

Instream Flow Standard Assessment Report for the surface water hydrologic unit of Waikoloa (8161)

Public Fact Gathering Meeting
April 18, 2024 5:30pm
Waimea, Hawai'i

COMMISSION ON WATER RESOURCE MANAGEMENT

Ke Kahuwai Pono

"The trustee who oversees the rightful sharing of water."





Ke Kahuwai Pono

“The trustee who oversees the rightful sharing of water.”



Overview



- History of the Commission on Water Resource Management
- Background on Instream Flow Standards
- Hydrology of the Waikoloa Hydrologic Unit
- Brief summary of instream and non-instream uses

1977 Hawai‘i State Constitution



Article XI, Section 1

“For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner **consistent with their conservation** and in furtherance of the self-sufficiency of the State”

1977 Hawai‘i State Constitution



Article XI, Section 7

“The legislature shall provide for a water resource agency which... shall set overall water conservation, quality and use policies; define reasonable and beneficial uses; protect ground and surface water resources, watersheds and natural stream environments; establish criteria for water use priorities while assuring appurtenant rights and existing correlative and riparian uses and establish procedures for regulating all uses of Hawaii’s water resources.”

Public Trust Doctrine



“...all public natural resources are held in trust by the State for the benefit of its people.”

“The State has an obligation to protect, control and regulate the use of Hawaii's water resources for the benefit of its people.”

State Constitution, Article XI

Public Trust Doctrine



Public Trust Purposes of Water

1. Water in it's natural state
2. Water for traditional and customary practices
3. Water for the Department of Hawaiian Home Lands
4. Water for domestic use

Commission on Water Resource Management



- Seven (7) Members of the Commission
 - Chairperson of BLNR (Chair of Water Commission)
 - Dawn Chang
 - Director, State DOH (ex-officio voting member)
 - Kenneth Fink, MD, MPH
 - Five members are appointed by the Governor & confirmed by the State Senate



Wayne Katayama



Aurora Kagawa-Viviani



Larry Miike

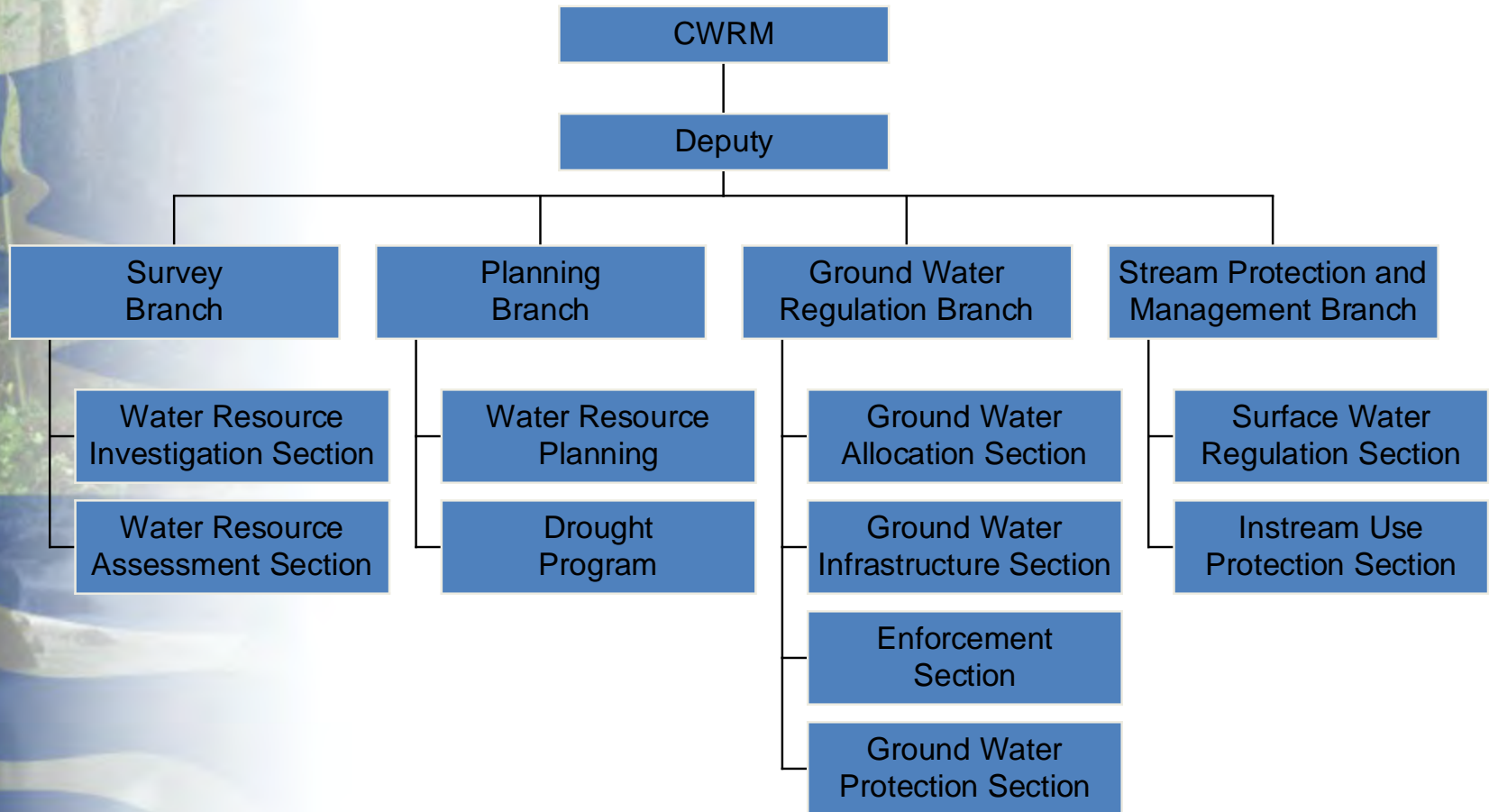


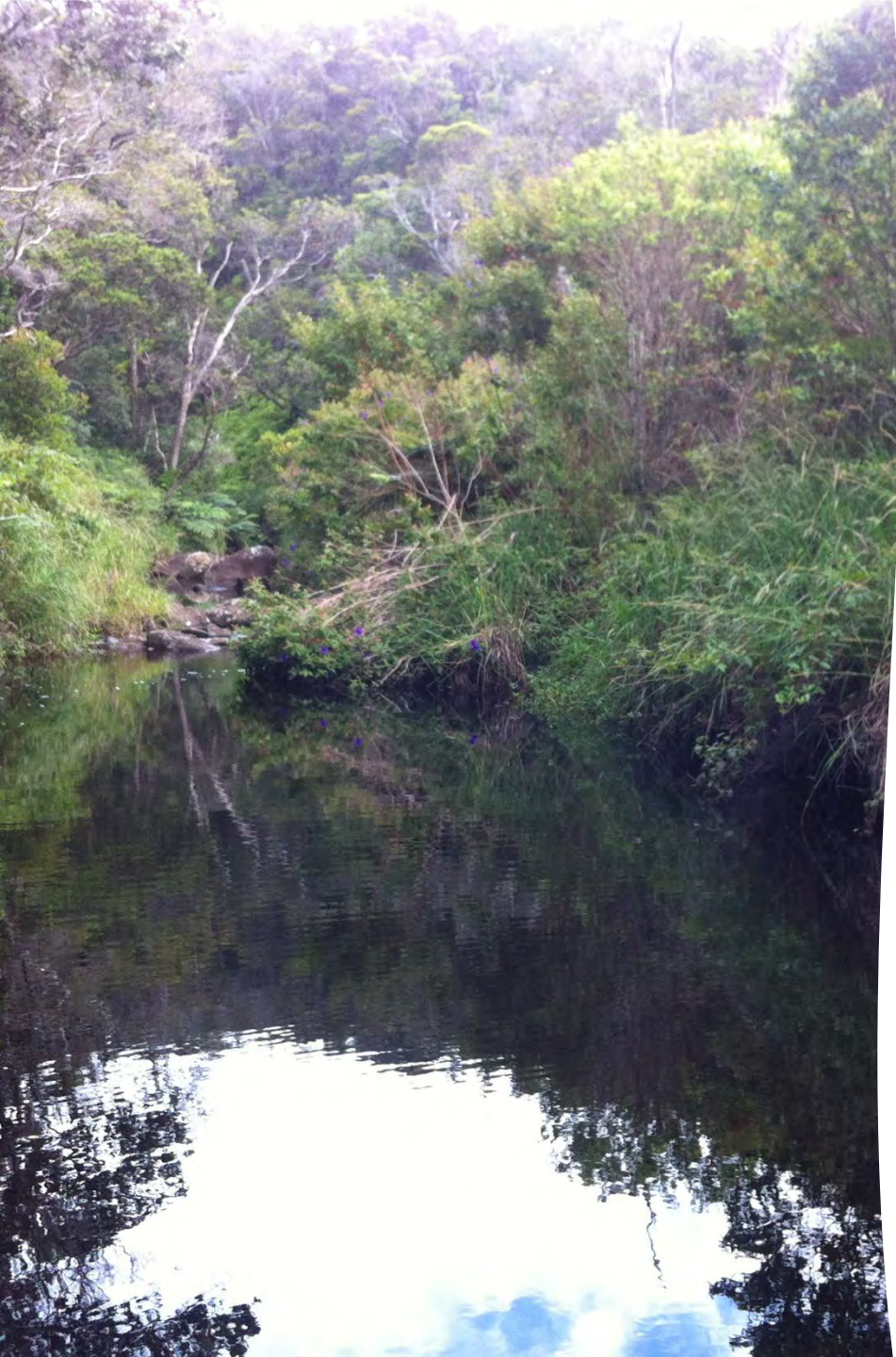
Neil Hannahs



Paul Meyer

Commission on Water Resource Management (CWRM)





Stream Protection & Management Branch

- Regulate stream channel alterations and stream diversion works
- Set measurable instream flow standards
- Respond to requests for determination
- Respond to surface water-related complaints
- Administration of surface water use permits in surface water management areas

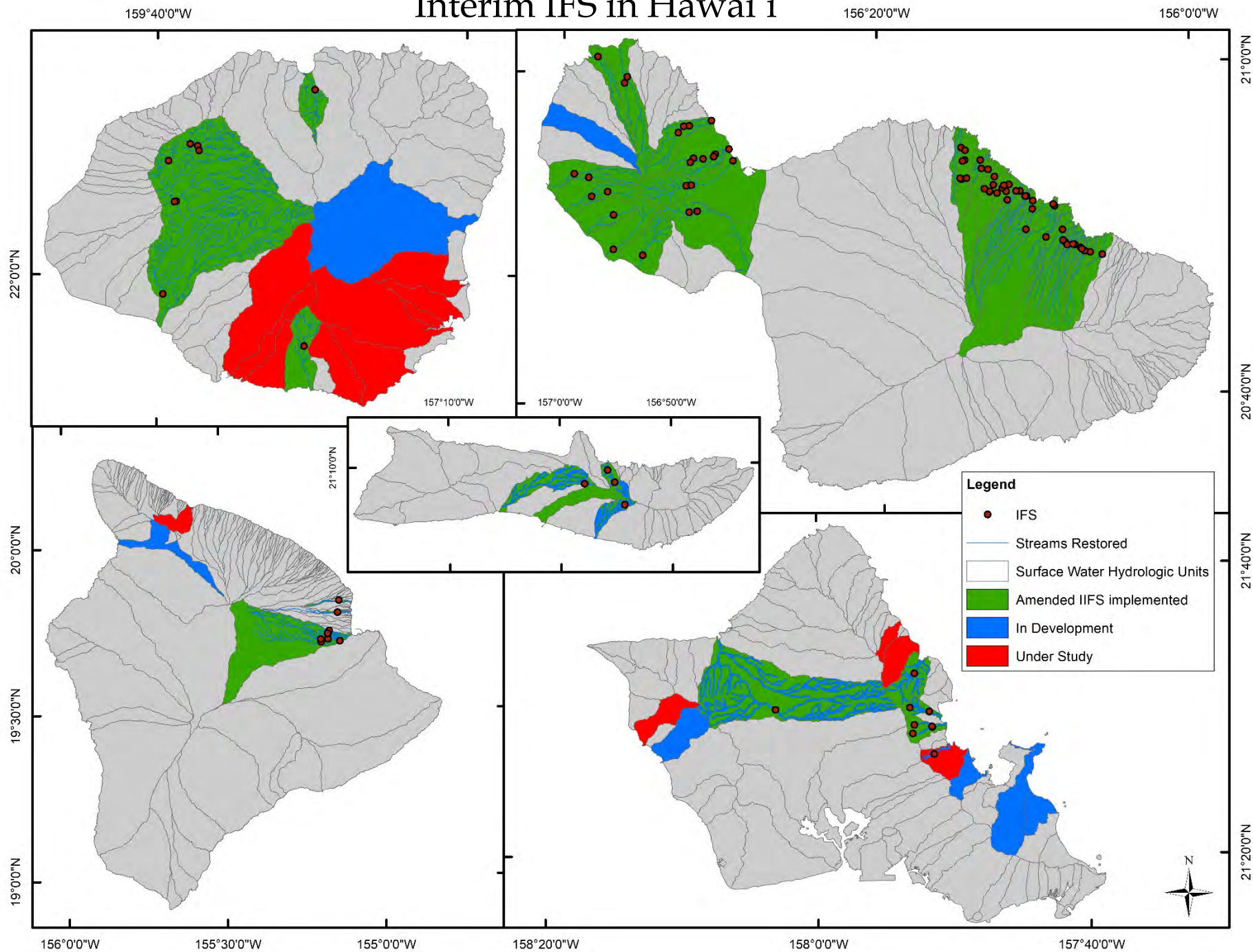
Brief History of Surface Water Management Post-Water Code

- **1987** State Water Code Signed (HRS 174C)
 - HRS 13-169 Protection of Instream Uses of Water
- **1989** Commission required the registration of all surface water diversions
 - Database of stream diversions established
- **1990** Publication of the Hawaii Stream Assessment
 - Inventoried ecological, cultural, recreational, riparian uses
- **2000-2006** Waiāhole Contested Case appeals to Supreme Court decision
- **2002** Stream Protection and Management Branch created
 - Focus was on responding to petitions to amend interim IFS in Maui, O‘ahu
- **2008** Commission established interim IFS for 6 streams in East Maui
- **2008** Nā Wai ‘Ehā becomes first Surface Water Management Area designated
- **2010** Began monitoring Amended interim IFS
- **2017** Commission approved interim IFS for 7 streams in Waimea, Kauai

Brief History of Surface Water Management

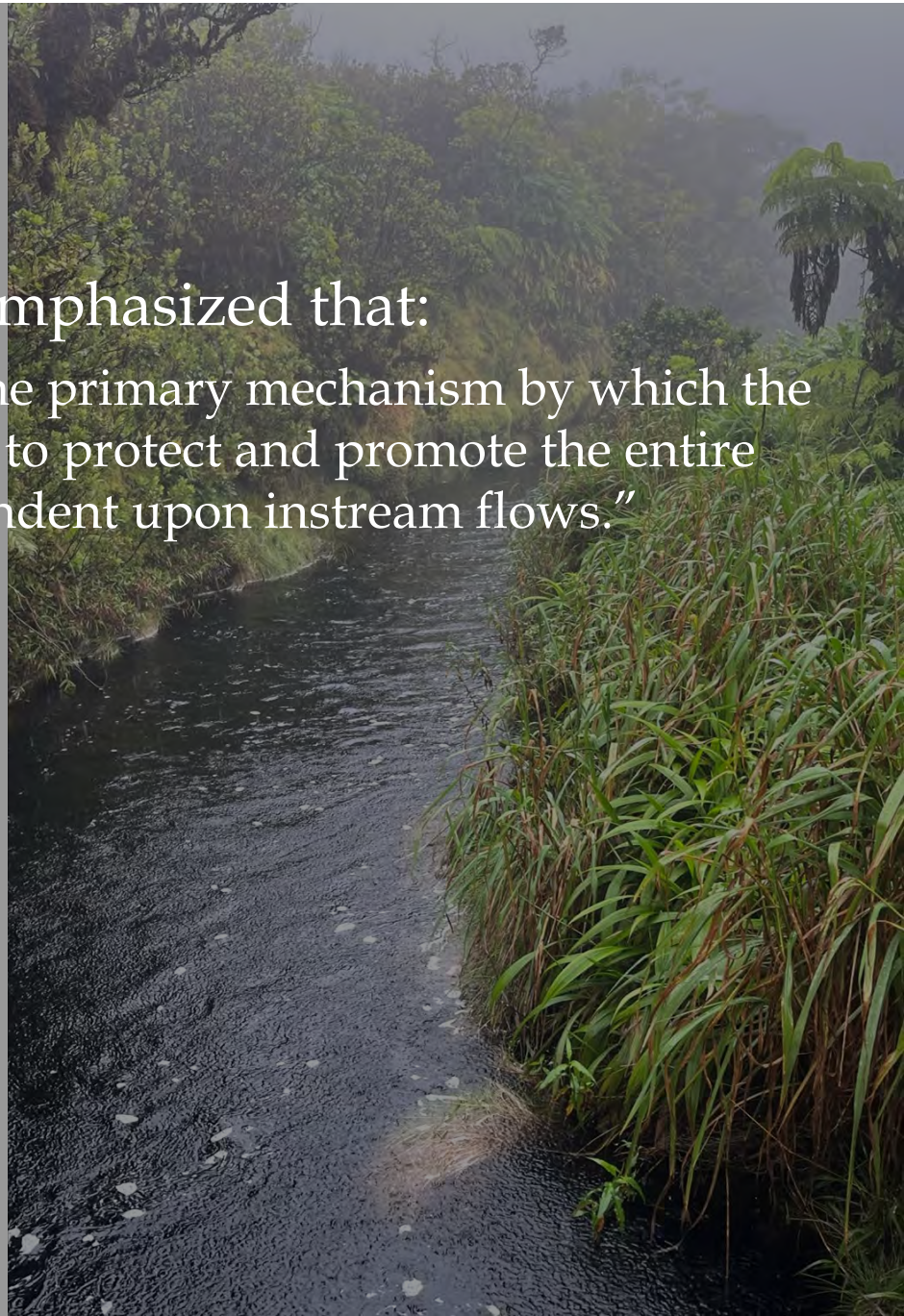
- **2018** Commission initiated interim IFS established for
 - 6 streams in West Maui
 - 21 streams in East Maui
- **2019** Commission initiated interim IFS approved for 1 stream on Hawai'i Island
- **2020** Commission initiated interim IFS approved for 4 streams on Hawai'i Island
- **2021** Commission initiated interim IFS approved for
 - 3 streams in West Maui
 - 2 streams on Kaua'i
 - 1 stream on O'ahu
 - 1 stream on Hawai'i
- **2022** Commission designates Lahaina Aquifer Sector as a combined surface and groundwater management area
- **2022** Commission approved interim IFS for
 - 5 streams on Moloka'i
 - 14 streams in East Maui


Interim IFS in Hawai'i



The Hawai'i Supreme Court emphasized that:

“instream flow standards serve as the primary mechanism by which the Commission is to discharge its duty to protect and promote the entire range of public trust purposes dependent upon instream flows.”





