. As such, deep connection to ‘āina is inherent in the traditional and customary practice of lo‘i kalo cultivation, and the “best practices” associated with kalo cultivation not only ensure healthier crops, but also serve to protect the surrounding environment and communities as well. Thus, the reciprocal relationship between the Hui and the kalo they cultivate will yield numerous natural benefits to the environment and larger Kaua‘i community.

For example, lo‘i kalo cultivation in Wai‘oli provides vital environmental benefits such as flood mitigation, ground water recharge, and native habitat preservation. Additionally, the proposed action will facilitate the Hui’s continued monitoring and stewardship of their natural resources, which will reinforce their community’s identity, perpetuate Native Hawaiian traditional and customary practices, and support local food security as well as community-based

¹ As illustrated in the attached report by OHA Research Analyst Natashja Wahine‘aipōhaku Tong, historical documentation demonstrates that the ‘auwai, mānowai, and po‘owai relied on by the Hui and subject to the proposed easement is part of a traditional irrigation system that existed since time immemorial, to support an agricultural complex of no less than 41 separate kuleana ‘apana containing lo‘i kalo at the time of the Māhele, of which no less than 12 referred to this particular ‘auwai as part of their metes and bounds description. See Attachment A.

cultural and agricultural education. **Accordingly, given the substantial environmental benefits that will arise from the proposed action, OHA believes that the FONSI anticipated in this DEA is appropriate.**

Regarding the protection of historic resources and sites, OHA understands that the Hui’s DEA promotes lo‘i irrigation systems as archaeological resources. Although the DEA indicates that no archaeological work specific to the parcel has been carried out, OHA appreciates the Hui’s efforts to coordinate with the State Historic Preservation Division (SHPD). Considering the importance of the archaeological and cultural resources in Wai‘oli Valley and the work of SHPD, OHA recommends that the Hui engage SHPD via a Hawai‘i Revised Statutes 6E submittal, and consider requesting a State Inventory of Historic Places number for the lo‘i irrigation system as part of that submittal.

Mahalo nui for the opportunity to comment on this matter. For any questions or concerns, please contact myself at (808) 594-1973 or via e-mail at sylviah@oha.org, or have your staff contact Sterling Wong, Chief Advocate, at (808) 561-4430 or via email at sterlingw@oha.org.

‘O wau iho nō me ka ‘oia‘i‘o,



Sylvia M. Hussey, Ed.D.

Ka Pouhana, Chief Executive Officer



August 26, 2021

Office of Hawaiian Affairs
Attn: Sylvia M. Hussey, Ed.D.
560 Nimitz Highway #200
Honolulu, Hawai'i 96817
Via email: sylviah@oha.org

Aloha mai e ka Office of Hawaiian Affairs,

Mahalo nui for submitting comments regarding the Draft Environmental Assessment (“DEA”) for the Wai’oli Valley Taro Hui Long-Term Water Lease for Traditional Lo’i Kalo Cultivation and for your support of the proposed finding of no significant impact.

As practitioners committed to lo’i kalo cultivation, the Hui appreciates OHA’s emphasis on the “intimate connection between Native Hawaiians and the ‘āina that sustains us both physically and spiritually.” The Hui agrees that the “archaeological and cultural resources in Wai’oli Valley” are of immense importance and will consider coordinating with the State Historic Preservation Division (“SHPD”) as another means to protect these invaluable resources. We are grateful for the Office of Hawaiian Affairs’ continued support as well as its work and advocacy for the wellbeing of all Native Hawaiians and Hawai’i pae ‘āina.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko’o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U’ilani Tanigawa Lum
On behalf of the Wai’oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



The Senate
Office of the President

STATE CAPITOL
HONOLULU, HAWAII 96813

July 8, 2021

Via Electronic Mail to info@tridason.com and anelatan@hawaii.edu

Ms. Suzanne D. Case
Chairperson, Department of Land and Natural Resources
Kalanimoku Building
1151 Punchbowl St.
Honolulu, HI 96813

RE: Support for the Wai'oli Valley Taro Hui's Draft Environmental Assessment for a Long-Term Water Lease for Traditional Kalo Cultivation

Dear Chair Case:

I am informed that the Wai'oli Valley Taro Hui submitted a Draft Environmental Assessment (DEA) for their proposed project on the ongoing traditional and customary Native Hawaiian use of water from the Wai'oli Stream for lo'i kalo cultivation and submit this letter in support of the assessment.

The Wai'oli Valley Taro Hui consists of families that have been in Wai'oli Valley for generations, equipping them with intergenerational knowledge to understand the patterns found in this environment. After the 2018 floods on the North Shore of Kaua'i, the Wai'oli Valley Taro Hui was instrumental in addressing the flood damage, by assuming primary responsibility over maintaining the Wai'oli Stream and ensuring water flow and quality. The long-term water lease will allow the Wai'oli Valley Taro Hui to provide clean, fresh water to nourish the lo'i kalo and continue to pass intergenerational knowledge to future generations.

Thank you for your consideration and should you have any questions with regard to the foregoing, please do not hesitate to contact my office.

Sincerely,

RONALD D. KOUCHI
Senate President
Senator – 8th Senatorial District

cc: A. U'ilani Tanigawa Lum
Tricia Dang
Russell Tsuji
Ian Hirokawa



August 26, 2021

Senate President Ronald D. Kouchi
Senator, 8th Senatorial District
Hawai'i State Capitol
Honolulu, Hawai'i 96813
Via email: k.chang@capitol.hawaii.gov

Aloha mai e Senate President Kouchi,

Mahalo nui for submitting comments pertaining to the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As the Senate President, the Hui appreciates your comments on this DEA. The Hui is also grateful of your recognition that the long-term water lease will “allow the Wai‘oli Valley Taro Hui to provide clean, fresh water to nourish the lo‘i kalo and continue to pass intergenerational knowledge to future generations.” The Hui agrees and is committed to this work for these very reasons.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)
Kaleo Chang (k.chang@capitol.hawaii.gov)
Roth Puahala (r.puahala@capitol.hawaii.gov)
Ross Tsukenjo (r.tsukenjo@capitol.hawaii.gov)



UNIVERSITY
of HAWAII®
MĀNOA

July 7, 2021

Via Electronic Mail

Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
E: ian.c.hirokawa@hawaii.gov

RE: Comments in support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment

Dear Mr. Hirokawa:

Aloha, my name is Davianna Pōmaika'i McGregor, a Professor of Ethnic Studies at UH Mānoa and Director of the Center for Oral History in the Department of Ethnic Studies, College of Social Sciences. I have provided expert witness testimony in the following administrative hearings before the Hawai'i Water Commission:

- Nā Moku Aupuni O Ko'olau Hui Contested Case Docket DLNR Fil No. 01-05-MA 2005
- Kamiloloa Aquifer Case, In re Waiola O Molokai, Docket no. CCH-MO096-11997
- Ewa Marina Case, 1996
- Waiāhole Water Case, Docket No. CCH-0A95-1, 1996

I have reviewed the Wai'oli Valley Taro Hui's Draft Environmental Assessment and concur with the assessment that the Proposed Action to provide a long-term water lease for up to 13.5 million gallons per day (mgd) of instream, throughflow water to support up to 84-acres of existing lo'i in Wai'oli Valley will have a significant **positive** environmental and cultural impacts by providing for the continuation of traditional and customary water use and an ancient water-land stewardship system within the framework of the modern legal paradigm for water management. The Proposed Action will sustain the production of the Wai'oli Valley Taro Hui, which consists of 14 farms and 16 kalo farmers whose families have been living and working in Wai'oli for generations. Together, the Hui historically produced an estimated two (2) to three (3) million pounds of kalo annually. (DEA, p. 25)


This DEA provides the information and justification for legal approval of water use to sustain a Native Hawaiian traditional and customary practice that has persevered in Wai'oli Valley for centuries. In accordance with HRS 343 environmental review process, this Draft Environmental Assessment documents how the Proposed Action for a long-term water lease for up to 13.5 mgd will sustain the natural resources in Wai'oli Valley, provide a range of beneficial uses of the environment, align with the

State's environmental policies and long-term environmental goals and have a positive effect on the economic welfare, social welfare, and cultural practices of the Wai'oli Valley families and the State of Hawai'i as a whole. In 1989, the Hui declared and in the early 1990s the Water Commission verified that Hui members were using this amount of water for the same lo'i they continue to cultivate today. There is no expansion of use. The Hui seeks only legal permission for the same amount of water necessary to cultivate the same fields these same families have stewarded on private land outside the Conservation Zone for four or more generations.

The Proposed Action will also sustain and affirm the public trust and "all rights customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" which are reaffirmed and protected by Article XII Section 7 of the Hawai'i State Constitution. As a constitutionally protected Native Hawaiian traditional and customary practice, kalo cultivation is a cultural lifeway and is foundational to the community's identity. For many kalo farmers, kalo cultivation actively maintains their connection to 'āina and 'ohana. The Hui humbly recognizes the importance of passing on generational knowledge and this cultural practice to their families and others committed to learning and practicing this way of life. The Hui does not wish to engage in or create a profit-driven system; rather, the Hui seeks to continue their 'ohana practices. The Hui, similar to many lo'i kalo farmers across Hawai'i, relies on the surrounding watershed, its water, and the Lo'i Kalo Irrigation System to support and perpetuate kalo cultivation. For Wai'oli, the system of interconnected fields and flowing water has defined the Wai'oli plain for hundreds of years, producing Native and rare kalo varieties. Once harvested, this important food source is processed into poi and other kalo products (e.g., lū'au leaf, kalo pa'a, etc.). A significant amount of the Wai'oli kalo is processed by Waipā Foundation in the neighboring ahupua'a of Waipā.

Thank you for this opportunity to provide a comment in support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment. I can be reached at davianna@hawaii.edu if you have any questions.