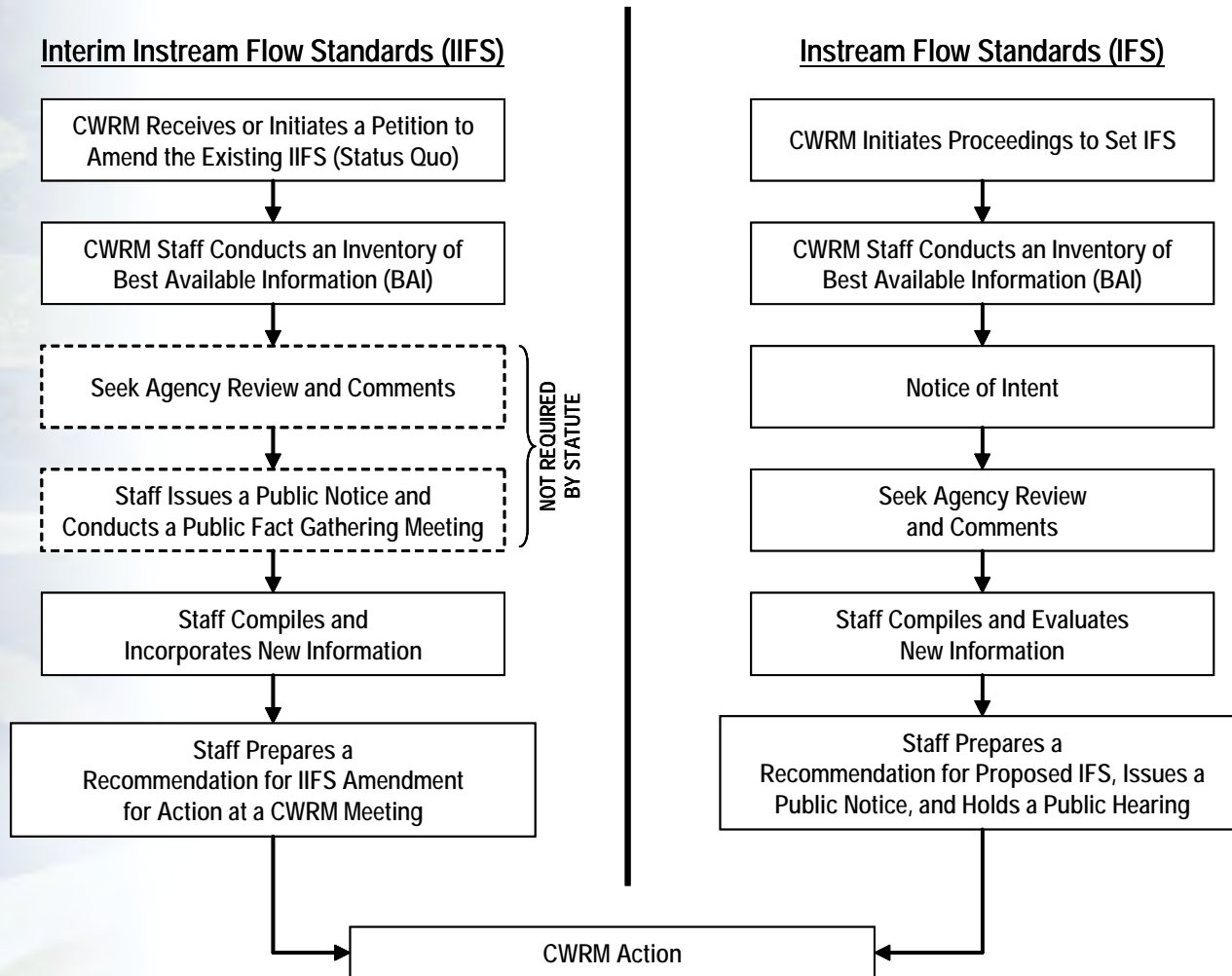
What is an interim instream flow standard?

- expressed for specified time intervals and reaches in terms of the quantity, depth, quality, or other measurable attributes of stream water needed to preserve, enhance, or restore the stream or stream reach's ability to provide for identified instream uses

Instream Flow Standard Process

The commission may initiate proceedings for the establishment of an instream flow standard for any stream or stream reach in the state.

Instream flow standards shall be established on a stream-by-stream basis whenever necessary to protect the public interest in waters of the state. HRS §13-169-30



How does CWRM determine an interim IFS?

- Analyze/Develop/Evaluate the available hydrologic data
- Conduct an assessment of current, historic, and potential instream uses
- Weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for non-instream purposes, including the economic impact of the restriction of such uses



Instream and Non-instream Uses of Surface Water

Hydrology

- Median Flow
- Base Flow
- Pre-Diversion Flow Estimate
- Groundwater Interaction
- Surface-Water Use
- Ground-Water Use
- Other

Fish/Wildlife Habitat

- Stream Channelizations
- Native Vertebrates
- Invertebrates
- Invasive Species
- Recruitment
- Abundance
- Diversity
- Distribution
- Other

Recreation

- Swimming
- Nature Study
- Fishing
- Boating
- Parks
- Other

Ecosystem Maintenance

- Estuaries
- Wetlands
- Nearshore Waters
- Natural Area Reserves
- National Parks
- Other Protected Areas
- Other

Aesthetics

- Scenic Views
- Waterfalls
- Tourism
- Other

Navigation

- Boating
- Other

Hydropower

- Present Use
- Potential Use
- Other

Water Quality

- Water Quality Standards
- 303(d) Impaired Waters
- Total Maximum Daily Loads
- Land Use
- Other

Conveyance of Water

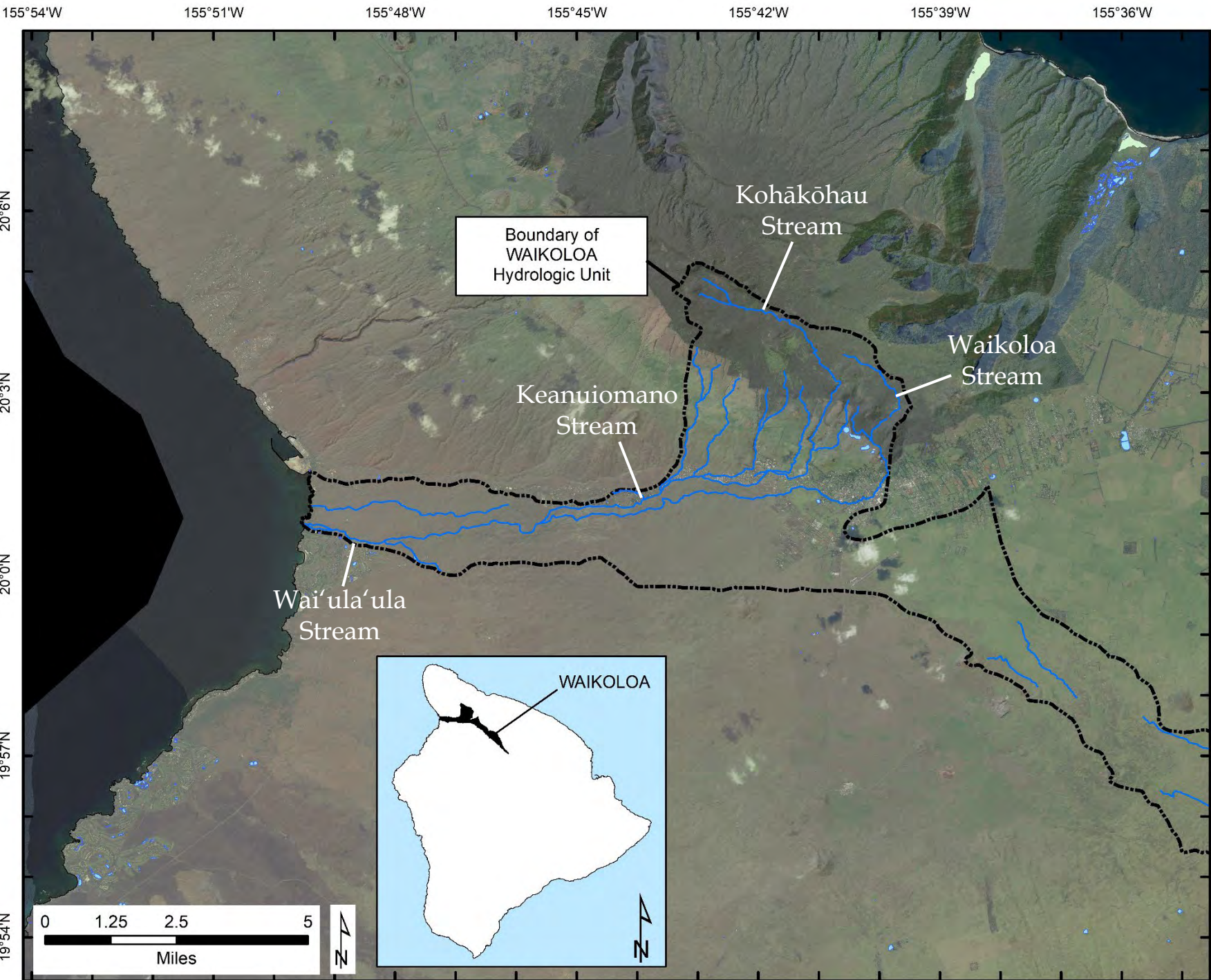
- Multiple Diversions on a Single Stream
- Other

Hawaiian Rights

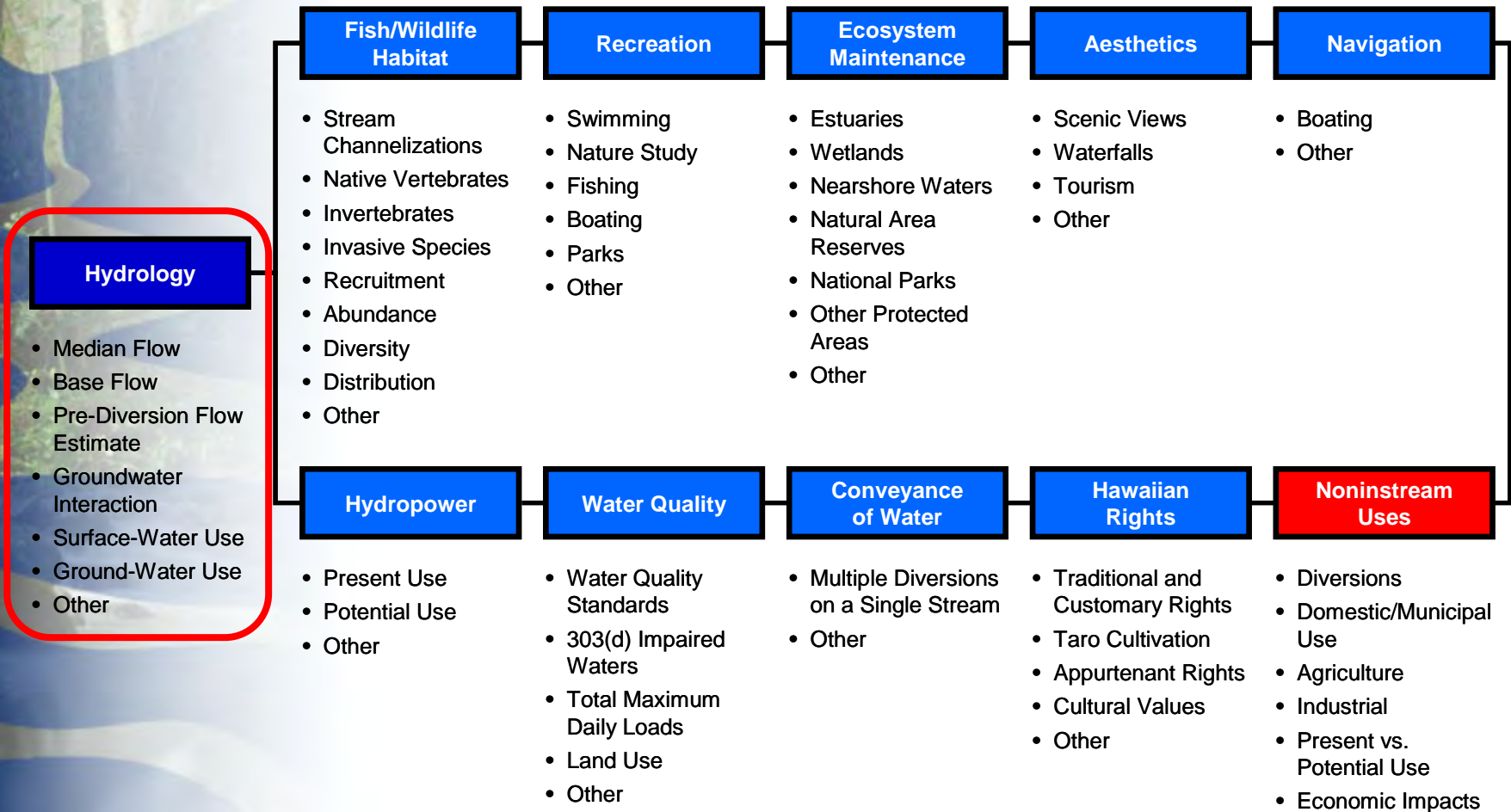
- Traditional and Customary Rights
- Taro Cultivation
- Appurtenant Rights
- Cultural Values
- Other

Noninstream Uses

- Diversions
- Domestic/Municipal Use
- Agriculture
- Industrial
- Present vs. Potential Use
- Economic Impacts



Instream and Non-instream Uses of Surface Water



Hydrologic Data in the Waikoloa Hydrologic Unit

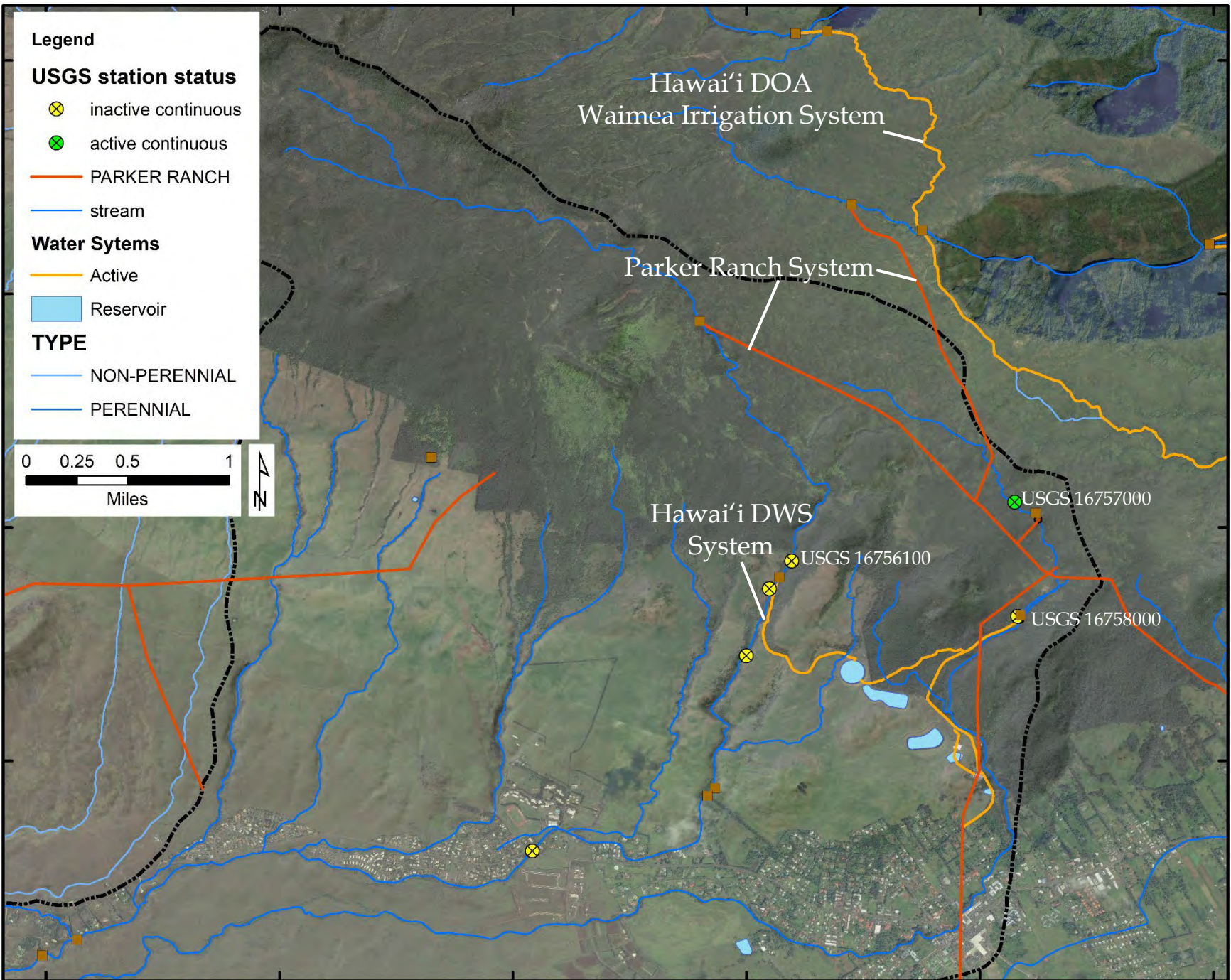


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Help Info

National Water Information System: Mapper





Continuous Record USGS stream gages on Waikoloa Stream

Legend

USGS station status

⊗ inactive continuous

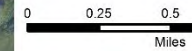
⊗ active continuous

■ diversion

— stream

— Hawaii DWS system

■ Reservoir

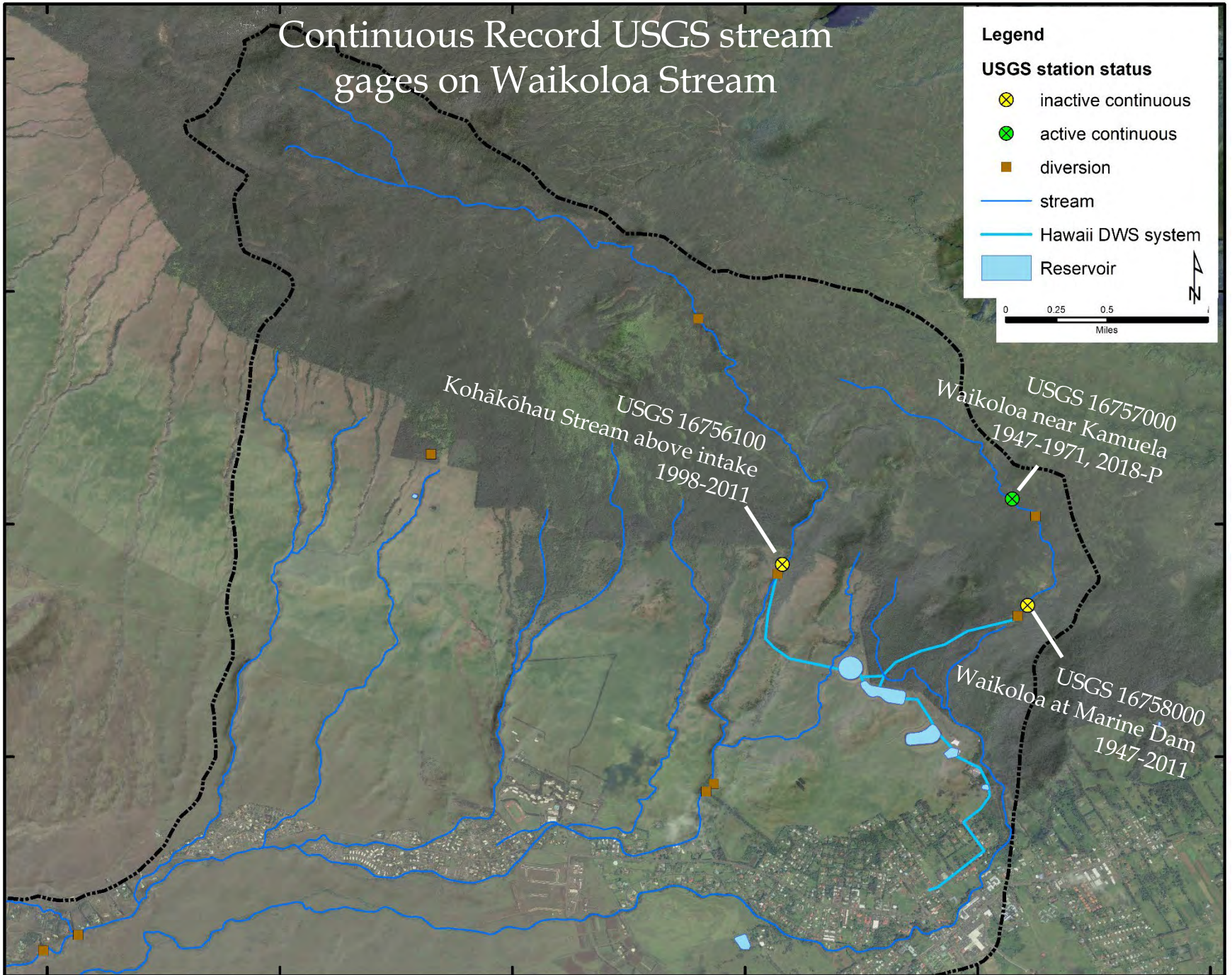


20°3'N

Kohākōhau Stream
USGS 16756100
above intake
1998-2011

Waikoloa near Kamuela
USGS 16757000
1947-1971, 2018-P

Waikoloa at Marine Dam
USGS 16758000
1947-2011



Continuous Record USGS stream gages on Waikoloa Stream

Legend

USGS station status

⊗ inactive continuous

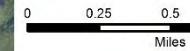
⊗ active continuous

■ diversion

— stream

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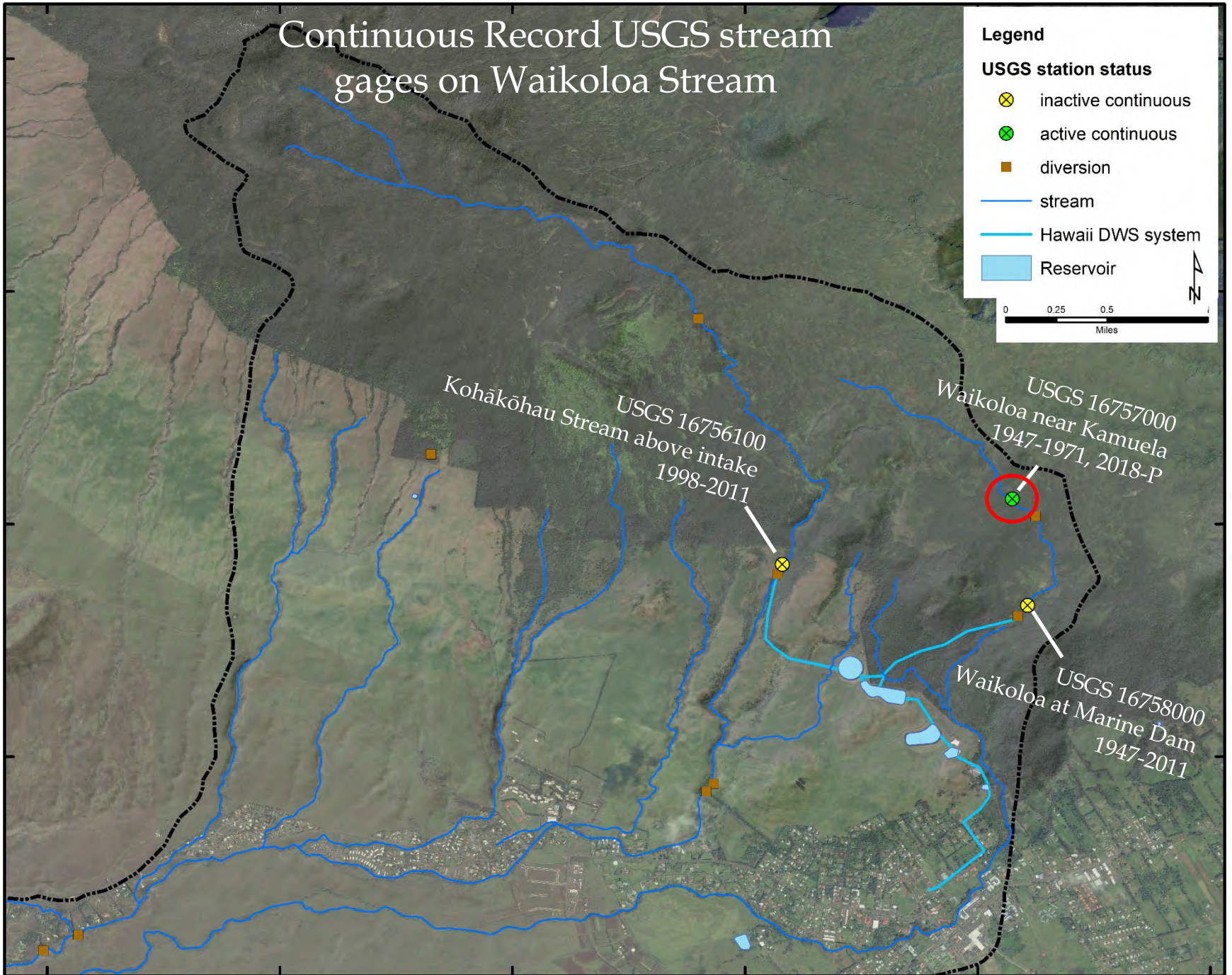
■ Reservoir



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above intake
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Waikoloa near Kamuela
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1947-1971, 2018-P

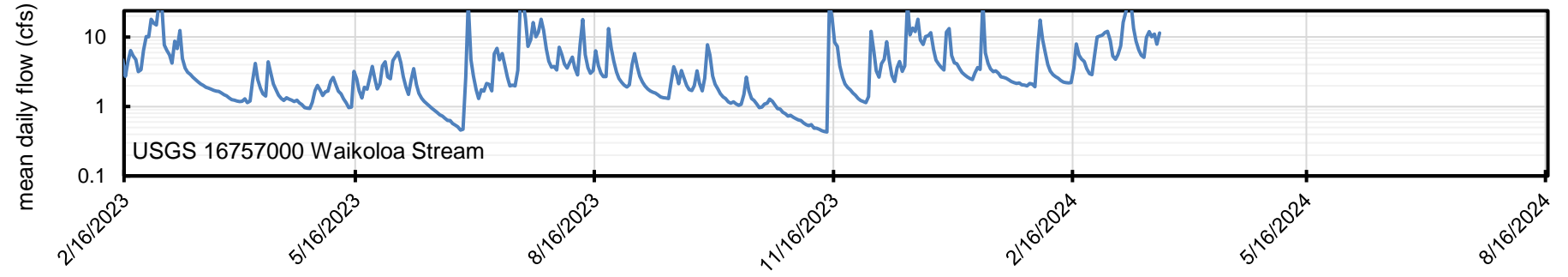
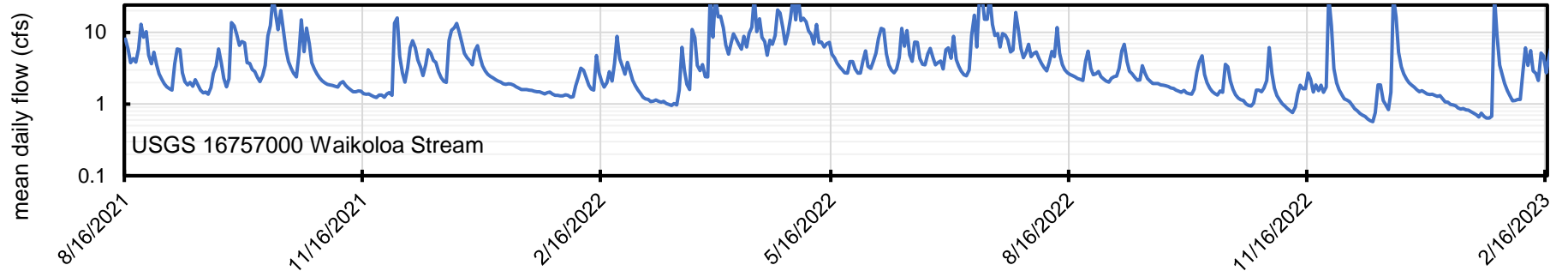
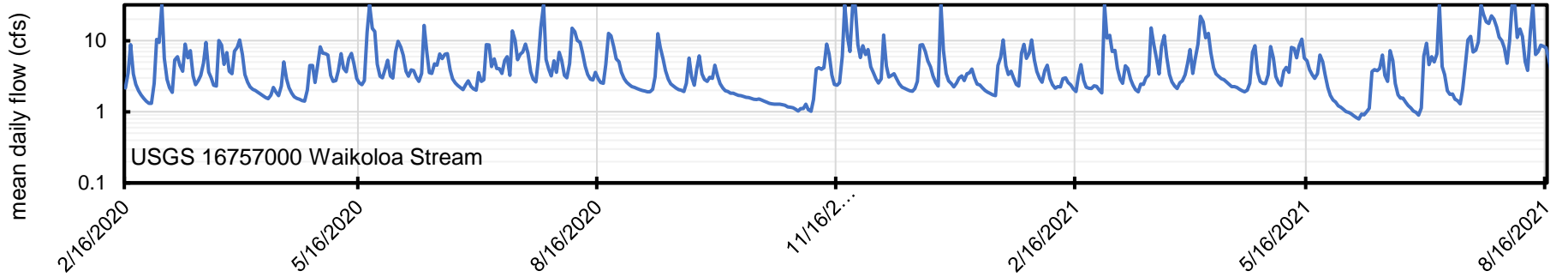
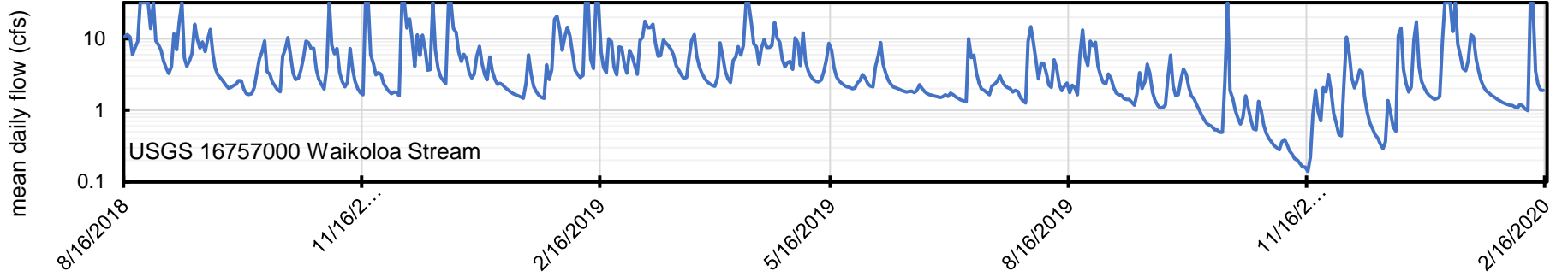
Waikoloa at Marine Dam
USGS 16758000
1947-2011



USGS station 16757000 Waikoloa Stream near Kamuela
(above Parker Ranch Intake)
active from 1957-71 and 2018-present

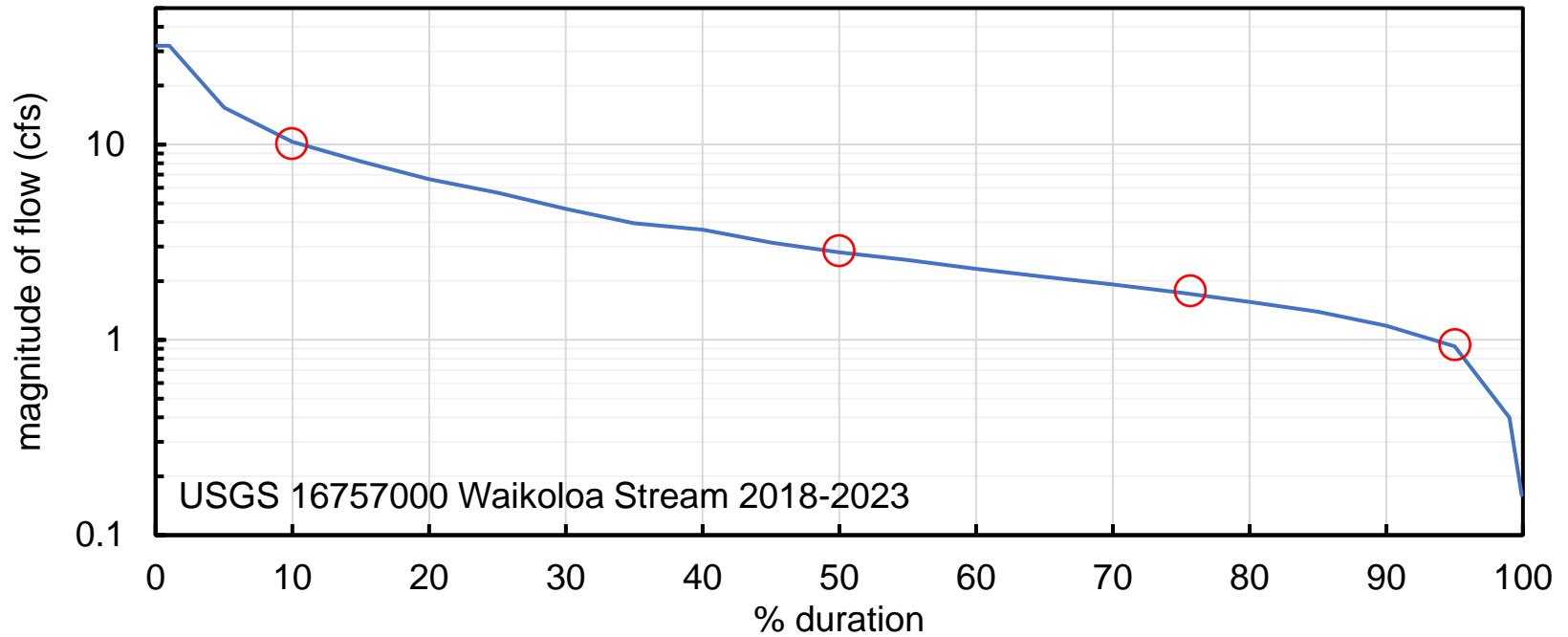


Hydrologic Data for Waikoloa Stream at USGS 16757000



Flow Duration Curve for USGS 16757000 (2018-2023)

→ above Parker Ranch diversion



Flow Duration	Magnitude (cfs)	Magnitude (mgd)
mean daily flow	5.09	3.29
Q ₁₀ (high flow)	10.3	6.66
Q ₅₀ (median flow)	2.81	1.81
Q ₇₅ (base flow)	1.77	1.12
Q ₉₅ (low flow)	0.92	0.60

Continuous Record USGS stream gages on Waikoloa Stream

Legend

USGS station status

⊗ inactive continuous

⊗ active continuous

■ diversion

— stream

— Hawaii DWS system

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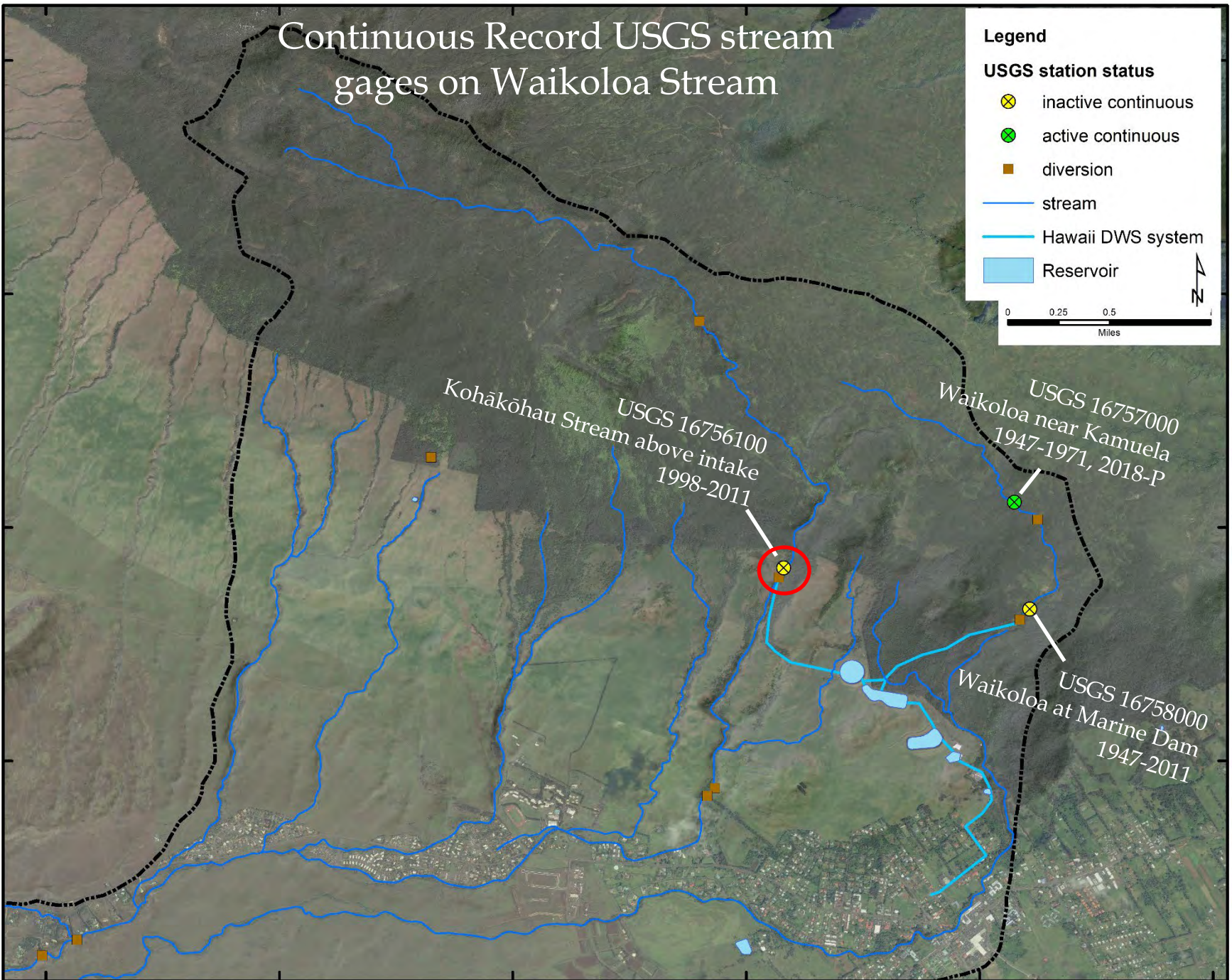


20°3'N

Kohākōhau Stream
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above intake
1998-2011

Waikoloa near Kamuela
USGS 16757000
1947-1971, 2018-P

Waikoloa at Marine Dam
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1947-2011