Me Ke Aloha,



Davianna Pōmaika'i McGregor
Professor of Ethnic Studies
Director, Center for Oral History
University of Hawai'i, Mānoa

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)



August 26, 2021

Davianna Pōmaika'i McGregor
Professor of Ethnic Studies, UH Mānoa
Director, Center for Oral History, UH Mānoa
Via email: davianna@hawaii.edu

Aloha mai e Ms. McGregor,

Mahalo nui for submitting comments in support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As an expert in Native Hawaiian traditional and customary practices, the Hui is incredibly grateful for your support of the DEA as well as your concurrence that a long-term water lease for up to 13.5 million gallons per day (“mgd”) will have a “significant **positive** environmental and cultural impact.” Further, the Hui also appreciates your recognition that a long-term water lease will “sustain and affirm the public trust” and have a “positive effect on the economic welfare, social welfare, and cultural practices of the Wai‘oli Valley families and State of Hawai‘i as a whole.”

We are grateful for, learn from, and admire your work, much of which makes continuing our work possible.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



23 June 2021

Via Electronic Mail

Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
E: ian.c.hirokawa@hawaii.gov

RE: Comments in support of the Wai'oli Valley Draft Environmental Assessment

Dear Mr. Hirokawa:

Thank you for the opportunity to provide comments on the Wai'oli Valley Taro Hui's Draft Environmental Assessment (DEA). My research on Hawai'i's climate and hydrology has included work relevant to this DEA.

After reviewing the January 2021 draft Instream Flow Standard Assessment Report, Island of Kaua'i, Hydrologic Unit 2018, Waioli (Draft PR-2021-01), the April 20, 2021 CWRM Staff Submittal on the Draft Amended Interim Instream Flow Standards for the Surface Water Hydrologic Unit of Wai'oli (2018), the May 18, 2021 CWRM Staff Submittal to Amend Interim Instream Flow Standards for Wai'oli Stream in the Surface Water Hydrologic Unit of Wai'oli (2018), and the DEA, I offer the following comments.

- Descriptions in the DEA of meteorological, climatological, geological, and hydrological characteristics of the Wai'oli Ahupua'a and the Halele'a Moku in which it is situated are accurate based on the available data.
- Coastal wetlands, including traditional Native Hawaiian lo'i kalo systems such as those in Wai'oli Valley, are known to be highly effective in mitigating flood impacts¹. Wetland cultivation systems also serve to trap and retain sediment and lower the nutrient load of surface waters, thereby reducing contamination of downstream aquatic, estuarine, and near-shore marine ecosystems^{2, 3}.

¹ Ghazal, K.A., Leta, O.T., El-Kadi, A.I., Dulai, H. 2020. Impact of coastal wetland restoration plan on the water balance components of Heeia Watershed, Hawaii. *Hydrology* 7: 86. <https://doi.org/10.3390/hydrology7040086>

² Bremer, L.L., Falinski, K., Ching, C., Wada, C.A., Burnett, K.M., Kukea-Shultz, K., Reppun, N., Chun, G., Oleson, K.L.L., Ticktin, T. 2018. Biocultural restoration of traditional agriculture: cultural, environmental, and economic outcomes of lo'i kalo restoration in He'eia, O'ahu. *Sustainability* 10: 4502. <https://doi.org/10.3390/su10124502>

³ Koshiba, S., Besebes, M., Soaladaob, K., Isechal, A.L., Victor, S., Golbuu, Y. 2013. Palau's taro fields and mangroves protect the coral reefs by trapping eroded fine sediment. *Wetl. Ecol. Manag.* 21: 157–164.

- Coastal wetlands including lo‘i kalo, provide a buffer against the negative impacts of climate and land cover changes by providing sustainable local food production⁴ and by promoting healthier and more resilient coral reefs and fisheries (Bremer et al. 2018).
- As accurately documented in the DEA, the lo‘i kalo and irrigation infrastructure of Wai‘oli have been in place since well before European contact and have become an integral part of the hydrological system that exchanges water between the Hanalei, Wai‘oli, and Waipā ahupua‘a.
- Preservation and restoration of traditional wetland cultivation in Hawai‘i has numerous benefits in addition to food production, including economic returns, energy savings, enhanced social and cultural connections, and health benefits (Bremer et al. 2018).
- I find no discrepancies or questionable statements in the DEA. It clearly presents the relevant physical, biological, and cultural facts. In light of the devastating impacts of recent extreme rainfall and flood events in Halele‘a and the apparent increase in the frequency and severity of these events, perhaps as a consequence of global anthropogenic climate warming, supporting efforts to preserve traditional cultural practices that enhance resiliency to extreme events is among the best management options available to reduce flood impacts on Kaua‘i. The facts presented in the DEA and the larger context around changing climate and increasing exposure to extreme events indicate that the public interest is well served by the Wai‘oli Valley Taro Hui’s efforts to sustain traditional lo‘i kalo cultivation by acquiring a long-term water lease.

Respectfully submitted,



Thomas Giambelluca
Director, Water Resources Research Center, UH Mānoa
Professor, Geography and Environment, UH Mānoa

cc: A. U‘ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)

⁴ Kurashima, N., Fortini, L. & Ticktin, T. 2019. The potential of indigenous agricultural food production under climate change in Hawai‘i. *Nat Sustain* 2: 191–199. <https://doi.org/10.1038/s41893-019-0226-1>



August 26, 2021

Thomas Giambelluca
Director, Water Resources Research Center, UH Mānoa
Professor, Geography and Environment, UH Mānoa
Via email: thomas@hawaii.edu

Aloha mai e Mr. Giambelluca,

Mahalo nui for submitting comments regarding the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

Given your extensive work in the area, the Hui appreciates your comments supporting the accuracy of the DEA as well as your comment that “supporting efforts to preserve traditional cultural practices that enhance resiliency to extreme events is among the best management options available to reduce flood impacts on Kaua‘i.” We are appreciative that you believe that the facts in the DEA “indicate that the public interest is well served” by our Hui’s efforts, kalo cultivation, and long-term water lease. Further, the Hui appreciates the additional research you provided that further supports the DEA’s findings. We have incorporated some of the scientific research and references provided in your comments into the Final Environmental Assessment.

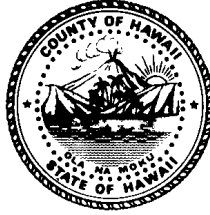
Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Holeka Goro Inaba
Council Member, District 8, N. Kona



Office: (808) 323-4280
Email: holeka.inaba@hawaiicounty.gov

HAWAI'I COUNTY COUNCIL

County of Hawai'i
West Hawai'i Civic Center, Bldg. A
74-5044 Ane Keohokalole Hwy.
Kailua-Kona, Hawai'i 96740

June 30, 2021

Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
E: ian.c.hirokawa@hawaii.gov

Re: Wai'oli Valley Draft EA

Aloha mai,

I am writing this letter in support of the Draft EA for Wai'oli Valley Taro Hui. The submitted Draft EA is comprehensive and informative as it relates to historical water use and kalo cultivation in the region. The work of the Wai'oli Valley Taro Hui, Inc. ("Hui") in requesting a 65-year water lease from the Board of Land and Natural Resources ("BLNR") for the ongoing traditional and customary Native Hawaiian use of water from Wai'oli Stream for lo'i kalo cultivation is worthy of our kākō'o.

Based on historic and existing use of this traditional irrigation system, and consistent with the Hawai'i Commission on Water Resource Management's 2021 numeric Interim Instream Flow Standard ("IIFS") for Wai'oli Stream of 4.0 million gallons per day ("mgd") the Hui is requesting all water in excess of the amended IIFS, up to 13.5 mgd, as needed to support lo'i kalo cultivation on private land outside the Conservation district.

The farmers of this 'āina who have ensured sustenance for their 'ohana and our pae 'āina deserve our support. As a Native Hawaiian traditional and customary practice and as the DEA outlines, kalo cultivation in Wai'oli benefits this 'āina and our larger pae 'āina. My warmest aloha and kākō'o from Kona, Hawai'i.

Sincerely,

HOLEKA GORO INABA

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)



August 26, 2021

Councilmember Holeka Goro Inaba
District 8, North Kona
County of Hawai'i
West Hawai'i Civic Center, Building A
74-5044 Ane Keohokalole Highway
Kailua-Kona, Hawai'i 96740
Via email: holeka.inaba@hawaiicounty.gov

Aloha mai e Councilmember Inaba,

Mahalo nui for submitting comments in support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As a leader of Hawai‘i Island recognizing the importance of kalo cultivation across the pae ‘āina, the Hui is grateful that you support the DEA and the 65-year water lease. The Hui appreciates your support and recognition of the Hui as “farmers of this ‘āina who have ensured sustenance for [our] ‘ohana and our pae ‘āina.” We are grateful for and admire your work!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

July 2, 2021

Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
E: ian.c.hirokawa@hawaii.gov

RE: Comments in support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment

Dear Mr. Hirokawa:

I am writing in strong support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment, which seeks approval for ongoing traditional and customary Native Hawaiian use of water from Wai'oli Stream for lo'i kalo cultivation through a 65-year long-term water lease. Lo'i kalo cultivation has been practiced in Wai'oli for centuries, and supporting and maintaining these systems is critical for sound and just natural resource management. Lo'i kalo systems have been found to provide important cultural, ecological, hydrological, and economic benefits, including by: producing healthy local food, providing habitat for endangered birds, supporting cultural connection to place and social networks, enhancing physical and mental health and well-being, reducing flooding to downstream communities, and reducing sediment and nutrient runoff with benefits to coral reefs and valued fisheries¹²³⁴⁵. Healthy and thriving lo'i kalo systems are fundamental to building and maintaining community resilience to climate change as they function as important natural infrastructure that provide benefits to both local communities and broader society. In fact, the Hawai'i State Climate Commission recently identified lo'i kalo as important green infrastructure technologies that are central in helping Hawai'i adapt to and respond to climate change⁶.