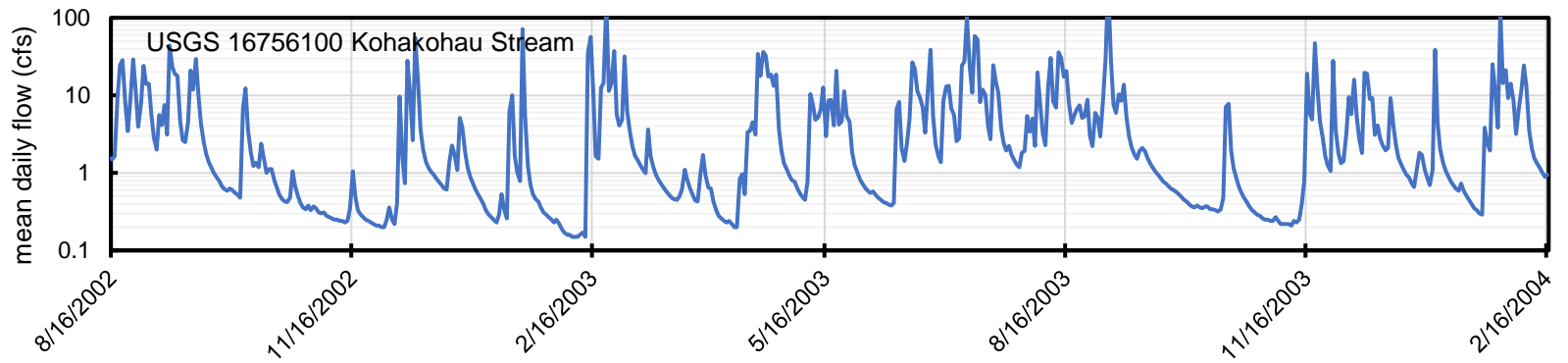
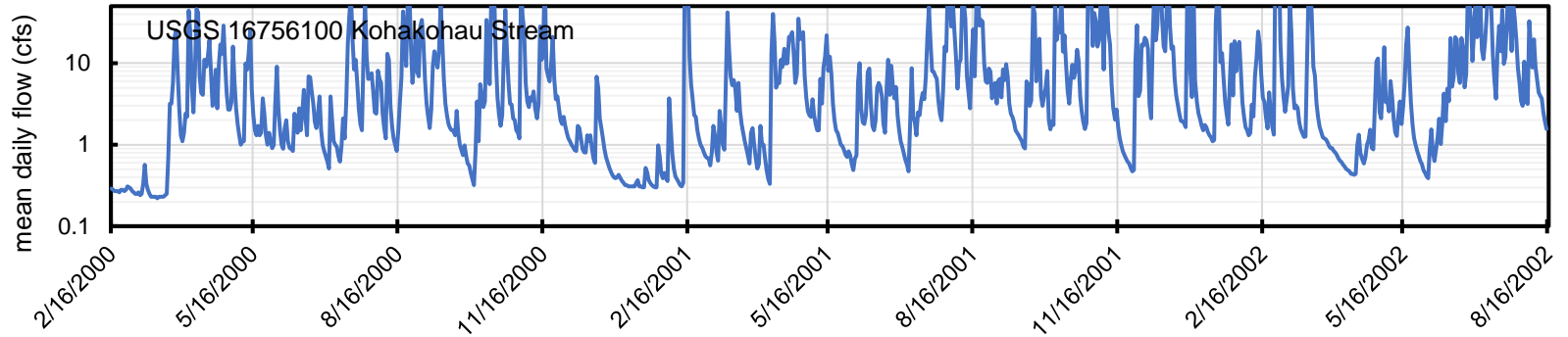
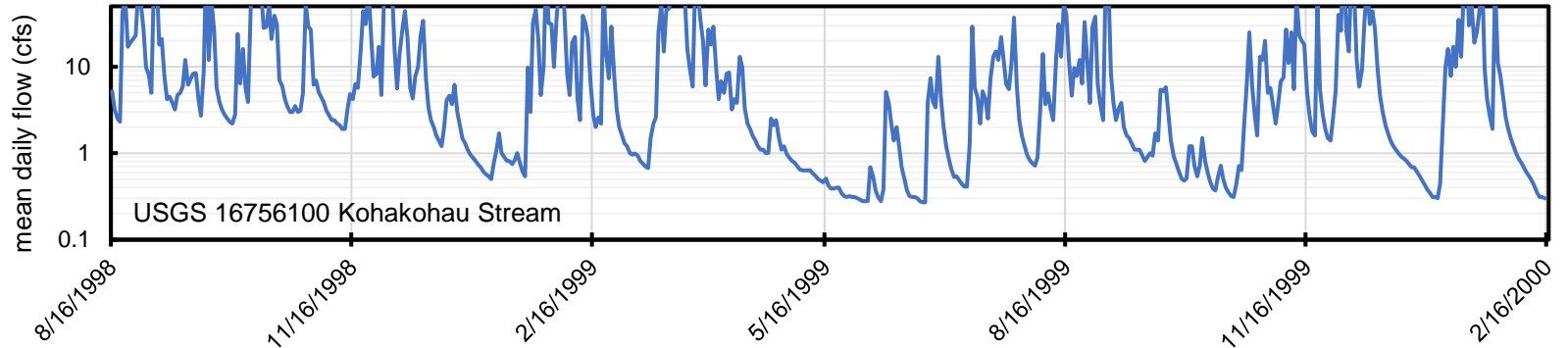


USGS station 16756100 Kohākōhau Stream

active from 1998-2011

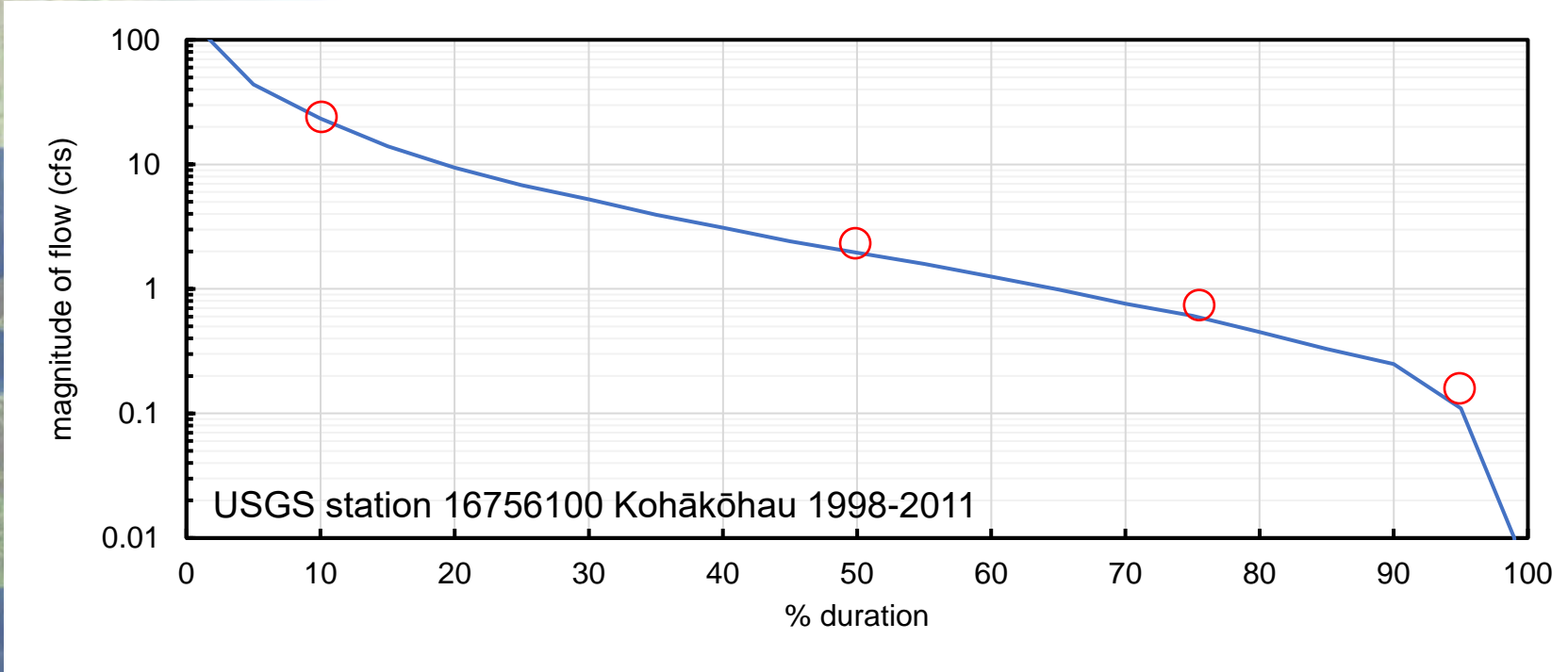


Hydrologic Data for Kohākōhau Stream



Kohākōhau Stream Flow Duration Curve

Parker Ranch diverts an unknown amount of water + seepage gains



(regulated flow)	Magnitude (cfs)	Magnitude (mgd)
Mean daily flow	9.58	6.19
Q ₁₀ (high flow)	23.3	15.1
Q ₅₀ (median flow)	2.0	1.26
Q ₇₅ (base flow)	0.61	0.39
Q ₉₅ (low flow)	0.11	0.07

Continuous Record USGS stream gages on Waikoloa Stream

Legend

USGS station status

⊗ inactive continuous

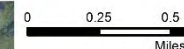
⊗ active continuous

■ diversion

— stream

— Hawaii DWS system

■ Reservoir

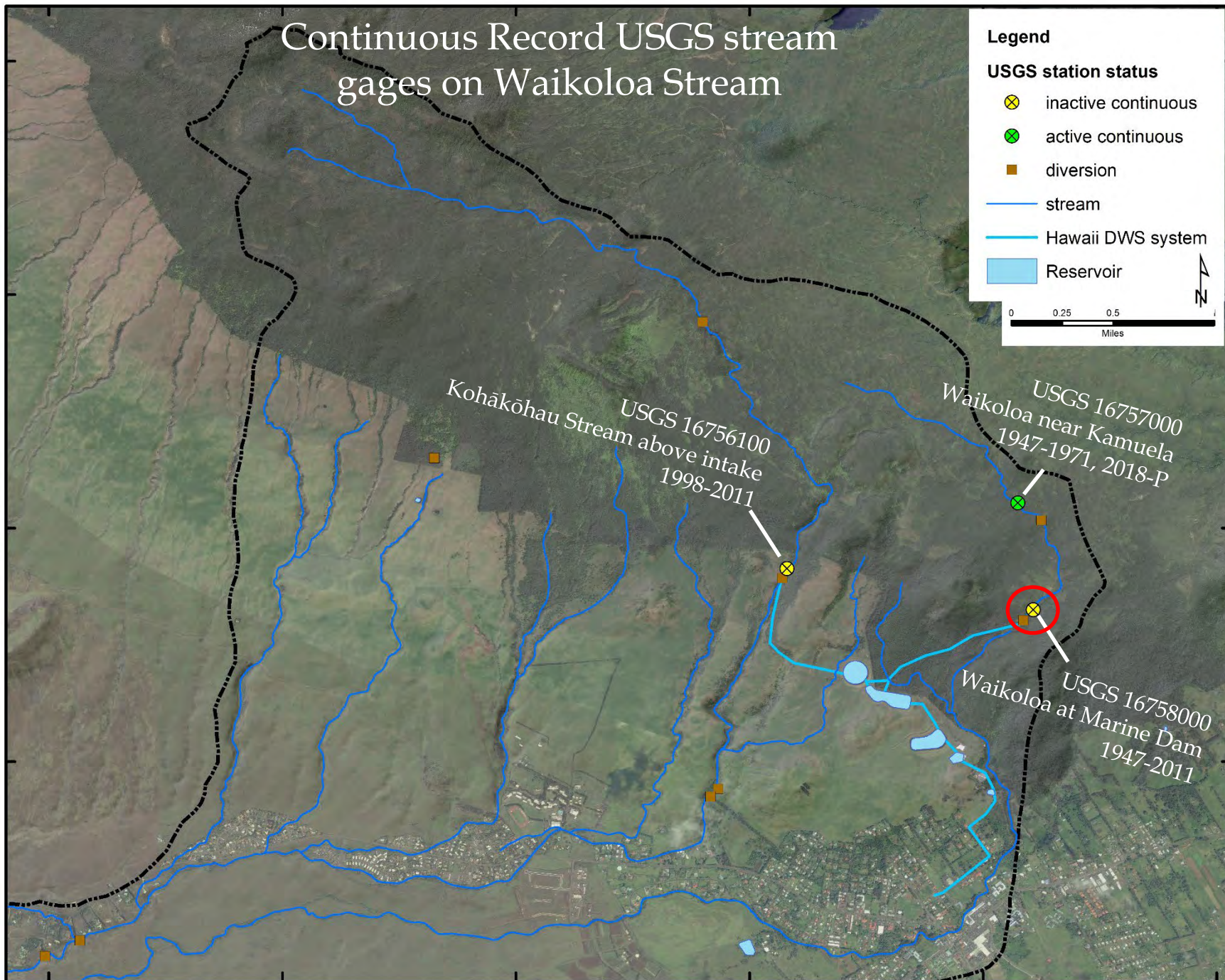


20°3'N

Kohākōhau Stream
USGS 16756100
above intake
1998-2011

Waikoloa near Kamuela
USGS 16757000
1947-1971, 2018-P

Waikoloa at Marine Dam
USGS 16758000
1947-2011

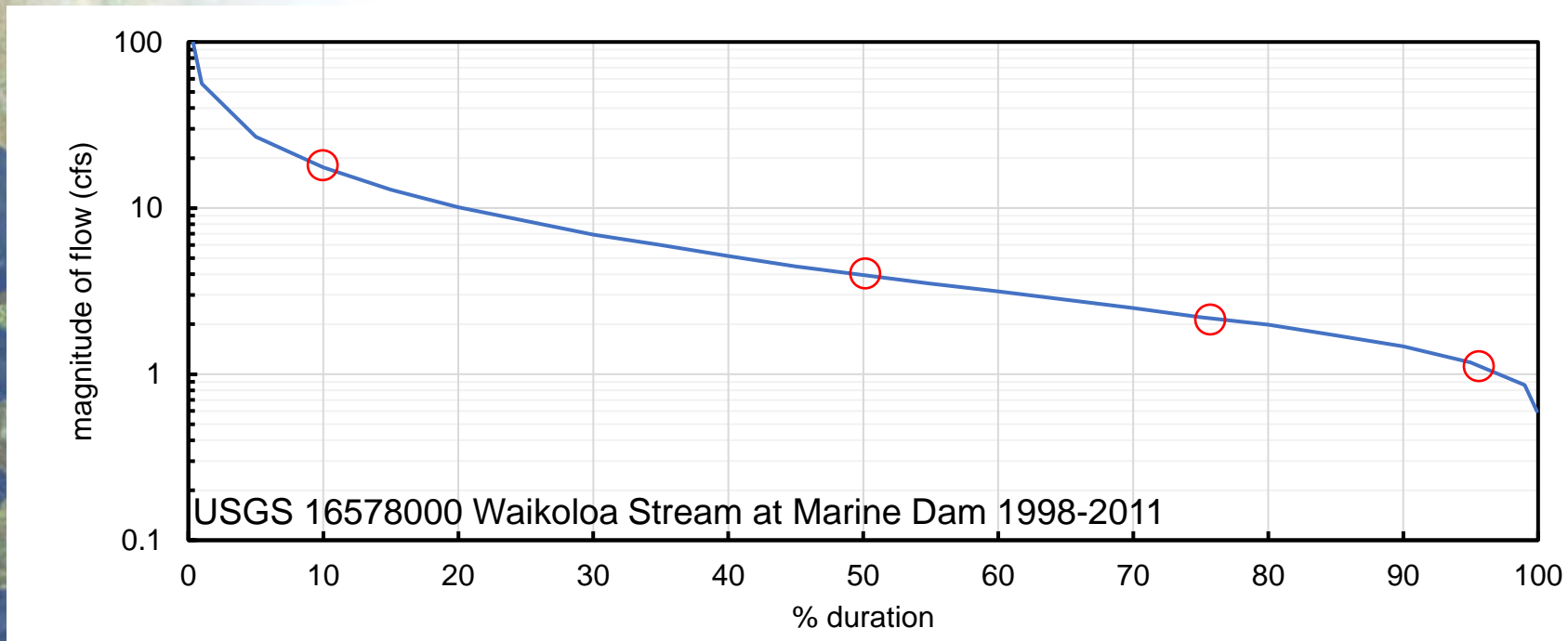


USGS station 16758000 Waikoloa Stream at Marine Dam



Waikoloa Stream at Marine Dam Flow Duration Curve

Parker Ranch diverts an unknown (approximately 0.45 mgd) amount of water + seepage gains



1998-2011 (regulated flow)	Magnitude (cfs)	Magnitude (mgd)
Mean daily flow	7.84	5.07
Q ₁₀ (high flow)	17.6	11.37
Q ₅₀ (median flow)	3.96	2.56
Q ₇₅ (base flow)	2.20	1.42
Q ₉₅ (low flow)	1.18	0.76

155°48'W

155°45'W

155°42'W

2021 Seepage Run Results

Legend

- Seepagerun measurements (cfs)
- other reaches

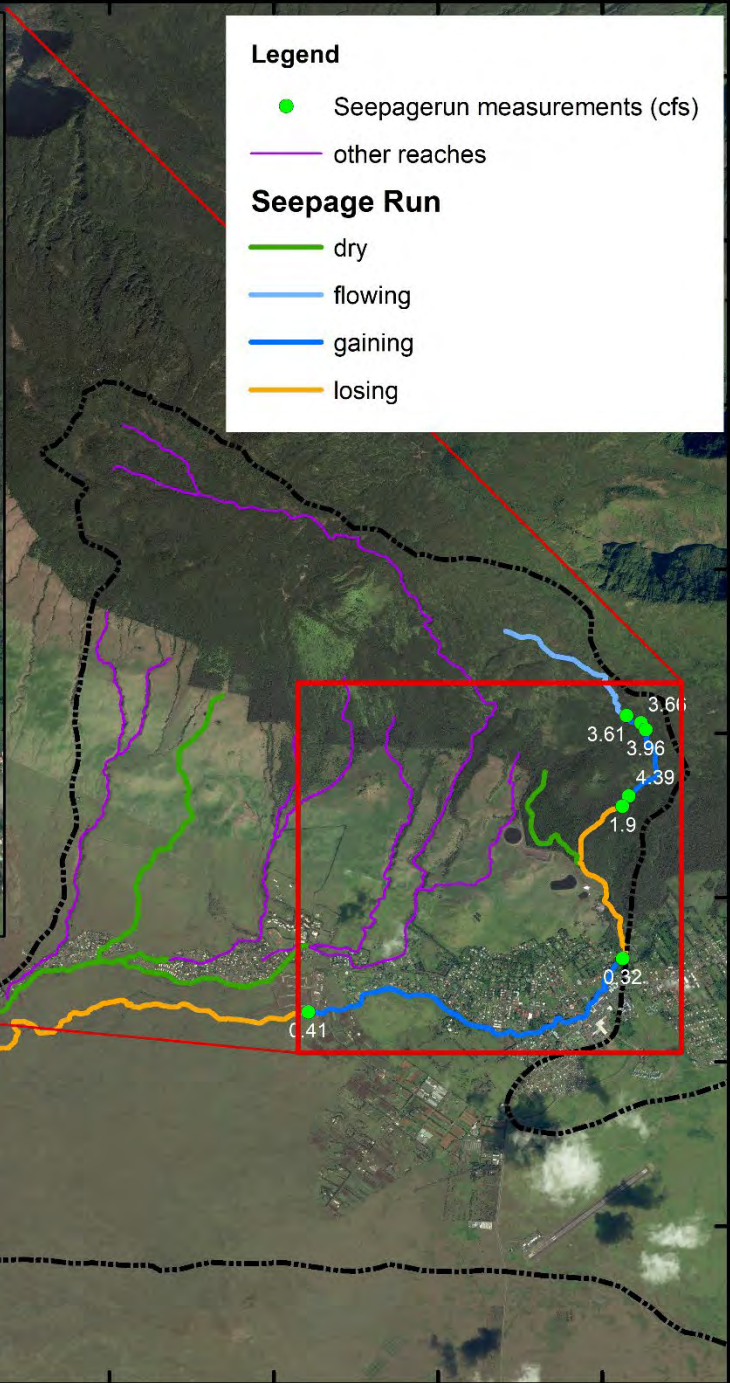
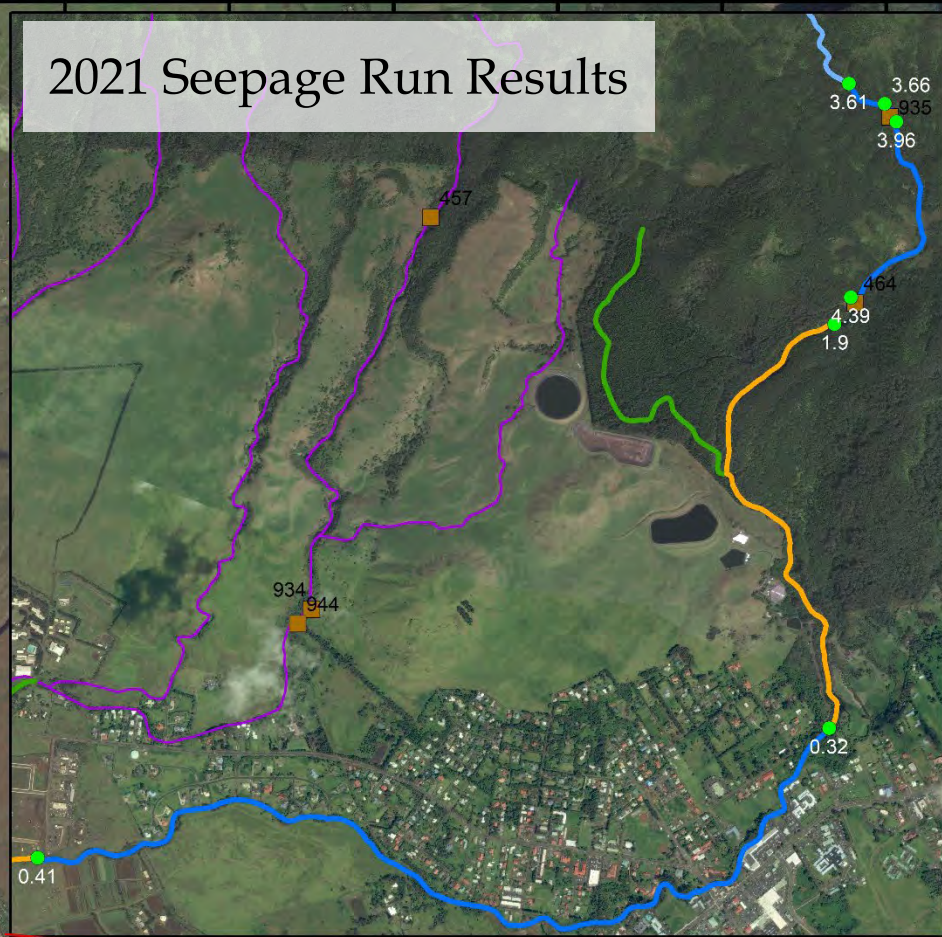
Seepage Run

- dry
- flowing
- gaining
- losing

20°6'N

20°3'N

20°0'N



Instream and Non-instream Uses of Surface Water

Hydrology

- Median Flow
- Base Flow
- Pre-Diversion Flow Estimate
- Groundwater Interaction
- Surface-Water Use
- Ground-Water Use
- Other

Fish/Wildlife Habitat

- Stream Channelizations
- Native Vertebrates
- Invertebrates
- Invasive Species
- Recruitment
- Abundance
- Diversity
- Distribution
- Other

Recreation

- Swimming
- Nature Study
- Fishing
- Boating
- Parks
- Other

Ecosystem Maintenance

- Estuaries
- Wetlands
- Nearshore Waters
- Natural Area Reserves
- National Parks
- Other Protected Areas
- Other

Aesthetics

- Scenic Views
- Waterfalls
- Tourism
- Other

Navigation

- Boating
- Other

Hydropower

- Present Use
- Potential Use
- Other

Water Quality

- Water Quality Standards
- 303(d) Impaired Waters
- Total Maximum Daily Loads
- Land Use
- Other

Conveyance of Water

- Multiple Diversions on a Single Stream
- Other

Hawaiian Rights

- Traditional and Customary Rights
- Taro Cultivation
- Appurtenant Rights
- Cultural Values
- Other

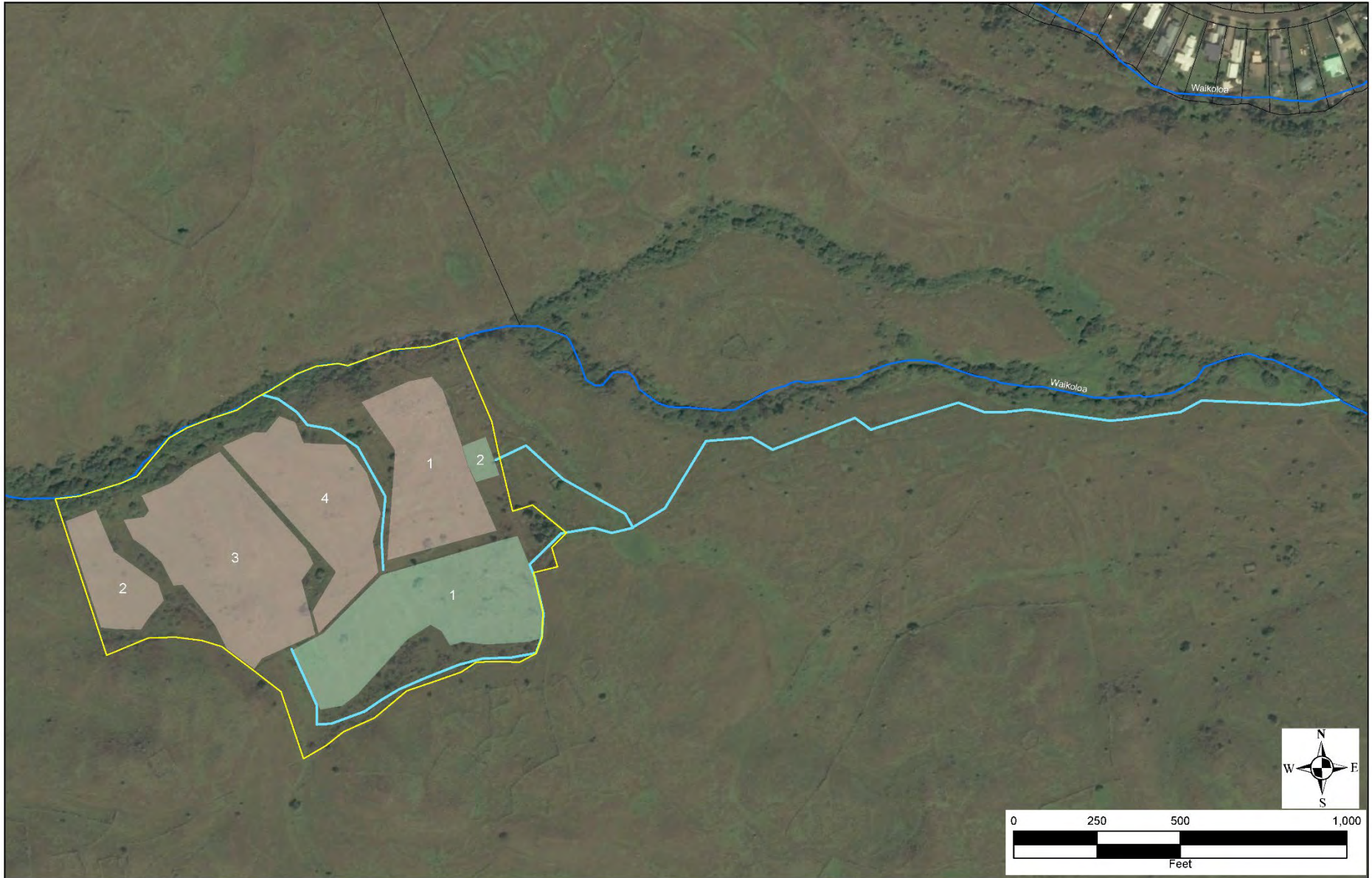
Noninstream Uses

- Diversions
- Domestic/Municipal Use
- Agriculture
- Industrial
- Present vs. Potential Use
- Economic Impacts



Traditional and
Customary Practices

regeneration of 'auwai system



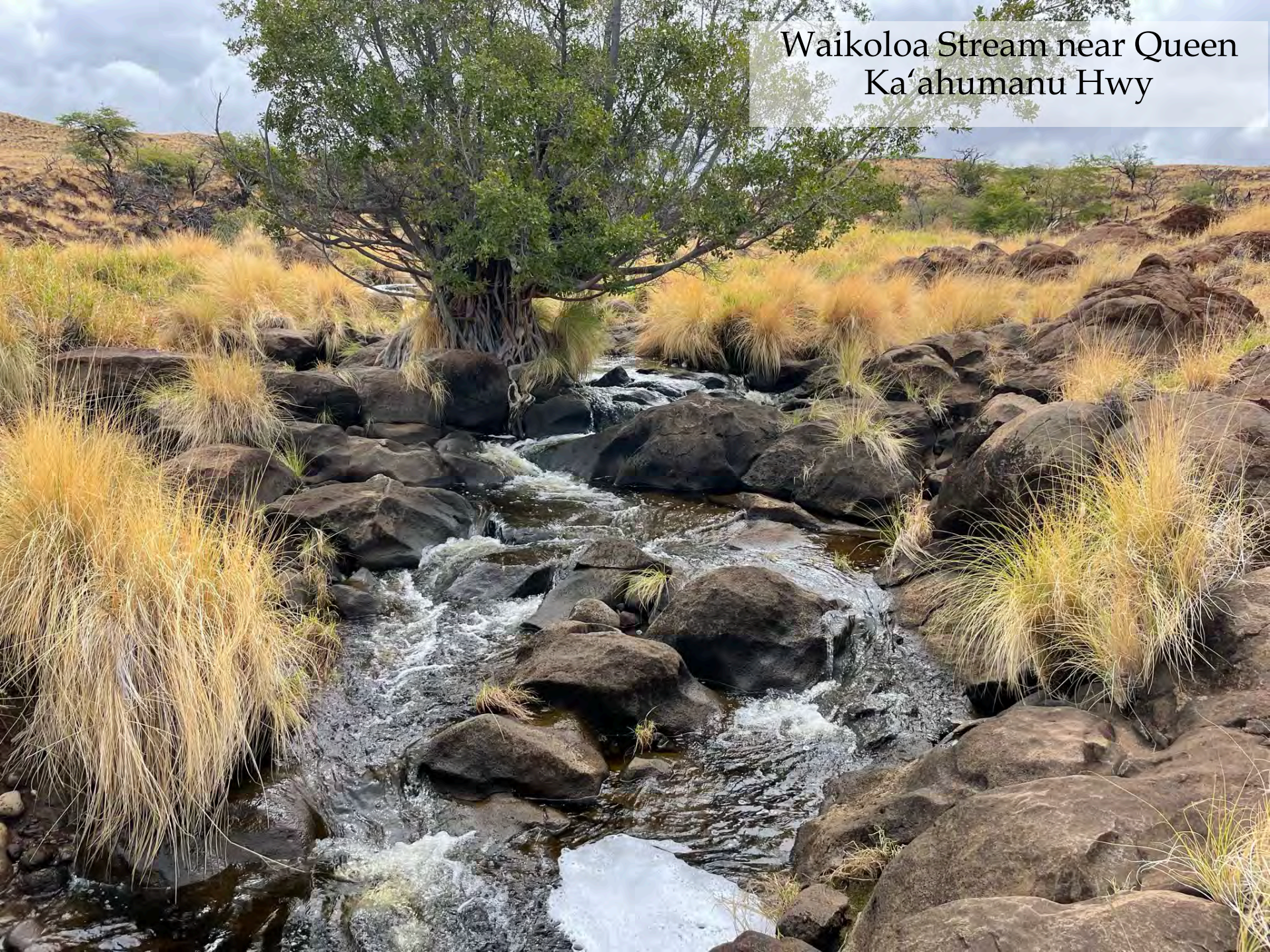


'auwai below Lalamilo
Farm Lots

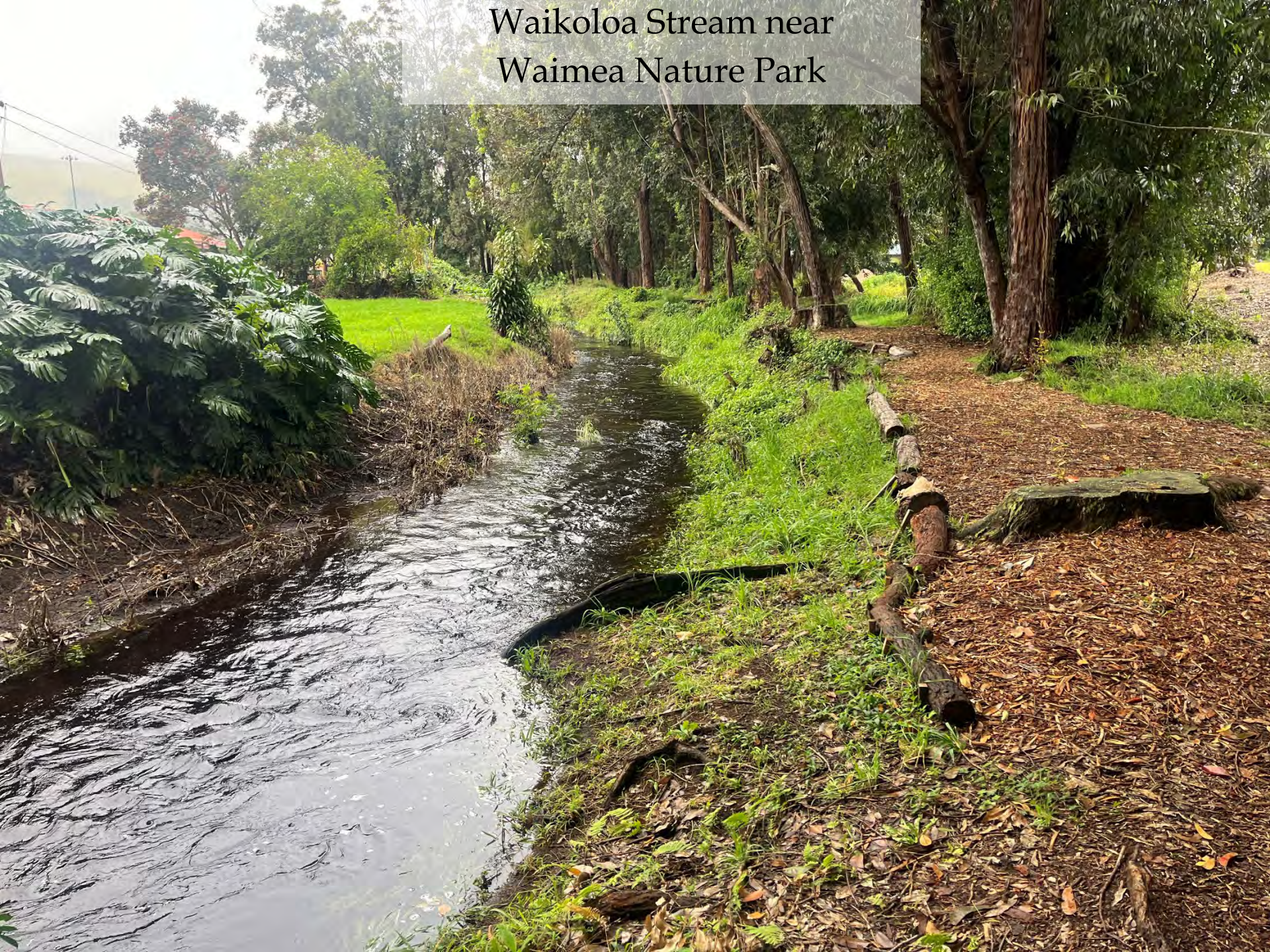
Recreational and
Aesthetic Values




Waikoloa Stream near Queen
Ka'ahumanu Hwy



Waikoloa Stream near
Waimea Nature Park





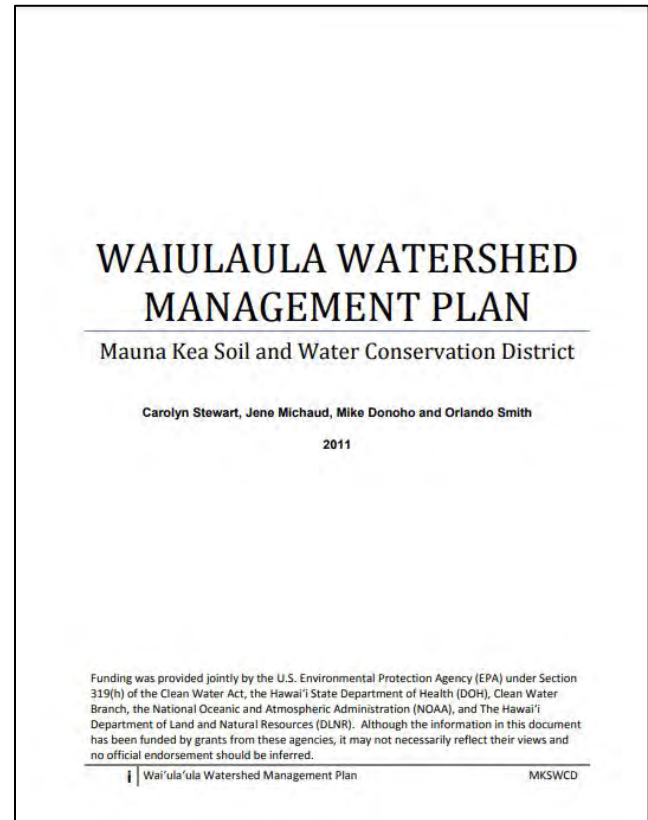
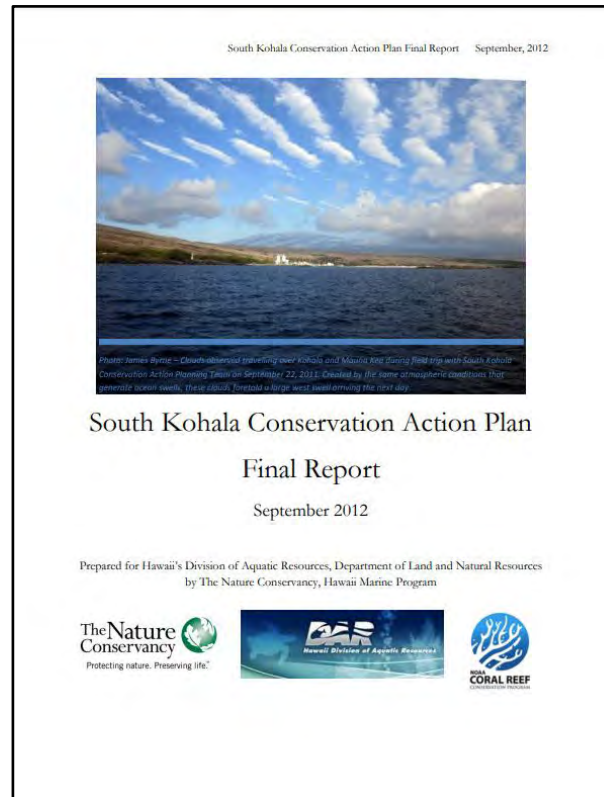
Water Quality

- Temperature
- Turbidity/sediment
- Nitrogen/Phosphorus

Water Quality

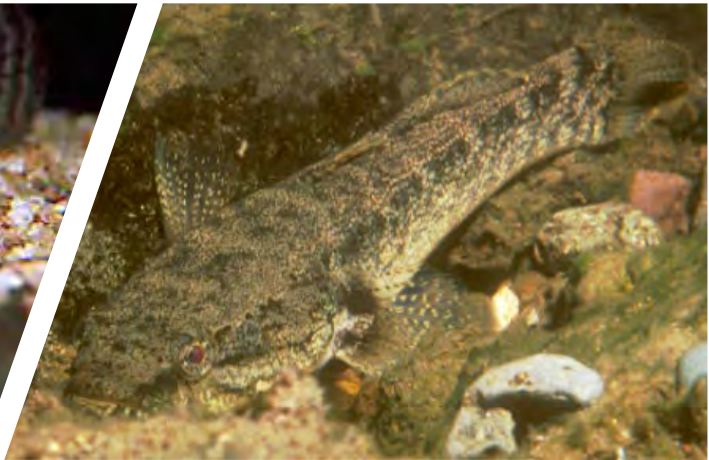
watershed of identified as important for restoration to reduce sediment and nutrient pollution to Pelekane Bay by:

- Hawai'i DOH
- EPA
- NOAA Coral Reef Conservation
- The Nature Conservancy
- Hawai'i DAR