Lo'i kalo and associated irrigation systems at Wai'oli are also critically important to protect given that they represent and hold centuries to millenia of Indigenous knowledge and practice, which are essential to community well-being and social-ecological resilience to climate change. The Office of Hawaiian Affairs dated the lo'i kalo and their irrigation systems to the 1500s. Accordingly, this Indigenous system has been a part of, not separate from, the ecosystem for centuries and is central to the ways in which water flows within and between the ahupua'a of Hanalei, Wai'oli, and Waipā. In recognition of the importance of lo'i kalo to water flows, in setting the Interim Instream Flow Standards in May 2021, the Hawai'i Commission on Water Resource Management recognized this area as the Hanalei Kalana—a unit bigger

¹ Aikau, H. K., & Camvel, D. A. K. (2016). Cultural Traditions and Food: Kānaka Maoli and the Production of Poi in the He'e'ia Wetland. *Food, Culture & Society*, 19(3), 539-561.

² Harmon, K. C., Winter, K. B., Kurashima, N., Fletcher, C. H., Kane, H. H., & Price, M. R. (2021). The role of indigenous practices in expanding waterbird habitat in the face of rising seas. *Anthropocene*, 34, 100293.

³ Bremer, L. L., Falinski, K., Ching, C., Wada, C. A., Burnett, K. M., Kukea-Shultz, K., ... & Ticktin, T. (2018). Biocultural restoration of traditional agriculture: cultural, environmental, and economic outcomes of lo'i kalo restoration in He'e'ia, O'ahu. *Sustainability* 10 (12): 4502.

⁴ Winter, K., Lincoln, N., Berkes, F., Alegado, R., Kurashima, N., Frank, K., ... & Toonen, R. (2020). Ecomimicry in Indigenous resource management: optimizing ecosystem services to achieve resource abundance, with examples from Hawai'i. *Ecology and Society*, 25(2).

⁵ Pascua, P. A., McMillen, H., Ticktin, T., Vaughan, M., & Winter, K. B. (2017). Beyond services: A process and framework to incorporate cultural, genealogical, place-based, and indigenous relationships in ecosystem service assessments. *Ecosystem Services*, 26, 465-475.

⁶ State of Hawai'i Department of Land and Natural Resources. (2021). Nature-Based Resilience and Adaptation to Climate Change in Hawai'i: A Climate Ready Hawai'i Working Paper. <https://climate.hawaii.gov/wp-content/uploads/2021/04/CRHI-Working-Paper-V5.pdf>

than an ahupua‘a, in recognition of how Native Hawaiians managed the larger Hanalei watershed (including Wai‘oli) as an integrated biocultural system. Calls to protect lo‘i kalo and Indigenous agroecosystems, more broadly, as important social-ecological systems are increasing around the world, and Hawai‘i is at the forefront of community-based efforts to restore and protect these important systems that our future social and ecological well-being depend on⁴.

Beyond managing the lo‘i kalo themselves, farmers in Wai‘oli do a tremendous amount of uncompensated labor to protect and restore the watershed for their communities and beyond. For example, they have played an active role in the removal of highly invasive and hydrologically damaging Albizia trees. Following the flooding in 2018, over 60 farmers and community members worked with the Hui to clear streams and roads, removing trees, rocks, boulders, and debris. These management actions, which would otherwise be extremely cost prohibitive, are fundamental to reducing devastating land slides, blocking streams, and damaging homes and other infrastructure.

The ability of the Hui to continue this culturally and ecologically important traditional practice is contingent upon their access to cool, fresh flowing water, as they have for centuries, long before Hawai‘i became a state or there was a conservation district. The Hui’s request is consistent with the Commission on Water Resource Management’s Interim Instream Flow Standard (4.0 million gallons per day) for Wai‘oli Stream, and seeks the same amount of water for the same amount of lo‘i documented in the 1990s by this same commission. Moreover, lo‘i kalo systems have been found to have high groundwater recharge rates, returning much of this water to the aquifer⁷, and eventually to submarine groundwater discharge, which feeds nearshore systems. The Hui, as with many other Native Hawaiian communities, have demonstrated time and time again their commitment and capacity for sound cooperative collective-action resource management based on ancestral and place-based knowledge and practice. Supporting lo‘i kalo cultivation in Wai‘oli provides many benefits and is also constitutionally protected as a customary and traditional Native Hawaiian practice and public trust right. It is of critical importance that the state do everything in its power to support this practice and the stewards who take care of Hawai‘i for the benefit of all of Hawai‘i’s people.

Thank you for your time and consideration.

Sincerely,



Leah Bremer, PhD
Associate Specialist of Environmental Science and Policy
University of Hawai‘i Economic Research Organization (Co-Director of Environmental Policy and Planning Group)
Water Resources Research Center

cc: A. U‘ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)

⁷ Brewington, L., Keener, V., & Mair, A. (2019). Simulating land cover change impacts on groundwater recharge under selected climate projections, Maui, Hawai‘i. *Remote Sensing*, 11(24), 3048.



August 26, 2021

Leah Bremer, PhD
Associate Specialist of Environmental Science and Policy
University of Hawai'i Economic Research Organization
Water Resources Research Center
Via email: lbremer@hawaii.edu

Aloha mai e Ms. Bremer,

Mahalo nui for submitting comments for and your strong support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As generational stewards of ‘āina in Wai‘oli, the Hui appreciates your comment that “supporting and maintaining these [lo‘i kalo] systems is critical for sound and just natural resource management,” especially since they provide “important cultural, ecological, hydrological, and economic benefits.” Recognizing your expertise in environmental science and policy, the Hui is also grateful that you highlight that “healthy and thriving lo‘i kalo systems are fundamental to building and maintaining community resilience to climate change.” The Hui also agrees that Hawai‘i is “at the forefront of community-based efforts to restore and protect” important Indigenous agroecosystems – just as we steward the larger Hanalei Kalana as an “integrated biocultural system.”

Finally, the Hui is deeply appreciative of the additional research you provide that further supports the DEA’s findings. We have incorporated some of the scientific research and references provided in your comments into the Final Environmental Assessment. Mahalo for all your work and for your support.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Wai'oli Valley Taro Hui Long-term Water Lease for Traditional Lo'i Kalo Cultivation: Draft EA Comments

The Draft Environmental Assessment has been published and is available for review: http://oegc2.doh.hawaii.gov/Doc_Library/2021-06-08-KA-DEA-Waioli-Valley-Taro-Hui-Long-Term-Water-Lease.pdf

Please submit comments in writing using this form by Thursday, July, 8, 2021.

All comments will be considered in development of the Final Environmental Assessment.

Email Address *

jhkubota@hawaii.edu

First Name *

Hökū

Last Name *

Chun

Address *

227 Puuala St., Kula, HI

Zip Code *

96790

Please let us know what topics your comments are related to. Select all that apply. *

- Historic, Cultural, Archaeological resources
- Natural resources (biological resources, water resources, natural hazards)
- Agricultural, socio-economic Resources
- Other:

Share Your Comment Here: *

I strongly support the Wai'oli Valley Taro Hui's (the Hui) continued use of water from the Wai'oli Stream for the cultivation of their lo'i kalo. The members of the Hui are pillars of the community. Not only are they cultivating kalo in a traditional and customary manner, they are feeding and sustaining the community. The good that comes from the Hui goes beyond Kaua'i. As a Native Hawaiian, it is important to me that we not only protect and preserve, but whole heartedly support Native Hawaiian traditional and customary practices. For the sake of future generations, we need kalo, we need kalo farmers, and we need water to feed out people. Please approve the Hui's DEA.

Questions? Contact:

Tricia Dang, Planner, at tricia@tridason.com
U'ilani Tanigawa Lum at anelatan@hawaii.edu

This form was created inside of Tridason LLC.





WAI'OLI VALLEY
TARO HUI

August 26, 2021

Hökū Chun
227 Puuala Street
Kula, Hawai'i, 96790
Via email: jhkubota@hawaii.edu

Aloha mai e Ms. Chun,

Mahalo nui for submitting comments in strong support of the Draft Environmental Assessment (“DEA”) for the Wai’oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As humble family farmers, the Hui is grateful for your comment that we are “pillars of the community” and are “feeding and sustaining the community.” The Hui also agrees and hopes that this work extends beyond Kaua‘i and that it benefits future generations. We are grateful for and admire your work and look forward to meeting you soon!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai’oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Comment on Wai'oli Valley Draft EA

1 message

Alexa Deike <alexadeike808@gmail.com>
To: Ian C Hirokawa <ian.c.hirokawa@hawaii.gov>
Cc: "A. U'ilani Tanigawa Lum\\"" <anelatan@hawaii.edu>, info@tridason.com

Thu, Jul 8, 2021 at 4:51 PM

Aloha Ian,

Please find my comment on the DEA below.

Mahalo,
Alexa

I applaud the Wai'oli Valley Taro Hui for providing such an excellent and thorough draft environmental assessment. Meeting the Hawai'i Revised Statutes chapter 343 requirements is a huge undertaking for these humble and extremely hardworking kalo farmers. The devastation of the 2018 floods is still on-going and the road of recovery is long and arduous to have water returned to their lo'i and return to growing kalo. Besides facing the challenge of repairing their water intake from the stream and their silt damaged lo'i fields, the Wai'oli Valley Taro Hui was confronted with the extremely difficult legal hurdle of obtaining a water lease.