Habitat for Freshwater Biota



Presence of native aquatic species

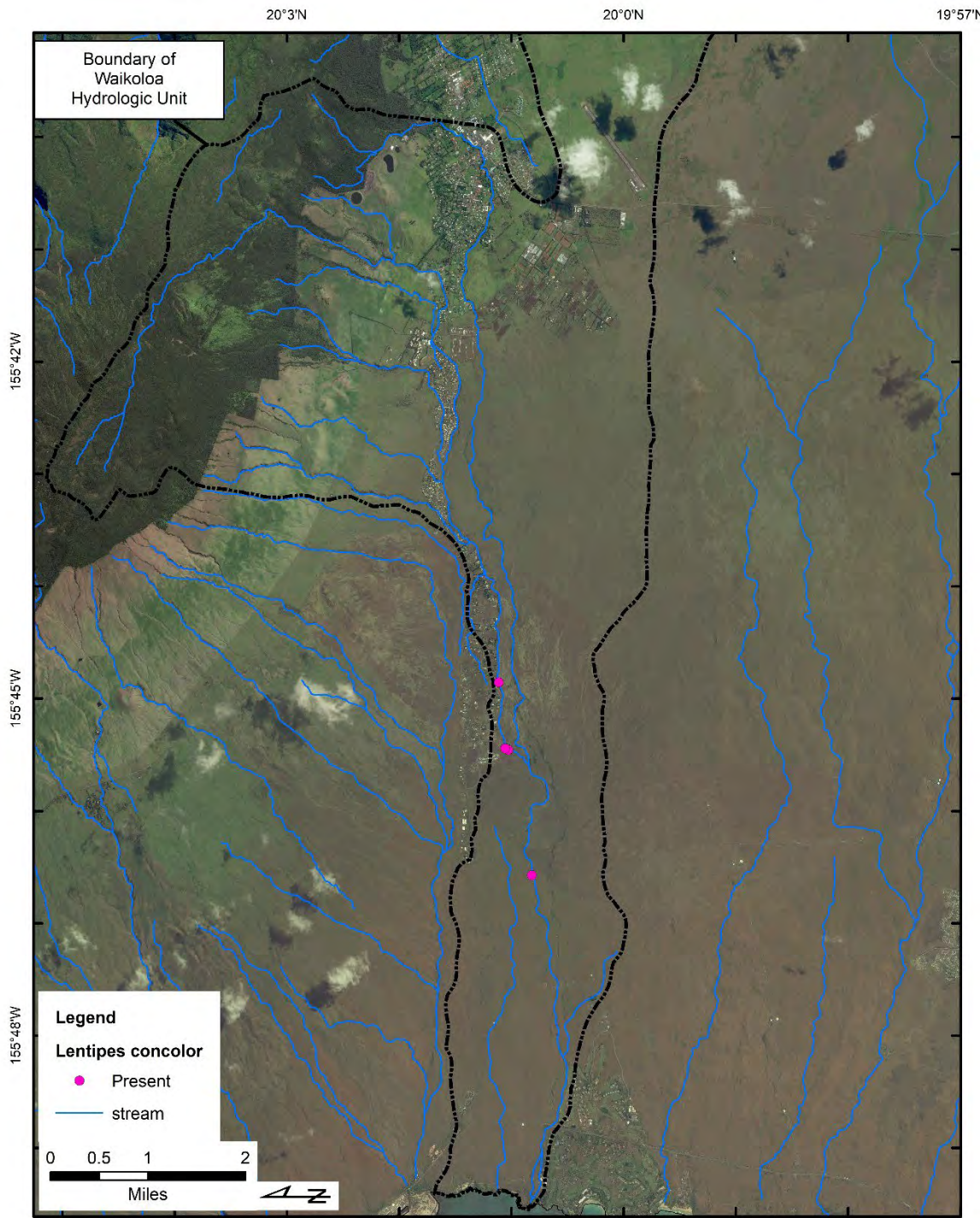
species	Estuary	Lower	Middle	Upper	Headwaters
<i>Atyoida bisulcata</i>			P	P	
<i>Lentipes concolor</i>				P	
<i>Awaous stamineus</i>		P	P	P	
<i>Eleotris sandwicensis</i>					
<i>Sicyopterus stimpsoni</i>		P	P	P	
<i>Stenogobius hawaiiensis</i>					
<i>Macrobrachium grandimanus</i>		P			

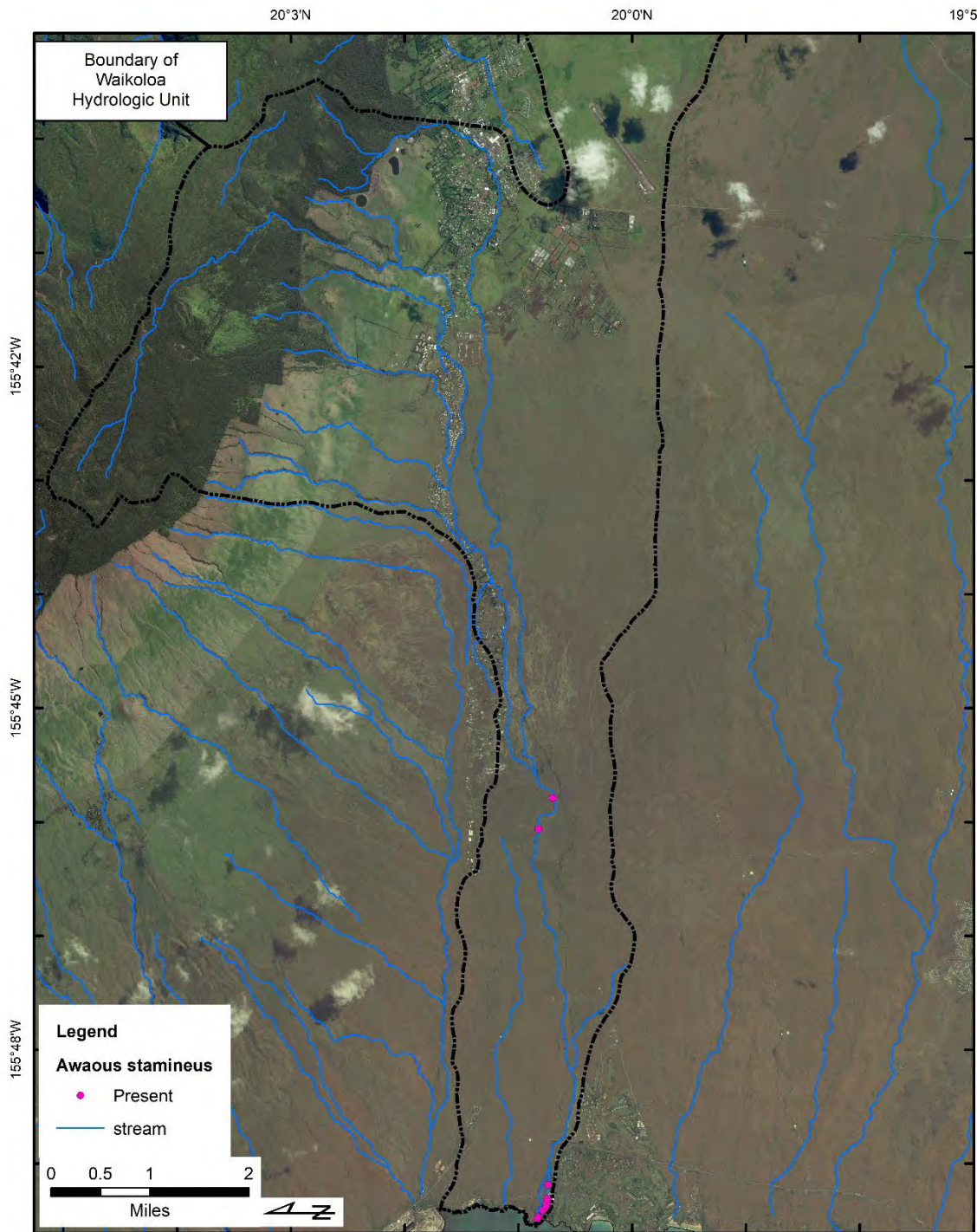
“Favorable habitats such as scoured bedrock channels with moderately sized cobble, large waterfalls and cascades, with clear water”

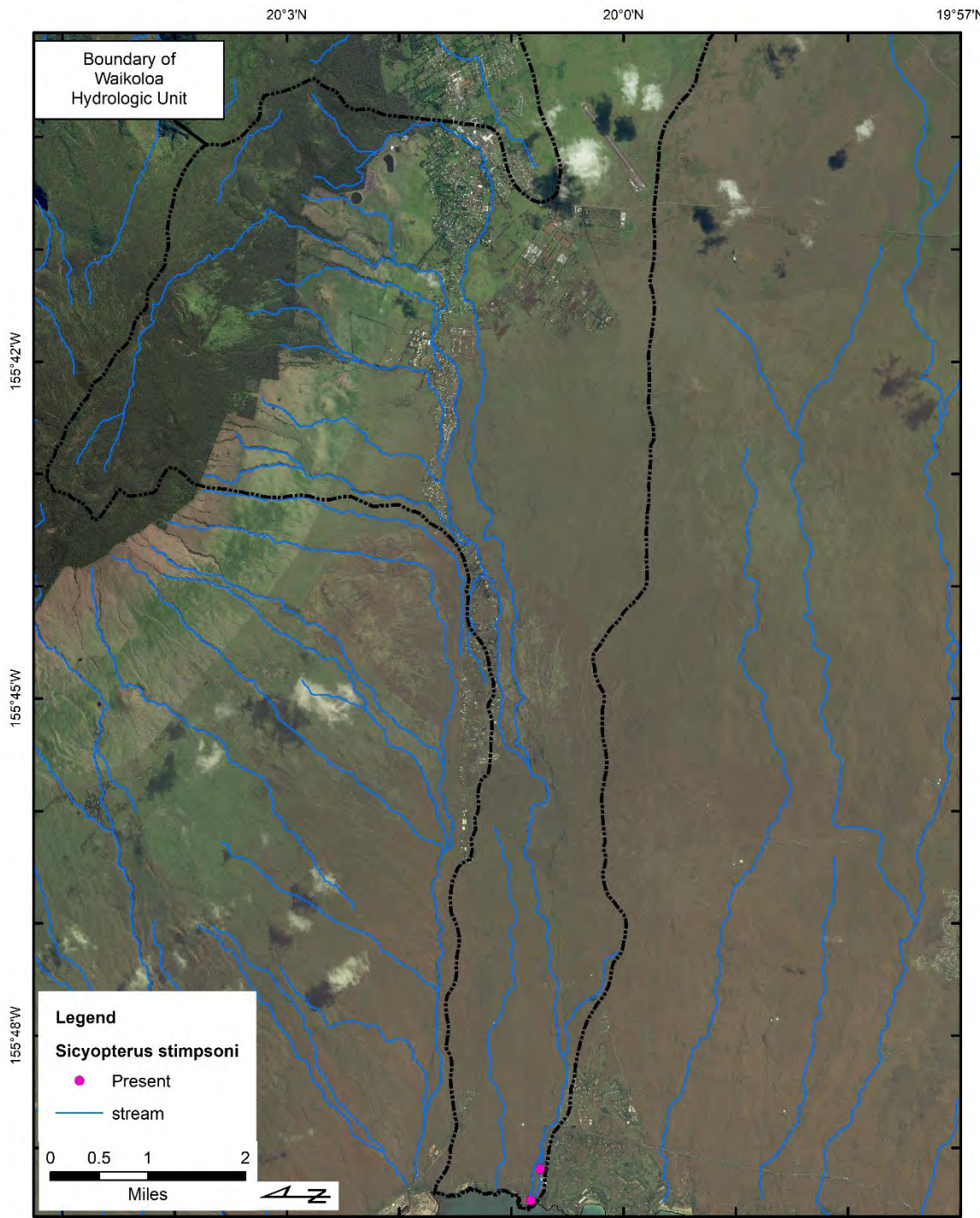
-Waiaulaula Watershed Management Plan
Mauna Kea Soil and Water Conservation District

“Permanent groundwater-fed pools are important stepping stones for native aquatic fish species as they travel upstream to access the upper reaches of the watershed”

Englund (2010)







Instream and Non-instream Uses of Surface Water

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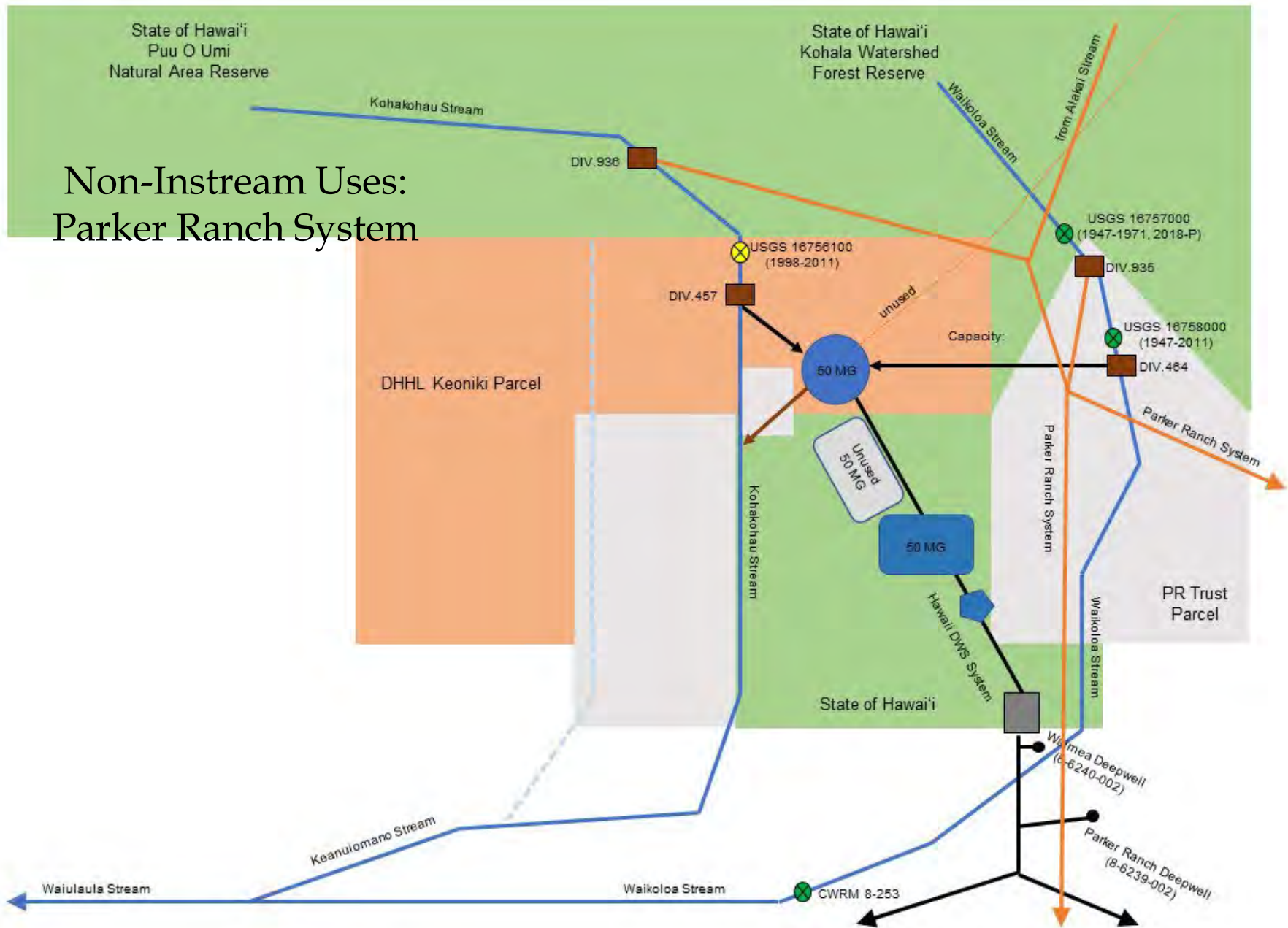
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- Industrial
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- Economic Impacts

Non-Instream Uses: Parker Ranch System



NOTE: NOT TO SCALE



Waikoloa Stream
Diversion

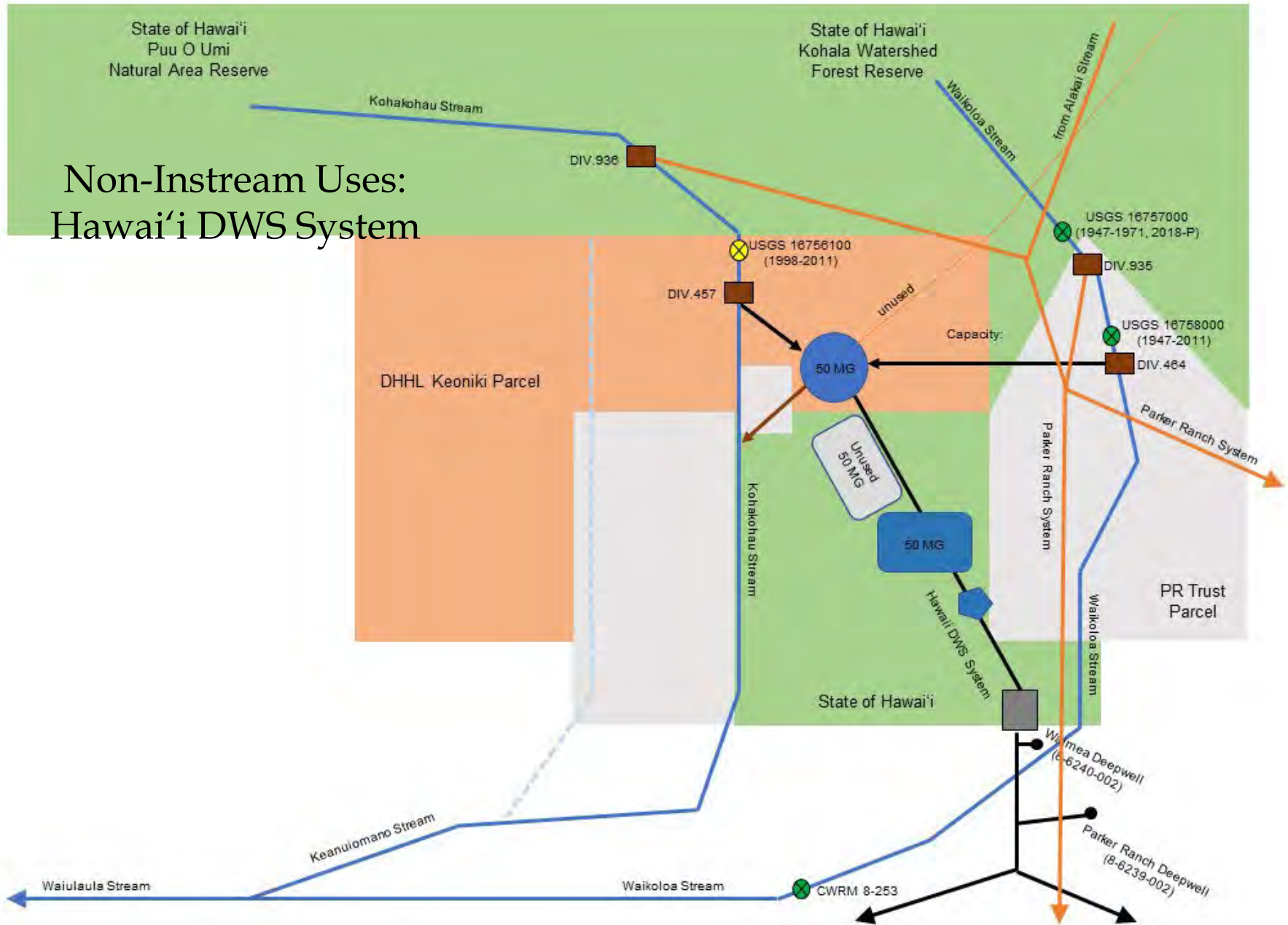
Parker Ranch
System



Kohākohau Stream
Diversion



Non-Instream Uses: Hawai'i DWS System



NOTE: NOT TO SCALE

Hawai'i DWS Diversion on Waikoloa Stream at Marine Dam (Parker Ranch Trust-owned land)



Hawai'i DWS Diversion on Waikoloa Stream at Marine Dam (Parker Ranch Trust-owned land)



Hawai'i DWS Diversion on Kohākōhau Stream (State of Hawai'i DHHL-owned land)



Hawai'i DWS Diversion on Kohākōhau Stream (State of Hawai'i DHHL-owned land)



Hawai'i DWS Diversion on Kohākōhau Stream (State of Hawai'i DHHL-owned land)



Hawai'i DWS Waikoloa Reservoir No. 2 (50 MG)



Hawai'i DWS Waikoloa Reservoir No. 1 (50 MG)



Hawai'i DWS Waikoloa Reservoir No. 3 (50 MG)



Hawai'i DWS Waikoloa Reservoir No. 4 (20 MG)

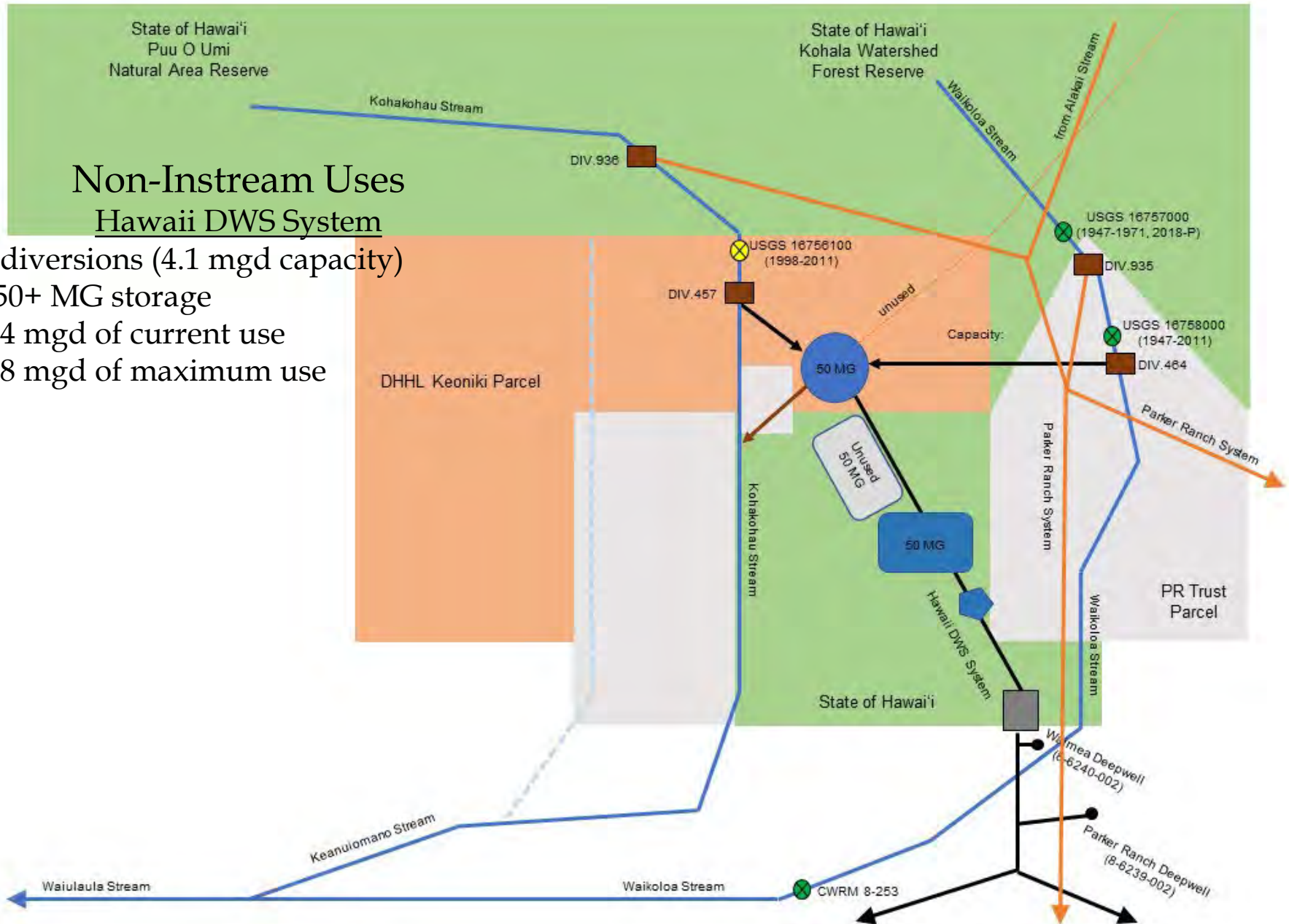


State of Hawai'i
Puu O Umi
Natural Area Reserve

State of Hawai'i
Kohala Watershed
Forest Reserve

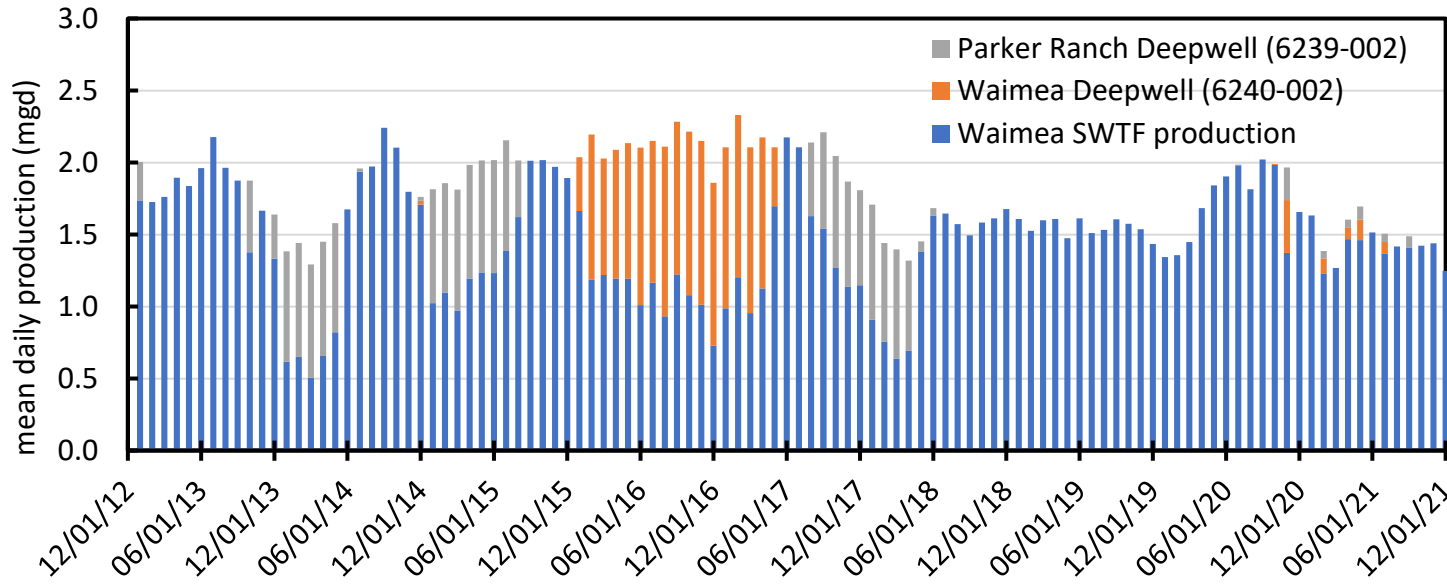
Non-Instream Uses Hawaii DWS System

- 2 diversions (4.1 mgd capacity)
- 150+ MG storage
- 1.4 mgd of current use
- 1.8 mgd of maximum use



NOTE: NOT TO SCALE

Hawai'i DWS South Kohala System Sources



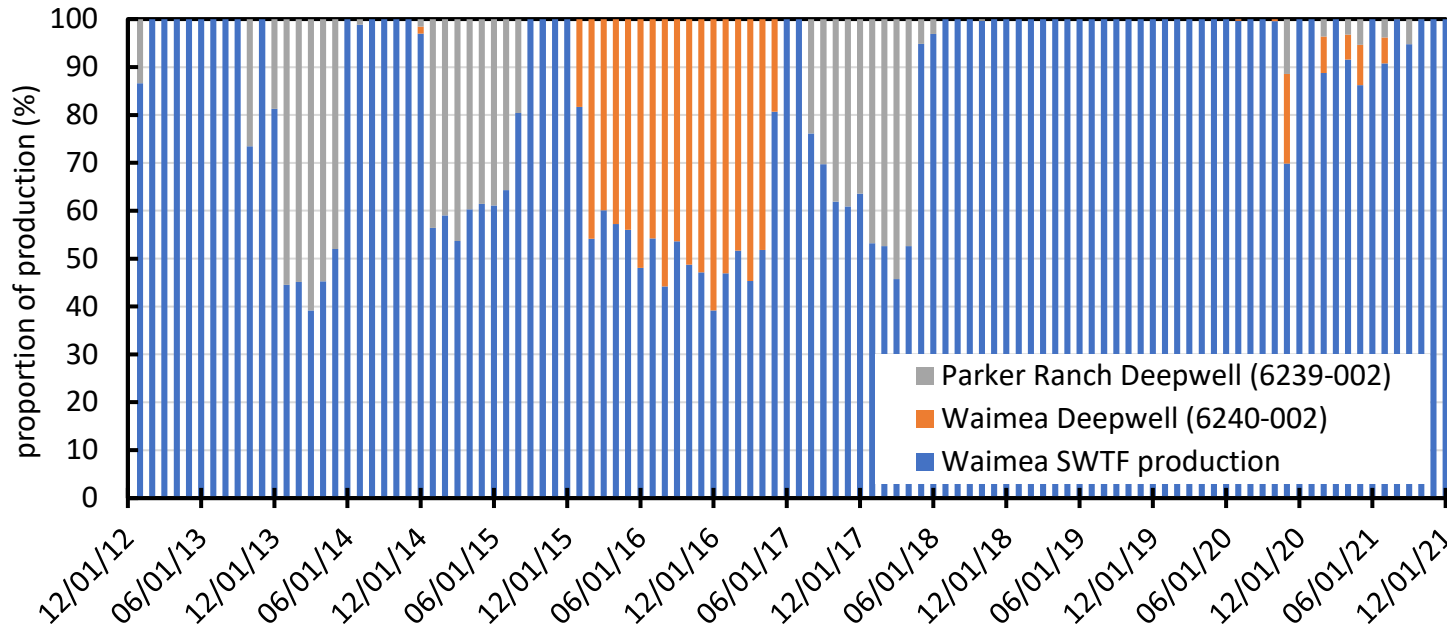
2013-2021 Statistics

Waimea SWTF

Mean = 1.46 mgd
 Median = 1.50 mgd
 Min = 0.51 mgd
 Max = 2.24 mgd

Waimea Deepwell

Mean = 0.16 mgd
 Median = 0.00 mgd
 Min = 0.00 mgd
 Max = 1.18 mgd



Parker Ranch Well

Mean = 0.17 mgd
 Median = 0.00 mgd
 Min = 0.00 mgd
 Max = 2.84 mgd

Total Production

Mean = 1.79 mgd
 Median = 1.81 mgd
 Min = 1.25 mgd
 Max = 2.33 mgd

Hawai'i DWS Alternative Groundwater Supplies

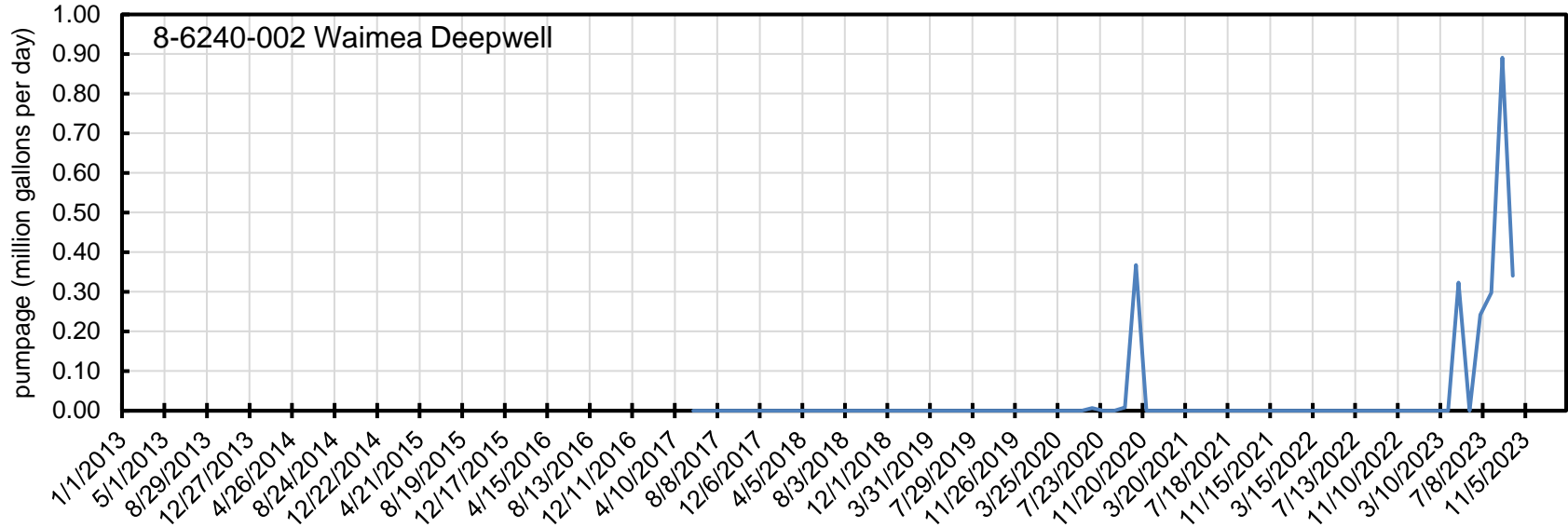
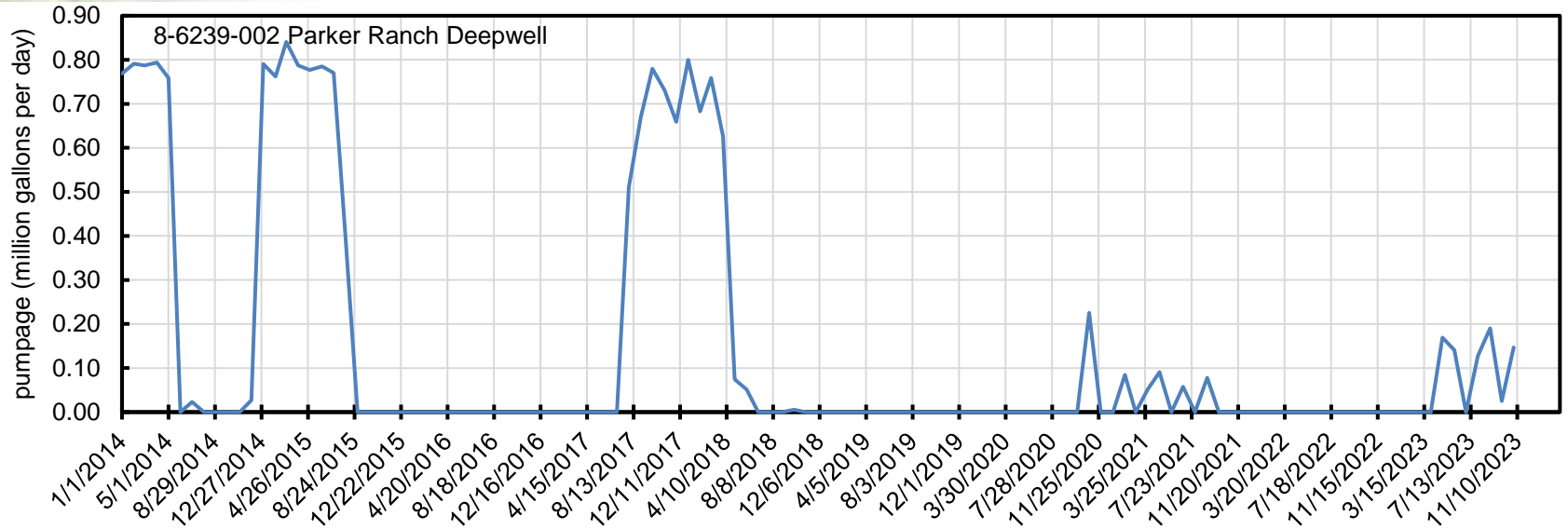
8-6240-002 Waimea Deepwell