This lo'i kalo system has been in perpetual use since time immemorial and Wai'oli Stream is one of the very few streams in Hawai'i that has not been siphoned for plantation purposes. Instead, Kānaka Maoli have cultivated kalo and always stewarded this water guided by the principles of aloha 'āina – resource management in harmony and reciprocity with the ecosystem. Their diversion intake, the mānowai, was carefully designed to take only as much water as needed and break away in times of high streamflow. The Wai'oli Valley Taro Hui continues this traditional and customary Native Hawaiian practice. Most members of the Hui have been kalo farmers for four to six generations, some are farming the same kuleana lo'i that their ancestors have cultivated for centuries. The Wai'oli Valley Taro Hui is an example of a living culture and authentic Native Hawaiian way of life that is fast disappearing in Hawai'i today.

These traditional and cultural Native Hawaiian practices have been proven to be truly sustainable. Many would argue that they should be exempt from the water lease and chapter 343 requirement as it was proposed in the recent legislative session with the amendment (h) to HRS 171-58 in HB1015 H.D.2. The continued support from the Environmental Law and Native Hawaiian Rights Clinics of the William S. Richardson School of Law helped the Wai'oli Valley Taro Hui to accomplish this draft environmental assessment. Other Native Hawaiian kalo farmers would most likely not have this kind of support and meeting the chapter 343 requirements would be insurmountable.

Alexa Deike

2563 Peter St,
Honolulu, HI 96816

Alexadeike808@gmail.com



August 26, 2021

Alexa Deike
2563 Peter Street
Honolulu, Hawai'i 96816
Via email: alexadeike808@gmail.com

Aloha mai e Ms. Deike,

Mahalo nui for submitting comments pertaining to the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

The Hui appreciates your comment that “Kānaka Maoli have cultivated kalo and always stewarded this water guided by principles of aloha ‘āina – resource management in harmony and reciprocity with the ecosystem.” The Hui also appreciates your comment that “many would argue that [the Hui] should be exempt from the water lease and chapter 343 requirement.” As you also point out, this process has been incredibly cumbersome for small family farmers such as ourselves, and we share the same concern that this would not be possible for other “Native Hawaiian kalo farmers.”

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



July 8, 2021

Via Email

Ian C. Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street, Room 220
Honolulu, HI 96813
ian.c.hirokawa@hawaii.gov

Re: Wai'oli Valley Taro Hui Long-Term Water Lease, Draft Environmental Assessment, Island of Kaua'i, Hawai'i (June 2021)

Dear Mr. Hirokawa:

Earthjustice submits these comments in response to the Department of Land and Natural Resources' ("Department's") request for public comment on the Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation, Draft Environmental Assessment, Island of Kaua'i, Hawai'i (June 2021) ("DEA"). As discussed below, Earthjustice supports the proposed finding of no significant impact for the Wai'oli Valley Taro Hui's ("Hui's") requested long-term lease to use water for the protected public trust purpose of cultivating kalo using traditional growing methods.

The Wai'oli lo'i kalo complex has been an integral part of greater Halele'a's natural and cultural environment for likely thousands of years, and granting a 65-year water lease will help to perpetuate traditional kalo cultivation and community food resiliency for successive generations. *See* DEA at 126. As intended by its Native Hawaiian architects, water flow through the lo'i kalo system also creates habitat for aquatic stream life and waterfowl, mitigates flooding, and feeds downstream estuaries which thrive on these nutrient rich waters. *See id.* at 102, 110, 152. Alternatives to a long-term water lease from this traditional source are unduly burdensome for the Hui as a small, community-based nonprofit and will likely endanger continued kalo cultivation in the area and the related ecosystem services described above. *See id.* at 61-65. Because the lease of water to the Hui is not likely to have any significant, adverse effects on the surrounding environment, and the DEA itself fully complies with the informational requirements of Hawai'i Revised Statutes ("HRS") Chapter 343 and its implementing regulations, a finding of no significant impact is appropriate in this case. This is particularly true given the net environmental *benefits* provided by the maintenance of this traditional cultural landscape.

I. LEGAL FRAMEWORK

The Hawai'i Environmental Policy Act's fundamental purpose is to ensure that State and County agencies fully and publicly examine the environmental impacts of their actions before those actions proceed. *See* HRS § 343-1. To that end, an environmental assessment must be prepared "at the earliest practicable time to determine whether an environmental impact statement shall be required." *Id.* § 343-5(b). "An environmental assessment must include . . . (1) a detailed description of the proposed action or project; (2) an evaluation of the direct, indirect, and cumulative impacts; (3) a discussion of alternatives to the proposed project or action; and (4) a description of any measures proposed to minimize potential impacts." *Kilakila 'O Haleakala v. Univ. of Hawai'i & David Lassner*, 138 Hawai'i 364, 370 (2016) (citation omitted).

An environmental impact statement ("EIS") "shall be required if the agency finds that the proposed action may have a significant effect on the environment." HRS § 343-5(c)(4). HEPA defines "significant effect" as "the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic welfare, social welfare, or cultural practices of the community and State." *Id.* § 343-2.

As noted above, the Wai'oli Hui's long-term water lease is not likely to have any significant effects on the environment. In fact, as highlighted in the DEA, the long-term water lease will have an overall net benefit on the environment, protected species, and the surrounding community by ensuring the Hui is able to maintain and preserve the Wai'oli lo'i kalo complex as a functioning traditional food-producing system. Finally, the DEA complies with all of the informational disclosure and analyses requirements under the law. Accordingly, the DEA's proposed finding of no significant impacts is well-supported by the law and the substance of the underlying HEPA documents.

II. RELEVANT ANALYSIS OF CULTURAL AND ENVIRONMENTAL BENEFITS OF THE PROPOSED LONG-TERM LEASE

The Hui's proposed water lease is unique in that it directly supports a protected public trust use of water, that is, cultivation of kalo using indigenous instream methods. Nonetheless, the DEA fully identifies the scope of related traditional and customary Native Hawaiian practices, discusses the impact of the proposed long-term lease on those practices, and addresses mitigation of potential impacts to those practices arising from the proposed action as

required by law.¹ See DEA at 116; App. C. Wetland kalo cultivation, and the making and eating of poi, are central to Native Hawaiian cultural identity, beliefs, and practices. App. C at 73. Moreover, fishing and hunting, are traditional and customary practices prevalent throughout Wai'oli that depend on the lo'i system. *Id.* at 65-68. Feral Hawaiian mountain pigs are attracted to kalo, particularly the Hawaiian varieties, and hunting practices evolved to protect lo'i cultivation. *Id.* at 67. A wide range of traditional and customary fishing practices are also perpetuated in Wai'oli, including fishing in the 'auwai and muliwai of the lo'i system, for 'o'opu, 'ōpae, hīhīwai (wī), 'anae, āholehole, 'ama'ama, and other aquatic species. *Id.* at 67. Additionally, gathering both cultivated and uncultivated resources along the kuāuna (taro patch banks) is performed for a range of cultural practices, including lā'au lapa'au and making lei. *Id.* at 68. Curtailing the flow of water through the Wai'oli system would thus harm a range of traditional customary practices dependent on healthy water flows through the lo'i kalo and into the nearshore waters.

Wai'oli's lo'i kalo system also provides important habitat for indigenous aquatic and wetland species. Lo'i kalo play a crucial role in promoting, protecting, and perpetuating native species; these species have adapted to lo'i kalo and depend on these systems for food, shelter, and reproduction. DEA at 110 (citing USDA, 2009). For example, five water birds classified as either endangered or threatened inhabiting the Hanalei National Wildlife Refuge—Koloa maoli, 'Alae ke'oke'o, 'Alae 'ula, Ae'o, and Nēnē—all rely on the Wai'oli lo'i kalo irrigation system as an extension of their habitat and flight range. DEA at 102. All five species of native goby ('o'opu) are found in the Wai'oli stream, as well as 'ōpae, hīhīwai (wī), and endemic and indigenous fish species, all serving as important indicators of the health of this traditional wetland ecosystem. *Id.* at 107-09.

Likewise, the Wai'oli lo'i kalo system, as designed and operated for centuries, benefits downstream users and the nearshore environment by reducing the negative ecological and environmental effects of storm runoff. The lo'i complex mitigates such impacts by absorbing the brunt of flooding events, and by slowing the onslaught of flash flood waters following especially heavy rains. DEA at 152. Additionally, the Hui's watershed management plan includes the phased removal of invasive overgrowth from waterways, which further reduces potential damage to downstream residents during floods. *Id.* As with the stream biota and waterfowl discussed above, significant negative impacts to downstream properties and the nearshore environment would likely occur if kalo cultivation were to cease. The longevity and integrated biocultural functionality of this ancient lo'i kalo system sets it apart from typical proposed uses under long-term water leases; the diversions and waterways within the Wai'oli

¹ See *Ka Pa'akai O Ka 'Āina*, 94 Hawai'i 31, 47, 7 P.3d 1068, 1084 (2000); Hawai'i Administrative Rules § 11-200.1-18(d)(7), (8).

Ian C. Hirokawa
Department of Land and Natural Resources
July 8, 2021
Page 4

system directly benefit both the ecological and human communities within Wai'oli ahupua'a and the larger Hanalei kalana.

III. CONCLUSION

We urge the Department to adopt the DEA's proposed finding of no significant impact regarding the long-term water lease for the Wai'oli lo'i complex. Granting this lease will allow for the perpetuation of the historical practice of lo'i kalo cultivation in Wai'oli and will have no significant impacts given that the lo'i complex has become a part of the natural landscape after centuries of continuous use. The proposed lease will not negatively affect stream life, the downstream or nearshore environments, or other traditional and customary practices such as subsistence fishing, hunting, or gathering. Instead, maintaining the lo'i complex will ensure habitat for imperiled waterfowl and instream species, and protect downstream and nearshore environments from flood risks. Moreover, granting the Hui's lease will promote the exercise of traditional and customary Native Hawaiian rights, serving the public trust while also supporting community resiliency.

Thank you for your consideration of these comments.