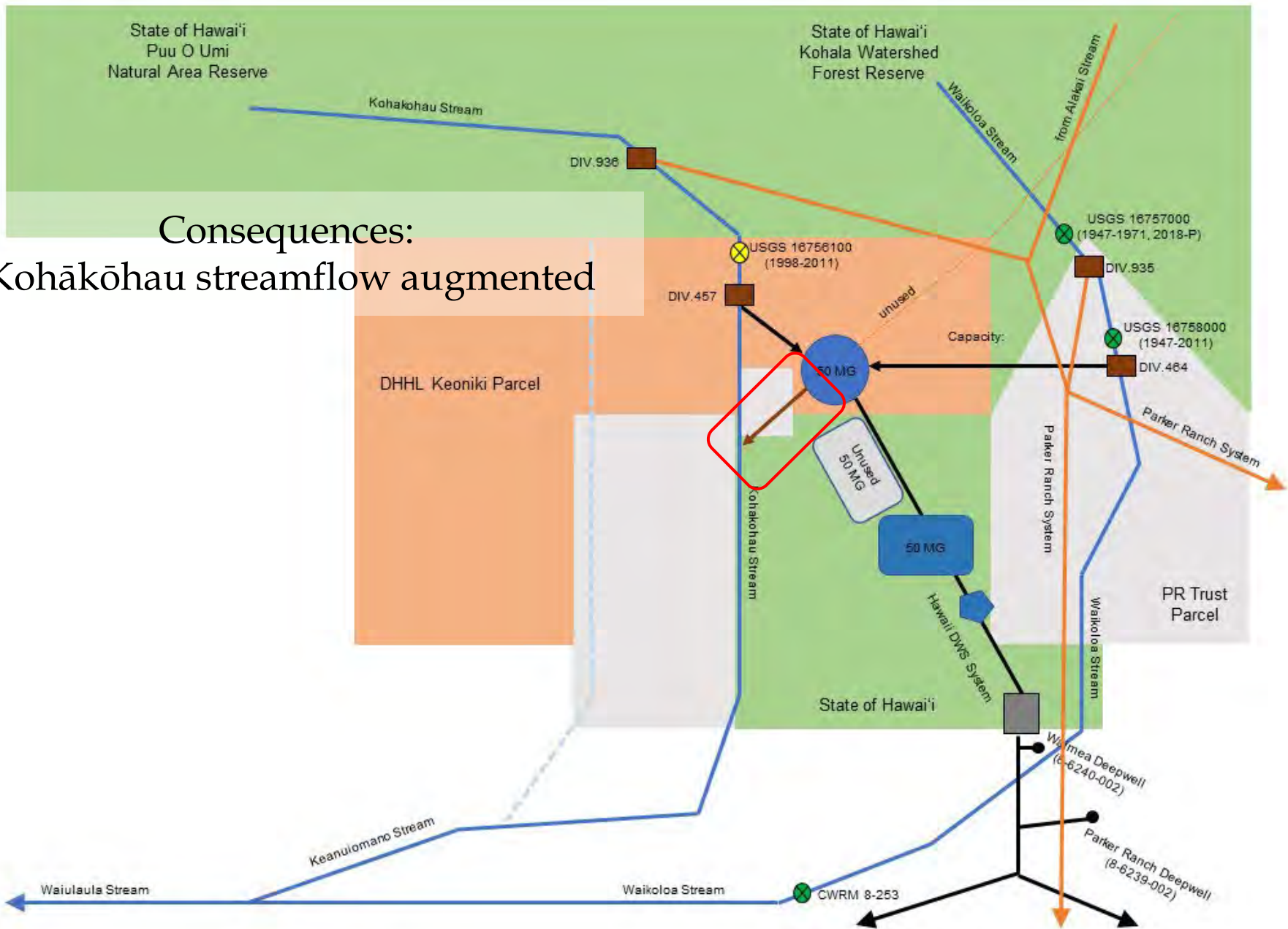
8-6239-002 Parker Ranch Deepwell



Hawai'i DWS Alternative Groundwater Supplies



Consequences: Kohākōhau streamflow augmented



NOTE: NOT TO SCALE

Hawai'i DWS Waikoloa Reservoir No. 2 Overflow



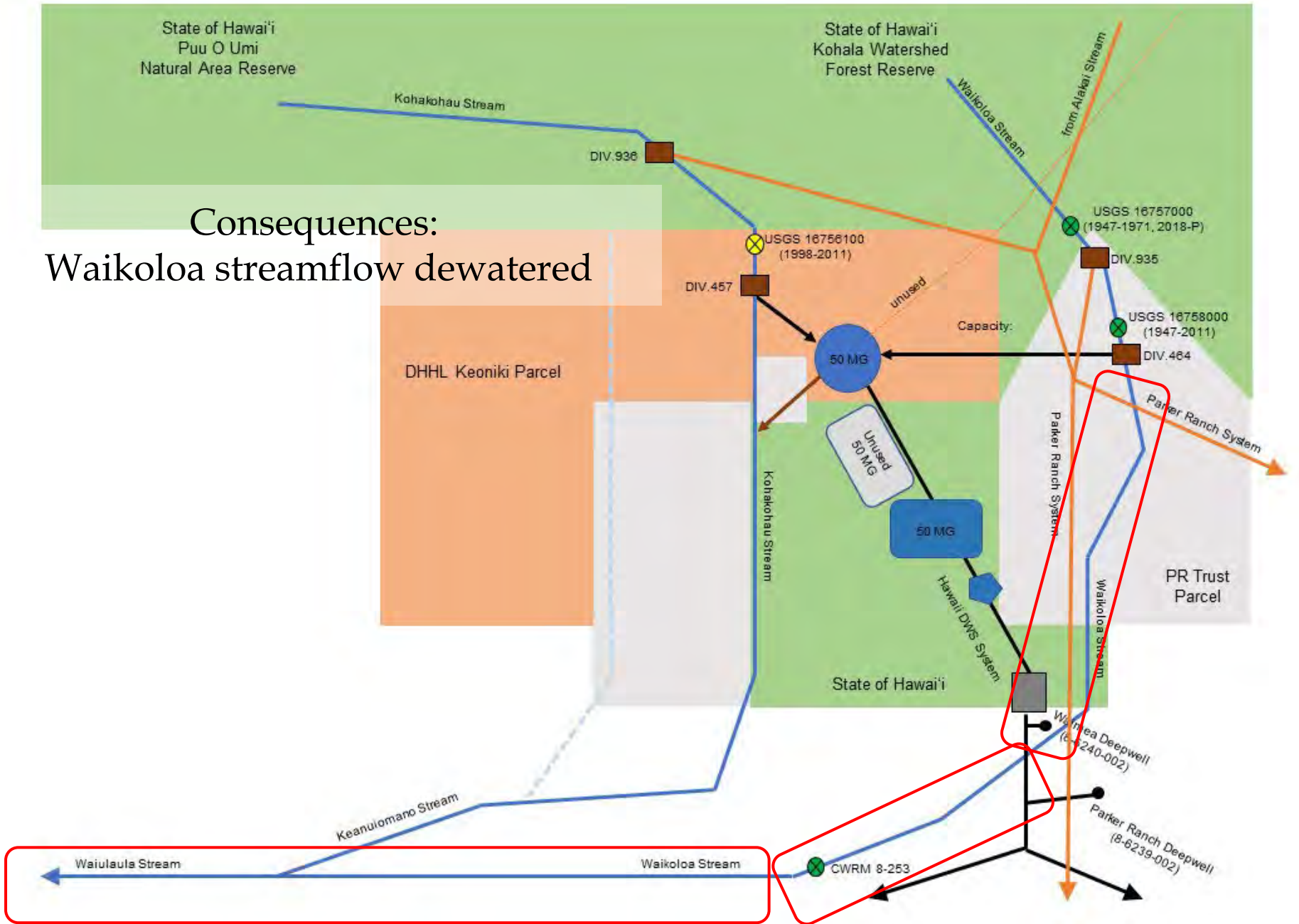
Kohākōhau streamflow augmented



Waikoloa streamflow dewatered



Consequences: Waikoloa streamflow dewatered



NOTE: NOT TO SCALE

01/25/2023



Waikoloa Stream dewatered

11/16/2022



02/22/2023



09/19/2022



Waikoloa Stream dewatered





Waikoloa Stream dewatered



Alternative Source: Upper Hāmākua Ditch

Legend

USGS station status

-  inactive continuous
-  active continuous


 PARKER RANCH

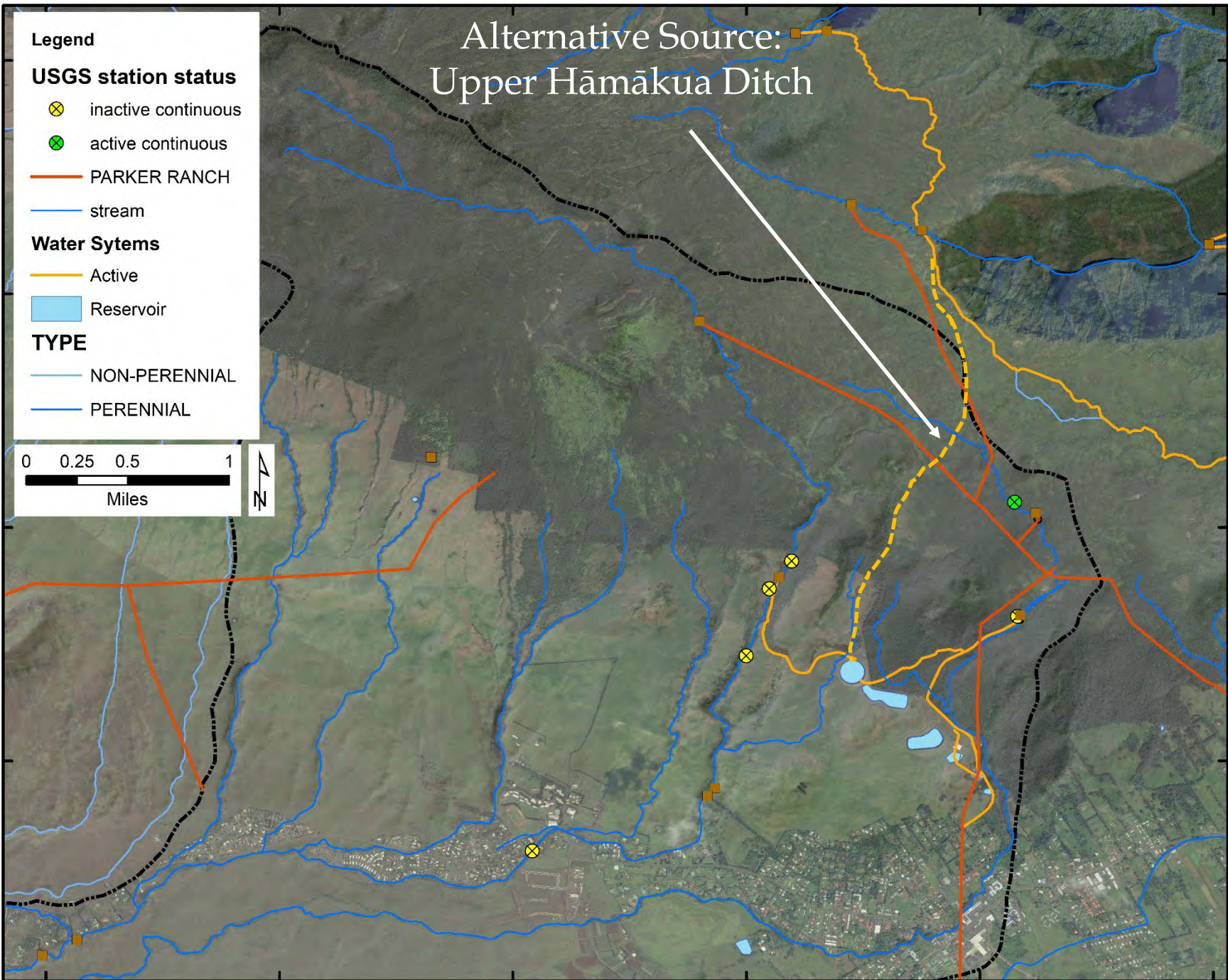
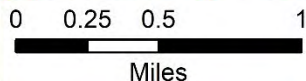
 stream

Water Systems

-  Active
-  Reservoir

TYPE

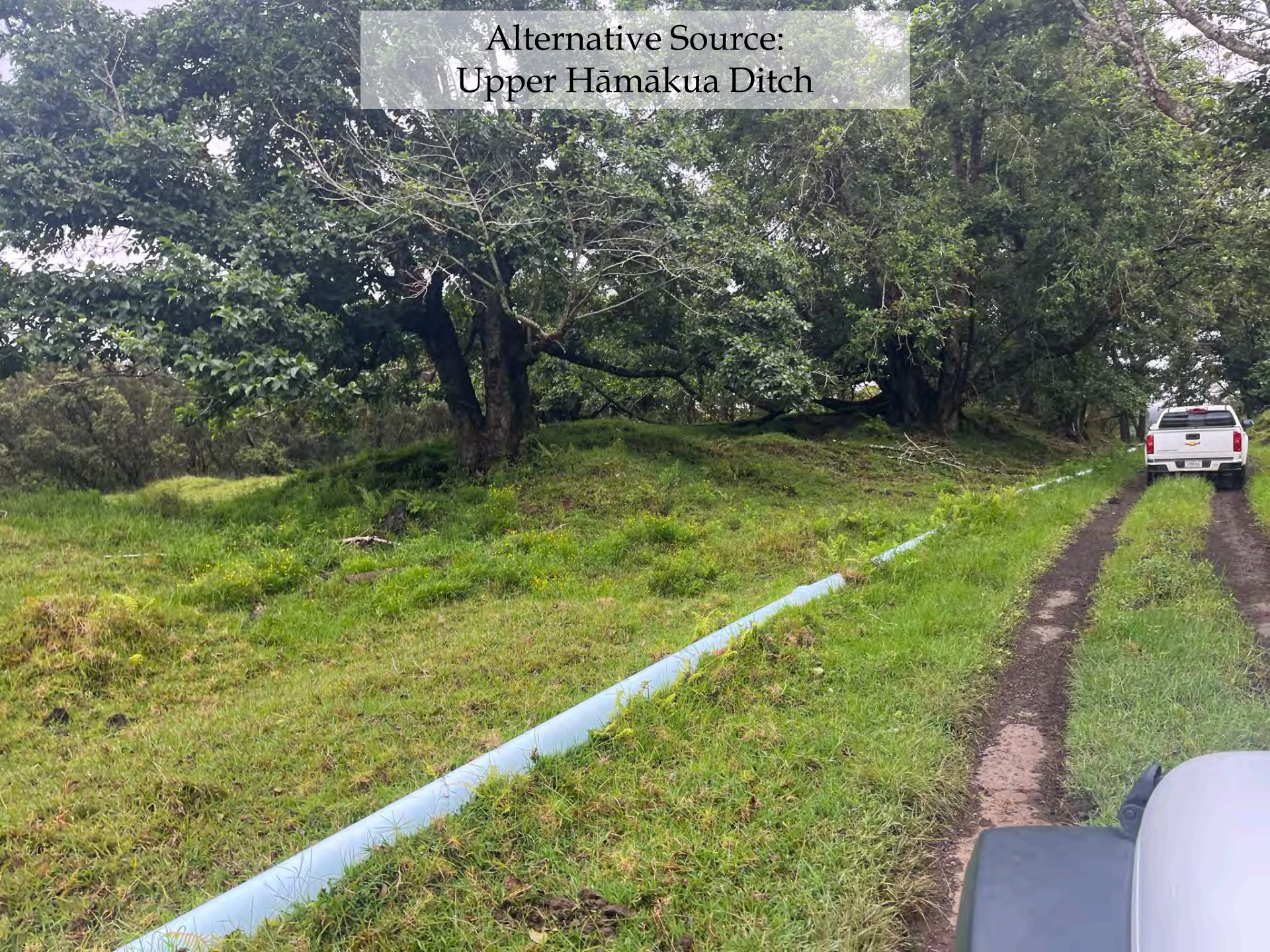
-  NON-PERENNIAL
-  PERENNIAL



Alternative Source:
Upper Hāmākua Ditch



Alternative Source:
Upper Hāmākua Ditch

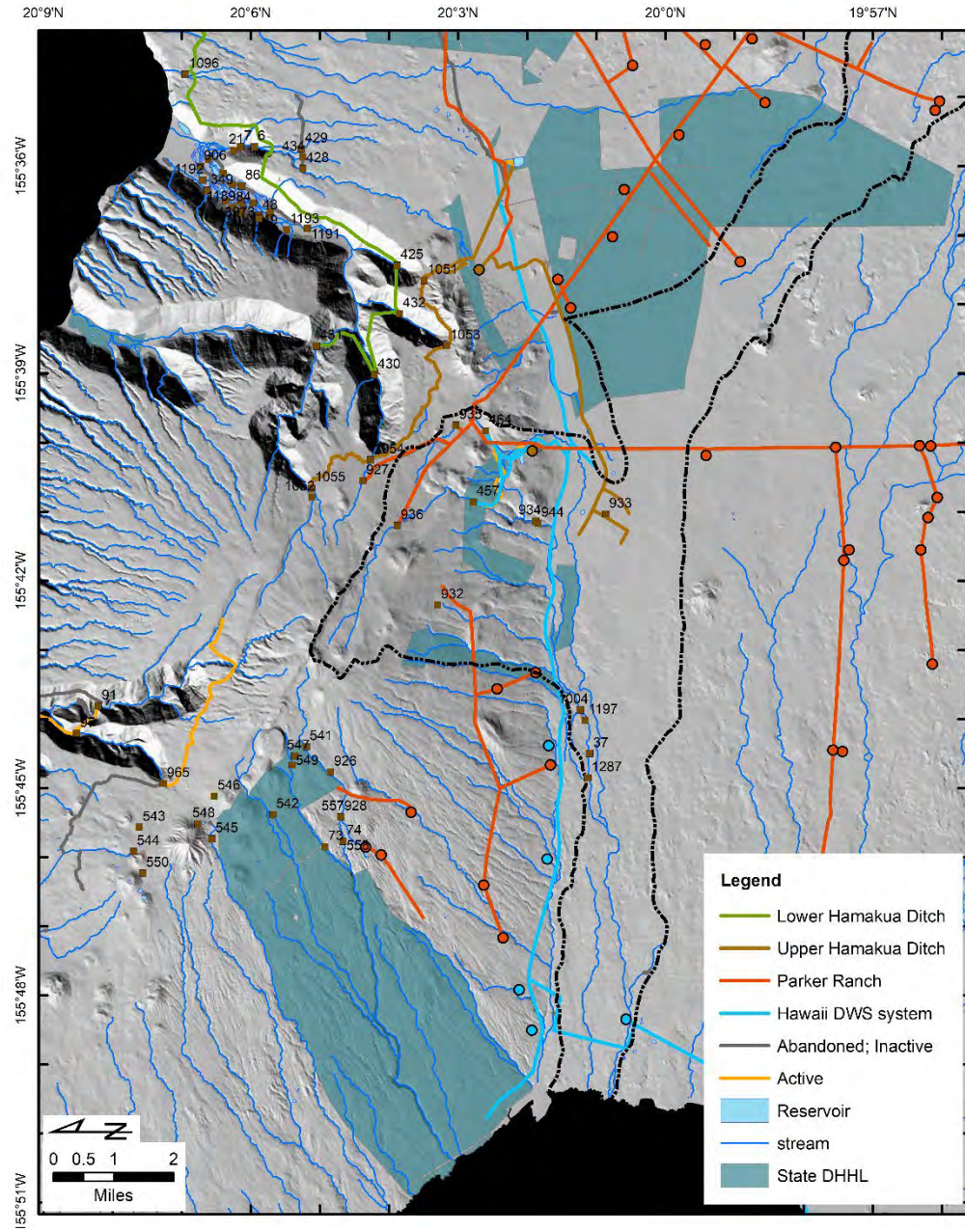
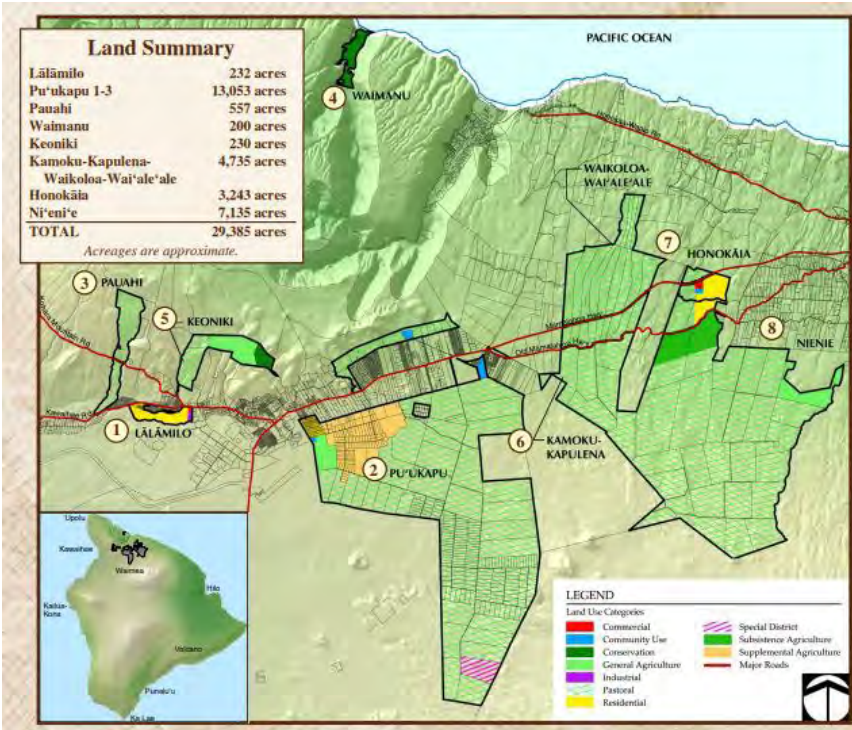


Alternative Source:
Upper Hāmākua Ditch





Potential Reservation of water for DHHL



Staff amendments to an instream flow standard...

DRAFT Instream Flow Standard Assessment Report

available in August 2023

Public Comments and Fact Gathering

due by May 2

Update IFSAR
Compile public testimony
Submittal to Commission to Amend interim IFS
(additional public testimony accepted at Commission Meeting)

at a future Commission meeting



Home » [Surface Water](#) » [Instream Flow Standards](#) » [Island of Hawai'i](#) » IFS: 8161 - Waikoloa, Hawai'i

IFS: 8161 - WAIKOLOA, HAWAI'I

Instream Flow Standard: Hydrologic Unit of Waikoloa (8161)

The Commission on Water Resource Management is developing a proposal to amend the interim instream flow standard(s) for the surface water hydrologic unit of Waikoloa, Hawai'i. Please review the Draft Instream Flow Standard Assessment Report for Waikoloa (Information Updates Section below) and provide comments to the Commission staff.



Hawai'i Department of Water Supply diversion intake at Kohākōhau Stream.



Hawai'i Department of Water Supply diversion intake (Marine Dam) on Waikoloa Stream.

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Symbols:

- indicates an external website link
- 📺 indicates a video link

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