Sincerely,



Leina'ala L. Ley
Mahesh Cleveland
Attorneys

Enclosure

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)



August 26, 2021

Earthjustice
Attn: Leinā'ala Ley and Mahesh Cleveland
850 Richards Street #400
Honolulu, Hawai'i 96813
Via email: lleym@earthjustice.org
mcleland@earthjustice.org

Aloha mai e Earthjustice,

Mahalo nui for submitting comments regarding the Draft Environmental Assessment (“DEA”) for the Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation and for your support of the proposed finding of no significant impact.

As humble stewards of this 'āina, the Hui appreciates the important legal framework and in-depth analysis of cultural and environmental benefits of the proposed long-term water lease. In particular, we appreciate your acknowledgement that the “Hui’s proposed water lease is unique in that it directly supports a protected public trust use of water, that is, cultivation of kalo using indigenous instream methods.” Given the importance of wai to Kānaka Maoli life and practices, we also appreciate that you highlight that “[t]he longevity and integrated biocultural functionality of this ancient lo'i kalo system sets it apart from typical proposed uses under long-term water leases.” We are grateful for Earthjustice’s continued advocacy and work.

Mahalo again for taking the time to review and respond to this DEA. Your comments will be included in the Final Environmental Assessment. Please contact us if you have any further questions or kāko'o.

Me ka mahalo nui,

A. U'ilani Tanigawa Lum
On behalf of the Wai'oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



July 7, 2021

To: Ian Hirokawa
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809
ian.c.hirokawa@hawaii.gov

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)

Re: Supporting the Wai'oli Valley Taro Hui's Draft Environmental Assessment

Dear Mr. Hirokawa,

Hawai'i Land Trust is Hawai'i's statewide nonprofit land trust which is Hawai'i-based and nationally accredited. Hawai'i Land Trust has protected 21,650 acres throughout Hawai'i and holds two conservation easements permanently protecting approximately 39 acres of kalo producing 'āina in Wai'oli that is currently farmed by members of the Wai'oli Valley Taro Hui. Recognizing the importance of kalo cultivation, a private landowner donated these conservation easements to HILT which restrict land use to kalo farming. HILT has seen firsthand the ongoing effects of the devastating 2018 floods. These lo'i kalo have fed 'ohana and community for generations. HILT supports the Draft Environmental Assessment's Finding of No Significant Impact and a long term water lease for kalo cultivation in Wa'ioli.

These small family farmers that make up the Wai'oli Valley Taro Hui, including those who currently farm on 'āina protected by HILT, provide an important source of food for our island

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Laura H. E. Kaakua, *President & CEO*



community. For example, they supply taro to the Waipā Foundation, whose poi feeds families from Hā'ena to Waimea, Kaua'i and even Ni'ihau. Moreover, the Wai'oli Valley Taro Hui's collective stewardship of the ma uka (upland, directioned towards the mountain) reaches of Wai'oli Valley and each families' respective lo'i kalo, provides critical and invaluable ecosystem services that protect Hanalei town and surrounding areas from minor and major flooding events. Lastly, kalo cultivation is integral to the community's identity on Kaua'i and HILT supports Hawai'i's local farmers who maintain this lifestyle and the generational knowledge inherent in this cultural tradition of growing food, caring for Hawai'i's water sources and systems, in ways that provide for reciprocated benefits for people and the environment. Without the families of Wa'oli farmers, without cultural practitioners, we have no culture.

Mahalo for accepting these comments in support of the Wai'oli Valley Taro Hui's Draft EA.

Mahalo nui,

A handwritten signature in black ink, appearing to read "M. Reilly".

Makana Reilly

Director of 'Āina Connection

P.O. Box 3537

Līhu'e, Hawai'i 96766



August 26, 2021

Hawai'i Land Trust
Attn: Makana Reilly, Director of 'Āina Connection
126 Queen Street, Suite 306
Honolulu, Hawai'i 96813
Via email: makana.reilly@hilt.org

Aloha mai e Hawai'i Land Trust,

Mahalo nui for submitting comments regarding the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation. Mahalo hou for your support of the finding of no significant impact and a long-term water lease for kalo cultivation.

As a Hawai‘i-based non-profit land trust and as the holder of two conservation easements in Wai‘oli Valley, the Hui acknowledges that Hawai‘i Land Trust (“HILT”) is uniquely positioned to offer comments on this DEA. The Hui appreciates HILT’s acknowledgment of kalo cultivation being “integral to the community’s identity on Kaua‘i” and our hui of small family farmers’ “collective stewardship” that “provide for reciprocated benefits for people and the environment.” We are grateful for HILT’s continued work in protection of ‘āina in Wai‘oli and throughout Hawai‘i pae ‘āina. Our practices and way of life are better because of your work.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Wai'oli Valley Taro Hui Long-term Water Lease for Traditional Lo'i Kalo Cultivation: Draft EA Comments

The Draft Environmental Assessment has been published and is available for review: http://oegc2.doh.hawaii.gov/Doc_Library/2021-06-08-KA-DEA-Waioli-Valley-Taro-Hui-Long-Term-Water-Lease.pdf

Please submit comments in writing using this form by Thursday, July, 8, 2021.

All comments will be considered in development of the Final Environmental Assessment.

Email Address *

jjidle@hawaii.edu

First Name *

Jessica

Last Name *

Idle

Address *

4604 Maile Rd. Waimea, HI

Zip Code *

96734

Please let us know what topics your comments are related to. Select all that apply. *

- Historic, Cultural, Archaeological resources
- Natural resources (biological resources, water resources, natural hazards)
- Agricultural, socio-economic Resources
- Other:

Share Your Comment Here: *

Aloha,

As a graduate student at the University of Hawai'i at Mānoa pursuing a degree in Natural Resources and Environmental Management, and as a member of the waterbird hui of the Hawai'i Wildlife Ecology Lab, I am in support of this Draft EA for Wai'oli Valley Taro Hui. The beneficial biological impacts that are likely to result due to the proposed action are well supported, and critical for restoring and preserving natural ecosystems, flora, and fauna. It is exciting that Wai'oli Valley currently has so many native species present, from plants to birds to invertebrates, and this needs to be protected and cherished. What better way to do that than to provide a secure and dependable water source that feeds the valley, which in turn, feeds its caretakers and protectors?

In working with Hawaiian waterbirds, and most exclusively the Ae'o, we as a group have documented the use of lo'i and other agricultural lands for nesting and foraging. Though they use many different habitat classifications and plant mediums for nesting, water in proximity is required for nesting. By ensuring a stable water source, and conducting the lo'i farming practices as described, it is inevitable that Hawaiian waterbirds will continue to utilize Wai'oli for nesting and foraging. This is ever-more critical, as we see a continued loss of wetland habitats in Hawai'i due to development and sea-level rise. The expansion and restoration of lo'i is vital for combating this loss of habitat (Harmon et al. 2021). Therefore, the efforts of the Wai'oli Valley Taro Hui and other lo'i farms across the state could play a significant role in the effort to reach species recovery for our endangered waterbirds, and hopefully reach a point in which they are abundant across the landscape again.

In addition to the minimization and mitigation efforts (5.5.4) listed in the Draft EA, I would recommend the addition of more predator control efforts, especially if providing waterbird habitat is a priority of the Hui. While providing habitat is a great first step, we always want to ensure that the target species are successfully reproducing in the habitat, otherwise we may not have as great of an impact as we would like. In addition to implementing ungulate control, we always recommend conducting invasive mammal control. On Kaua'i, this means rats and cats. Rats are a common nest (egg) predator, while cats will feast on young chicks of all waterbird species. Untrained or feral dogs can also attack and kill chicks and adults, so we recommend excluding bird-aggressive dogs from nesting areas as well. Further, in regards to botulism outbreaks, we recommend that the Wai'oli Valley Taro Hui participate in the Hawai'i Botulism Reporting Network and communicate closely with the Hanalei NWR given the proximity of the two sites. Botulism is a toxin that can cause severe illness and death in birds, and is spread via birds moving from area to area (https://www.usgs.gov/centers/nwhc/science/avian-botulism?qt-science_center_objects=0#qt-science_center_objects). We typically have annual outbreaks in Hawai'i, and we rely on swift communication between partners to collect and remove injured, sick, and dead birds to reduce the spread of the toxin. Research is still underway to figure out what biological conditions promote the presence of botulism, and we encourage the Wai'oli Valley Taro Hui to provide their kilo in this regard. Please feel free to reach out to us if you would like to talk about predator control and botulism control methods further, as they are key management actions for protecting native waterbirds.

Mahalo to all involved in composing this document and moving this effort forward.

Jessica

Harmon, K. C., Winter, K. B., Kurashima, N., Fletcher, C. H., Kane, H. H., & Price, M. R. (2021). The role of indigenous practices in expanding waterbird habitat in the face of rising seas. *Anthropocene*, 34, 100293.



August 26, 2021

Jessica Idle
4604 Maile Road
Waimea, Hawai'i 96734
Via email: jjidle@hawaii.edu

Aloha mai e Ms. Idle,

Mahalo nui for submitting comments in support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

The Hui looks forward to additional discussions on the recommendations to further the Hui’s predator control efforts, monitor untrained or feral dogs, and botulism reporting. As the DEA highlights, the Hui regularly monitors the Project Area and is unaware of any rats and cats that would threaten waterbirds. We will continue to monitor the area for these threats and appreciate the suggestion because the Hui’s wellbeing is intimately intertwined with the health of Native biota in Wai‘oli Stream as well as the resources upon which they both depend. We look forward to our continued partnership into the future.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



July 6, 2021

To: Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
ian.c.hirokawa@hawaii.gov

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)

Re: Support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment

Aloha Mr. Hirokawa,

My name is Kevin Chang and I am the Executive Director of Kua'āina Ulu 'Auamo (KUA) and on its behalf I submit the following comments in support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment.

Our full name means “grassroots growing through shared responsibility,” our acronym KUA means backbone. KUA works to empower communities to improve their quality of life through caring for their environmental heritage together. We employ a community-driven approach that currently supports a network of more than 36 mālama 'āina (care for that which feeds) community groups collectively referred to as E Alu Pū (moving forward together), over 40 fishpond restoration projects and practitioners called the Hui Mālama Loko I'ī (HMLI; the group that cares for fishponds), and the Limu (seaweed) Hui made up of limu loea (experts) all from across the state.

We count among some of our network participants initiatives to increase traditional crop cultivation as a practice essential to the soul of our community but also as part of a greater food and ecosystem service. Historic efforts to lift up these practices means a lot to our mission and the people we work with and serve. As respected members of both their Kaua'i community and larger community of practitioners, the Wai'oli Valley Taro Hui directly promotes the restoration and stewardship of our native species, ecosystem, resources, and practices.

As is well known scientifically and historically Hawai'i's natural and cultural resources — sacred landscapes, fisheries, streams, forests, and reefs — and people were deeply impacted by over 200 years of political, economic, and social upheaval and change. Today, Hawai'i has the highest concentration of endangered species anywhere on the planet. The knowledge and efforts of local communities are more important now than ever. The work of community-led organizations like the Wai'oli Valley Taro Hui is a critical part of combating this paradigm and caring for Hawai'i's natural and cultural resources in a responsible manner. The DEA highlights this community's ongoing relationship with and alongside their 'āina and resources. As a whole, the Hui is an invaluable resource of generational place-based knowledge and management of Wai'oli Stream, Wai'oli Ahupua'a, and the larger Hanalei Kalana.

The Wai'oli Valley Taro Hui is comprised of small family farmers, many of whom stewarded the same land for four to six generations or more. As a Native Hawaiian traditional and customary practice, the DEA describes lo'i kalo cultivation generally and memorializes the



unique practices of the Wai'oli community. Kalo cultivation is a vital practice and tradition of Kānaka Maoli and promotes pono natural resource stewardship by kama'āina of the place. Practices and community-driven natural resource management such as Wai'oli Valley Taro Hui's work must be prioritized and supported.

The Wai'oli Valley Taro Hui and its supporters worked hard to write a DEA that accurately reflects their cultural practice -- including important contextual insight around Kānaka Maoli worldviews, history, and language (see e.g., Section 1.3.1, Framing for the Environmental Assessment). This is a point of matter significant to the work of the people and the networks we serve; that the people who reside in a place, have cultivated the situated knowledge and practices of a place overtime and are most likely to take on the responsibility, accountability, and impact of an action on that place are at the root deeply involved in the process of caring for it. This point, similar to the work of the community through the Hui Maka'āinana o Makana and their community-based subsistence fishing area and land management vision- we believe also makes this process and DEA a matter of contemporary and historic significance.

Large-scale change happens only when connected, caring communities of people move together. Together with local communities, government agencies, schools, businesses, foundations, non-profits, and many, many others, KUA is growing a grassroots movement for nature, people, culture, and justice. To that end, KUA supports the Wai'oli Valley Taro Hui's DEA and request for a long-term 65-year water lease gratis.

Pūpūkahi i holomua e ho'okanaka
(Let us unite to better the human condition)

Kevin K.J. Chang
Executive-Director



August 26, 2021

Kua'āina Ulu 'Auamo
Attn: Kevin Chang, Executive Director
Via email: kevin@kuahawaii.org

Aloha mai e Kua'āina Ulu 'Auamo,

Mahalo nui for submitting comments on and for your support of the Draft Environmental Assessment (“DEA”) for the Wai'oli Valley Taro Hui Long-Term Water Lease for Traditional Lo'i Kalo Cultivation. Mahalo hou for your support of a long-term 65-year water lease gratis.

The Hui appreciates Kua'āina Ulu 'Auamo (“KUA's”) comment that the Wai'oli Valley Taro Hui is an “invaluable resource of generational place-based knowledge” and a critical part of “caring for Hawai'i's natural and cultural resources in a responsible manner.” As a hui of humble practitioners that has worked hard to engage in this process, the Hui is grateful for KUA's comment that the DEA “accurately reflects their cultural practice” including “important contextual insight around Kānaka Maoli worldviews, history, and language” and that KUA believes this makes this “DEA a matter of contemporary and historic significance.”

The Hui is grateful for and admires KUA's leadership and work to “empower communities to improve their quality of life through caring for their environmental heritage together.” We look forward to future work and collaboration on behalf of our 'āina aloha!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko'o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U'ilani Tanigawa Lum
On behalf of the Wai'oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Melody Kapilialoha MacKenzie, Esq.
579 Kāne‘āpu Place ♦ Kailua, Hawai‘i 96734
melodykmackenzie@gmail.com

July 5, 2021

Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai‘i 96813
ian.c.hirokawa@hawaii.gov

RE: Comments in Support of the Wai‘oli Valley Taro Hui’s Draft Environmental Assessment

Aloha e Mr. Hirokawa,

Please accept these comments in support of the Wai‘oli Valley Taro Hui’s Draft Environmental Assessment (“DEA”). The DEA seeks approval for ongoing traditional and customary Native Hawaiian use of water from Wai‘oli Stream for lo‘i kalo cultivation through a 65-year long-term water lease. My name is Melody Kapilialoha MacKenzie, and I am a Professor of Law Emerita at the William S. Richardson School of Law and the Editor-in-Chief of the first treatise in Native Hawaiian Law, the definitive resource for understanding critical legal issues affecting the Native Hawaiian community. As kama‘āina of Wai‘oli, the DEA makes clear that members of the Wai‘oli Valley Taro Hui, have stewarded this ‘āina for generations and committed themselves to upholding the traditional and customary practice of kalo cultivation. Traditional and customary practices such as this have an integral role in Hawai‘i’s historical and present-day society, enjoy special constitutional and statutory protections, and must be supported.

The exercise of traditional and customary rights in Hawai‘i nei is afforded broad and special protection under unique provisions of Hawai‘i law. Prior to Hawai‘i’s first written laws, Hawaiian custom and usage regulated Hawaiian life.¹ At the time of Western contact in 1778, Native Hawaiians “lived in a highly organized, self-sufficient, subsistent social system based on communal land tenure with a sophisticated language, culture, and religion.”² Hawaiian customary practices, particularly those related to land, have been recognized and incorporated into Hawai‘i’s statutory law since the earliest formal written laws in 1839.³

¹ John Ricord, Preface to 1 Statute Laws of His Majesty Kamehameha III, King of the Hawaiian Islands 3 (1846) (stating that “the Hawaiian kingdom was governed until the year 1838, without other system than usage, and with a few trifling exceptions, without legal enactments”), cited in Public Access Shoreline Hawaii v. Hawai‘i County Planning Comm’n, 79 Hawai‘i 425, 437 n. 21, 903 P.2d 1246, 1258 n. 21 (1995), cert. denied, 517 U.S. 1163 (1996).

² Joint Resolution to Acknowledge the 100th Anniversary of the January 17, 1893 Overthrow of the Kingdom of Hawaii, and to Offer an Apology to Native Hawaiians on behalf of the United States for the Overthrow of the Kingdom of Hawaii, S.J. Res. 19, 103d Cong., Pub. L. No. 103-150, 107 Stat. 1510 (1993).

³ *Hawaiian Custom in Hawai‘i State Law*, Conference Paper from Tūhonohono: The State and Custom, Tainui Endowed College and Te Mātāhauriki Research Institute, University of Waikato, Hamilton, Aotearoa/New Zealand, published in THE YEARBOOK OF NEW ZEALAND JURISPRUDENCE (2010).

Ian Hirokawa
July 5, 2021
Page Two

As the DEA outlines, traditional and customary practices such as kalo cultivation are fundamental to Kānaka Maoli society and wellbeing. Kānaka Maoli see themselves as a part of, not separate from, ‘āina itself. This understanding and kuleana supported the sophisticated, self-sufficient Hawaiian society and ensured the pono use of ‘āina and resources. In this case, the DEA provides key cultural context and makes clear that the Wai‘oli Valley Taro Hui stewards these resources in a pono manner, just as the members’ ancestors have done for generations. The lo‘i kalo system used in Wai‘oli has been dated to pre-contact times and represents a continuation of the practice of kalo cultivation in Wai‘oli. To transition this practice into the modern legal system, the Wai‘oli Valley Taro Hui has completed important legal and administrative requirements, including this DEA, in pursuit of a long-term water lease. Notably, the Cultural Impact Assessment also outlines important practices, resources, and the historical context. Illustrating the importance of this practice in present-day society, the Hui is also committed to engaging with the larger community, community organizations, and governmental agencies. The Hui seeks to promote important opportunities for education, collaboration, and pono stewardship of this ‘āina. Hui members also provide ‘ai pono to Kaua‘i and the larger Hawai‘i pae ‘āina.

Wai from Wai‘oli Stream is crucial to the continuation of this vital Native Hawaiian traditional and customary practice. Given the key role that kalo cultivation and this Hui play on Kaua‘i and throughout Hawai‘i, and considering the Hui’s hard work in fulfilling the applicable legal and administrative requirements, it is imperative that the State recognize these vital traditional and customary practices and support the important work of the Wai‘oli Valley Taro Hui.

Mahalo nui,



Melody Kapilialoha MacKenzie
Professor of Law Emerita, William S. Richardson School of Law

cc: A. U‘ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)



August 26, 2021

Melody Kapilialoha MacKenzie, Esq.
579 Kāne‘apu Place
Kailua, Hawai‘i, 96734
Via email: melodymackenzie@gmail.com

Aloha mai e Ms. MacKenzie,

Mahalo nui for submitting comments in support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As the world’s leading expert in Native Hawaiian Law, the Hui is incredibly grateful for your support of the DEA and the traditional and customary practices upon which we depend. The Hui agrees that these practices have “an integral role in Hawai‘i’s historical and present-day society” and because of this, as you point out, these practices “enjoy special constitutional and statutory protections, and must be supported.”

We are grateful for, learn from, and admire your work, much of which makes continuing our work possible.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

July 7, 2021

Ian Hirokawa
Hawai'i Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809
ian.c.hirokawa@hawaii.gov

Re: Comment in strong support of the Wai'oli Valley Taro Hui's Proposed Action for a Long-Term Water Lease for Traditional Lo'i Kalo Cultivation

Dear Mr. Hirokawa:

My name is MJ McDonald, and I write in strong support of the Wai'oli Valley Taro Hui's Proposed Action in the Draft Environmental Assessment for a Long-Term Water Lease for Traditional Lo'i Kalo Cultivation.

Kalo cultivation is vital for community sustainability and Maoli cultural identity. The Hui and their families have stewarded their lo'i kalo and the larger Hanalei Kalana for centuries, so there is no one better situated to continue this important Native Hawaiian traditional and customary practice. Their place-based knowledge not only maintains Wai'oli and Hanalei Kalana's 'āina and its resources, but also ensures responsible use of wai. Securing a long-term water lease would give the Hui much-needed stability as they continue to work tirelessly to restore their lo'i kalo from the devastating 2018 floods and will have positive environmental impacts as outlined in this DEA. Please support the Hui's Proposed Action.

Mahalo for your time and consideration,



MJ McDonald
2635 Doris Place, Apartment A
Honolulu, Hawai'i 96822

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)



August 26, 2021

MJ McDonald
2635 Doris Place, Apartment A
Honolulu, Hawai'i 96822
Via email: mjm8@hawaii.edu

Aloha mai e Ms. McDonald,

Mahalo nui for submitting comments in strong support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As humble family farmers, the Hui agrees that kalo cultivation is “vital for community sustainability and Maoli cultural identity.” Further, the Hui is grateful for your recognition that the Hui’s place-based knowledge “not only maintains Wai‘oli and Hanalei Kalana’s ‘āina and its resources, but also ensures responsible use of wai.”

We are grateful for and admire your work and look forward to meeting you soon!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Wai'oli Valley Taro Hui Long-term Water Lease for Traditional Lo'i Kalo Cultivation: Draft EA Comments

The Draft Environmental Assessment has been published and is available for review: http://oegc2.doh.hawaii.gov/Doc_Library/2021-06-08-KA-DEA-Waioli-Valley-Taro-Hui-Long-Term-Water-Lease.pdf

Please submit comments in writing using this form by Thursday, July, 8, 2021.

All comments will be considered in development of the Final Environmental Assessment.

Email Address *

mayakawailana@gmail.com

First Name *

Maya

Last Name *

Saffery

Address *

948 Lunahai Pl. Kailua, HI

Zip Code *

96734

Please let us know what topics your comments are related to. Select all that apply. *

- Historic, Cultural, Archaeological resources
- Natural resources (biological resources, water resources, natural hazards)
- Agricultural, socio-economic Resources
- Other: the importance of traditional and customary Native Hawaiian rights/practices

Share Your Comment Here: *

My name is Maya Kawailanaokeawaiki Saffery and I am a Kanaka Hawai'i – a Native Hawaiian educator, leader of a community non-profit, and hula practitioner from Kailua, O'ahu. It is from these different roles that I share my comments of strong support of the Wai'oli Valley Taro Hui Long-term Water Lease for Traditional Lo'i Kalo Cultivation.

The philosophy that guides all of my work – from the university to the community - is grounded in the ancestral understanding that Kānaka Hawai'i (Native Hawaiians) and our 'āina belong together. Many living narratives of our kūpuna teach us that our 'āina cannot be separated from us; thus, we cannot be separated from our 'āina. One such narrative, which I learned as a hula practitioner, is the mele (traditional chant), "Eia Hawai'i," a twelfth-century chant that was first offered by the kāula nui (great prophet, seer), Kamahualele, to his chief, Mō'īkeha, as the islands of Hawai'i rose up out of the sea in front of their voyaging canoes. The opening lines of "Eia Hawai'i" - "Eia Hawai'i, he moku, he kanaka. Here is Hawai'i, an island, a person" - teaches us that we have both a familial and generative relationship with our 'āina, a relationship that defines, grows, and sustains us as Kānaka Hawai'i. The reciprocal caring for and cultivation of one another helps to ensure healthy, abundant futures for us both. And by extension, when this foundational relationship is recognized and honored by all—Hawaiian and non-Hawaiian—it supports the well-being of everyone.

There are many ways that we can feed this life-giving relationship, including planting and eating kalo. We literally come from the land, but it is also our presence on the land, our cultivation of the land, and our engagement with the land through various practices that transform land to 'āina, that which feeds us nutritionally, culturally, and spiritually. People help to bring balance and abundance to the land through our cultivation of its soil, our stewardship of its resources, our naming of its many features, our conducting of ceremonies, etc. Through these cultural and spiritual practices, kānaka give life to the land, and in turn, the 'āina feeds us and gives us life as well.

This Draft EA clearly demonstrates how the Wai'olu Taro Hui has always been committed to this work of transforming land to 'āina through their traditional and customary Native Hawaiian use of water from Wai'oli Stream for lo'i kalo cultivation. From generation to generation, their cultural practice has benefited the land and water of Wai'oli as well as the community it feeds. In order to ensure that they can continue this practice of feeding for generations to come, I write in full support of this Draft EA.

Questions? Contact:

Tricia Dang, Planner, at tricia@tridason.com
U'ilani Tanigawa Lum at anelatan@hawaii.edu

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Google Forms



August 26, 2021

Maya Kawailanaokeawaiki Saffery
948 Lunahai Place
Kailua, Hawai'i 96734
Via email: mayakawailana@gmail.com

Aloha mai e Ms. Saffery,

Mahalo nui for submitting comments on and for your strong support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As small family farmers stewarding this ‘āina in Wai‘oli, the Hui appreciates your comment that the DEA demonstrates that the Wai‘oli Valley Taro Hui “has always been committed to this work of transforming land to ‘āina through their traditional and customary Native Hawaiian use of water from Wai‘oli Stream.” Further, you share that the Hui’s “cultural practice has benefited the land and water of Wai‘oli as well as the community it feeds.” Mahalo nui for those acknowledgements.

The Hui agrees that we come from ‘āina and that “our ‘āina cannot be separated from us; thus, we cannot be separated from our ‘āina.” As you mention, this is illustrated in many of our other cultural practices, and the mele, “Eia Hawai‘i,” in particular. We are grateful for, learn from, and admire the work of practitioners like yourself and hope to collaborate for our ‘āina aloha in the future!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kākō‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)

Wai'oli Valley Taro Hui Long-term Water Lease for Traditional Lo'i Kalo Cultivation: Draft EA Comments

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Please submit comments in writing using this form by Thursday, July, 8, 2021.

All comments will be considered in development of the Final Environmental Assessment.

Email Address *

emilyjl@hawaii.edu

First Name *

Emily

Last Name *

Schlack

Address *

1085 Kiionioni Loop

Zip Code *

96816

Please let us know what topics your comments are related to. Select all that apply. *

- Historic, Cultural, Archaeological resources
- Natural resources (biological resources, water resources, natural hazards)
- Agricultural, socio-economic Resources
- Other:

Share Your Comment Here: *

Mahalo nui for the opportunity to submit comments in strong support of this Draft Environmental Assessment (DEA).

The Wai'oli Valley Taro Hui has been stewarding the Wai'oli Stream and their surrounding lo'i kalo for generations, and the farmers are an incredible example of how cultural traditions and practices can be passed down through generations and continue to grow in strength. Following devastating floods to the area starting in 2018, the lo'i kalo are still recovering, and approval of the traditional and customary use of water from Wai'oli Stream for cultivating kalo would help with this process.

The traditional and customary practices of Native Hawaiians are an incredible resource, indigenous to Hawai'i, and just as we must mālama the natural resources we have been blessed with, so too must the traditions and knowledge of our ancestors be stewarded. This is why I strongly support this DEA, which seeks the approval of the ongoing traditional and customary Native Hawaiian use of water from Wai'oli Stream for the cultivation of lo'i kalo. Wai'oli Valley has been the site of this cultural practice since time immemorial, and the farmers of the Wai'oli Valley Taro Hui and their families before them have been growing kalo and feeding the people of Wai'oli Valley for generations. Thank you for your time and consideration of preserving these integral cultural practices for future generations.

Questions? Contact:

Tricia Dang, Planner, at tricia@tridason.com
U'ilani Tanigawa Lum at anelatan@hawaii.edu

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August 26, 2021

Emily Schlack
1085 Kiionioni Loop
Honolulu, HI 96816
Via email: emilyjl@hawaii.edu

Aloha mai e Ms. Schlack,

Mahalo nui for submitting comments in strong support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As humble family farmers, the Hui agrees that the “traditional and customary practices of Native Hawaiians are an incredible resource” and that we must “mālama the natural resources we have been blessed with.” We are grateful for and admire your work and look forward to meeting you soon!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



SIERRA CLUB OF HAWAI'I

TO: Ian Hirokawa
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809
ian.c.hirokawa@hawaii.gov
(808) 587-0420

CC: A. U'ilani Tanigawa Lum
anelatan@hawaii.edu

Tricia Dang
info@tridason.com

DATE: July 7, 2021

RE: Public Comments of the Sierra Club on the Draft Environmental
Assessment for the Wai'oli Valley Taro Hui Long-Term
Water Lease for Traditional Lo'i Kalo Cultivation

Thank you for the opportunity to comment on the draft environmental assessment (Draft EA) submitted by Wai'oli Valley Taro Hui, Inc. for the proposed long-term water lease for traditional lo'i kalo cultivation.

The Sierra Club of Hawai'i is a grassroots, member-driven chapter of the national Sierra Club. Sierra Club's mission is to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives. Locally, this mission is operationalized through efforts to protect Hawai'i's unique natural and cultural resources, supporting the traditional and customary practices of Native Hawaiian communities, and advocating for environmental justice statewide.

As detailed in our comments below, the Sierra Club of Hawai'i strongly supports the proposed action. The robust, detailed research provided in the Draft EA demonstrates the importance of

the proposed long-term water lease on the ongoing, historic traditional and customary Native Hawaiian use of water from Wai‘oli Stream for lo‘i kalo cultivation, a cultural practice that has and will feed Wai‘oli Valley communities for centuries.

I. Community Stewardship

This report identified numerous cultural practices that rely on the continued health of the Wai‘oli Lo‘i Kalo Irrigation System. In addition to kalo farming, the study recognized fishing, hunting, and gathering as some of the most important customs for families in the Wai‘oli area. Any threat to water flowing into the mānowai and through the irrigated lo‘i kalo is thus a serious concern, not just for the native ecosystems that thrive under this system, but for the families that have come to rely on this water source as part of their spiritual, cultural, and physical well-being.

As the report demonstrates, the Wai‘oli Lo‘i Kalo Irrigation System is an intimately interconnected one. It has changed very little over the last several centuries, largely because cleaning and maintaining the system is a community kuleana that has connected and strengthened families across generations. The residents of Wai‘oli have actively mālama the watershed as part of their livelihood and daily practice, safeguarding a diverse abundance of resources for future generations. For these reasons, there is no one else better qualified or more committed to steward these natural resources in perpetuity than the Hui.

II. Preservation of Natural Resources

As many farmers know, and as the report describes, the cultivation of lo‘i kalo inherently requires the protection and preservation of healthy streams. The Hui’s active monitoring and maintenance of the stream and surrounding infrastructure contributes to improved water quality, enhanced natural habitats, and management of invasive plant species. The denial of a long-term water lease and/or a revocable permit would cause irreparable damage to the Hui’s intimate and unique relationship to this wahi pana by denying them the ability to adequately care for the ‘āina in these ways. For example, some damaging impacts of denial include the diminishing or outright elimination of important habitats for endangered and threatened water birds, significant alteration of the natural ecosystem that has relied on and adapted to the lo‘i kalo, and an increasing presence of devastating pests and diseases related to diminished quality and quantity of water flow. The lack of regular stewardship and maintenance will have widespread negative impacts on Wai‘oli’s unique environment, resources, and communities, making continued access to the Wai‘oli stream a priority for the continued health of the area.

III. Climate Resilience

Like much of Kaua‘i, Wai‘oli was devastated by the massive floods of 2018. Experts recognize that climate change morphed otherwise typical rainy-day weather into a dangerous extreme weather event that this community is still recovering from. The Draft EA clearly demonstrates that continued lo‘i kalo farming and infrastructure increases climate resilience through flood mitigation and local food production. For example, the Hui’s multi-generational knowledge and maintenance of this extensive Lo‘i Kalo Irrigation System tempers and distributes overflow, thereby reducing the severity and impacts of floodwaters on Hanalei Town. The lo‘i themselves provide the staple food of Kānaka Maoli. The kalo harvested will be a continued source of food for the community, contributing to food security, community nutrition, and the cultural legacy of the area. Thus, the health of the Lo‘i Kalo Irrigation System is critical for the sustainability and resilience of the watershed as a whole, now and under an uncertain climate-changed future.

In conclusion, the Sierra Club of Hawai‘i believes the proposed action would produce numerous beneficial impacts on Native Hawaiian traditional and customary practices as well as the natural systems and species that these practices are reliant upon. A long-term water lease enables Hui members to continue providing for their own and larger community through kalo farming, sustained stream and watershed health, and perpetuating vital cultural practices for future generations. For these reasons, we strongly support the Draft EA and proposed long-term water lease for traditional lo‘i kalo cultivation.

Sierra Club of Hawai‘i

P.O. Box 2577
Honolulu, HI 96803
hawaii.chapter@sierraclub.org
(808) 538-6616



August 26, 2021

Sierra Club of Hawai'i
P.O. Box 2577
Honolulu, Hawai'i 96803
hawaii.chapter@sierraclub.org
(808) 538-6616

Aloha mai e ka Sierra Club of Hawai'i,

Mahalo nui for submitting comments regarding the Draft Environmental Assessment (“DEA”) for the Wai’oli Valley Taro Hui Long-Term Water Lease for Traditional Lo’i Kalo Cultivation and for your support of the proposed project.

As a hui of kama’āina and generational stewards of this ‘āina, the Hui appreciates Sierra Club’s comment that “there is no one else better qualified or more committed to steward these natural resources in perpetuity.” As Sierra Club highlights, the Hui also agrees that “continued lo’i kalo farming and infrastructure increases climate resilience through flood mitigation and local food production.” We are grateful for the Sierra Club of Hawai’i’s ongoing advocacy for and commitment to Hawai’i’s natural and cultural resources, environmental justice, and support of Native Hawaiian traditional and customary practices.

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko’o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U’ilani Tanigawa Lum
On behalf of the Wai’oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)



July 8, 2021

To: Ian Hirokawa
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
ian.c.hirokawa@hawaii.gov

cc: A. U'ilani Tanigawa Lum (anelatan@hawaii.edu)
Tricia Dang (info@tridason.com)

Re: Comments in support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment

Aloha Mr. Hirokawa,

My name is Stacy Sproat-Beck, and I am the founder and served as a board member of the Waipā Foundation from 1994-2001. Since 2001, I have served as the Executive Director. I am writing in strong support of the Wai'oli Valley Taro Hui's Draft Environmental Assessment (DEA) for ongoing traditional and customary Native Hawaiian use of water from Wai'oli Stream for lo'i kalo cultivation. As ongoing partners with the Wai'oli Valley Taro Hui, The Waipā Foundation also strongly supports a 65-year long-term water lease at a gratis rate.

As a 501(c)(3) nonprofit founded in 1994, Waipā Foundation's mission is to restore Waipā's vibrant natural systems and resources and inspire healthy, thriving communities connected to their resources. As practitioners in the neighboring ahupua'a, generational experts and stewards of our 'āina, and as a part of the larger Hanalei Kalana, Wai'oli Valley Taro Hui plays a key role to effectuating this mission. As the DEA outlines, the Hui has spent decades caring for and stewarding this place and its resources in a pono manner. In addition to on-the-ground work, the Hui also facilitates educational opportunities about Wai'oli and Hanalei Kalana, responsible resource management, and our traditional and customary practices and food.

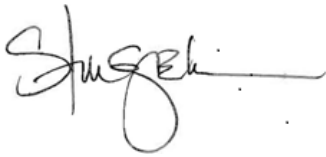
The Wai'oli Valley Taro Hui's practice of traditional lo'i kalo cultivation is integral to providing access to our traditional staple food, kalo, for our Kaua'i community and beyond. Producing and distributing poi to our lāhui and beyond is a priority for our organization because we believe the practice of consuming poi must continue. To that end, we produce and distribute poi weekly, and have done so since the late

1980s. The vast majority of our kalo comes from the farmers of Wai'oli. In the late 1980s our founders realized that the market price of poi was at such a level that kupuna, 'ohana and others would lose access to poi in retail markets. Waipā's poi has always been milled every Thursday and is distributed directly to our community, our kūpuna, as māhele for volunteers, 'ohana Ni'ihau, and even free for those with health issues. We are highly dependent on and grateful to each of the farmers of the Wai'oli Valley Taro Hui. We have long-standing pilina with the 'ohana of the Hui.

For over 20 years, Waipā has been a living learning center, our work is multi-faceted with efforts balanced between stewardship, cultural resiliency and economic development rooted in agriculture that has historically sustained local Hawaiian communities. The Wai'oli Valley Taro Hui has been a huge part of these efforts not only for the Waipā Foundation, but also for our Kaua'i Community. They are a shining example of Indigenous excellence, Native Hawaiian traditional and customary practices, and are a model for our larger Hawai'i nei.

The Waipā Foundation is confident that a 65-year water lease supporting Wai'oli Valley Taro Hui will ensure that Hanalei Kalana's land, resources, and people are healthy, vibrant, and overflowing with abundance.

Mahalo piha,

A handwritten signature in black ink, appearing to read "Stacy Sproat-Beck". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Stacy Sproat-Beck
Executive Director



August 26, 2021

Waipā Foundation
Attn: Stacy Sproat-Beck, Executive Director
P.O. Box 1189
Hanalei, Hawai'i 96714
Via email: stacy@waipafoundation.org

Aloha mai e Waipā Foundation,

Mahalo nui for submitting comments on and for your strong support of the Draft Environmental Assessment (“DEA”) for the Wai‘oli Valley Taro Hui Long-Term Water Lease for Traditional Lo‘i Kalo Cultivation.

As small ‘ohana farmers in the neighboring ahupua‘a, the Hui is grateful for Waipā Foundation’s acknowledgement that the Hui is a “shining example of Indigenous excellence, Native Hawaiian traditional and customary practices, and are a model for our larger Hawai‘i nei.” The Hui is grateful for the important and ongoing pilina with the Waipā Foundation. The Hui admires and appreciates Waipā’s continued service to and work for our beloved community. Put simply, we could not do what we do without Waipā’s support and collaboration. We look forward to continued work and collaboration into the future!

Mahalo again for taking the time to review and respond to this DEA. Please note that your comments will be included in the Final Environmental Assessment. If you have any further questions or kāko‘o, please do not hesitate to reach out.

Me ka mahalo nui,

A. U‘ilani Tanigawa Lum
On behalf of the Wai‘oli Valley Taro Hui

cc: Ian Hirokawa (ian.c.hirokawa@hawaii.gov)
Tricia Dang (info@tridason.com)