

Update on Water Resources in the Lahaina Aquifer Sector Area

Agenda Item C-1



September 19, 2023

Update on Water Resources in the Lahaina Aquifer Sector Area

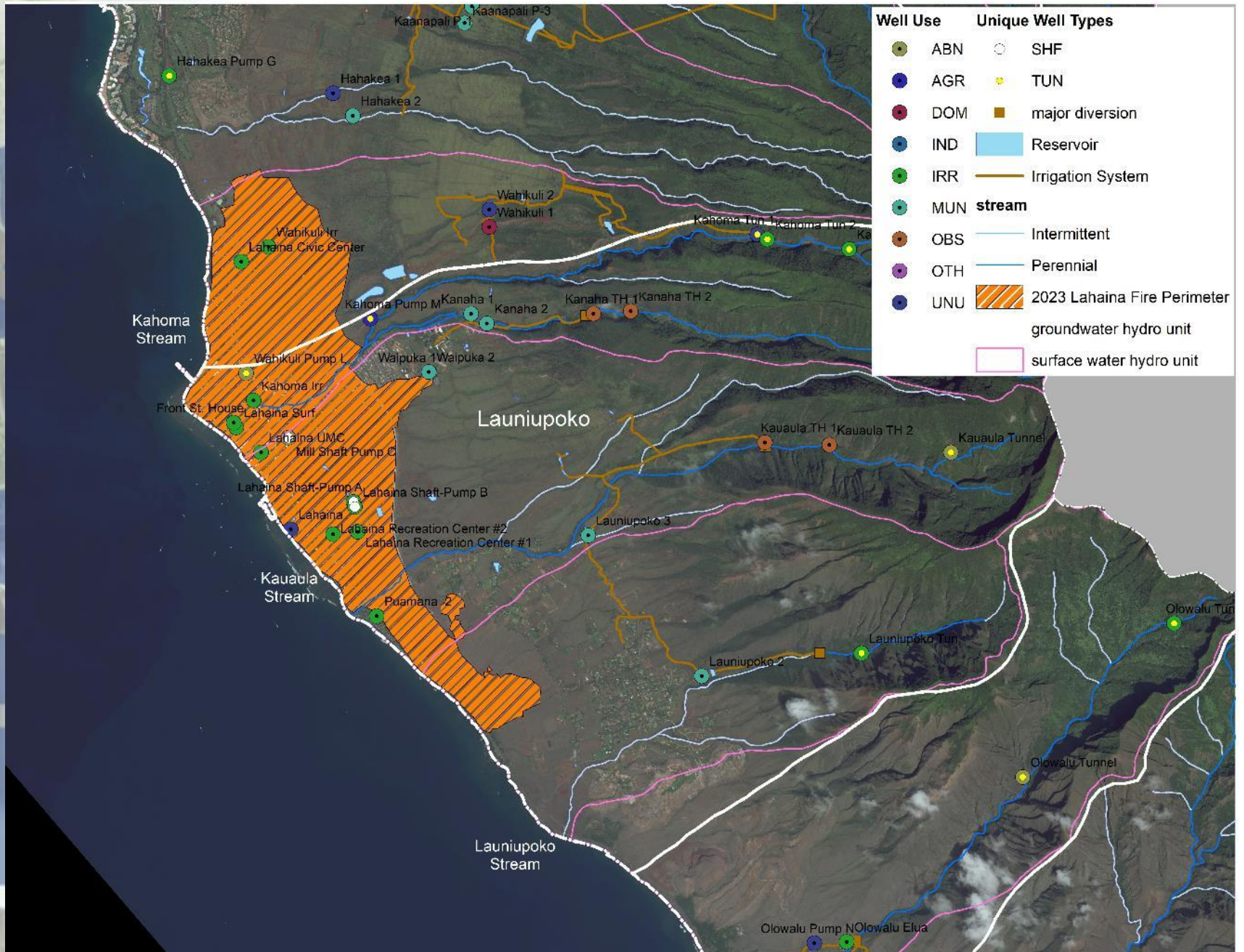
Agenda Item C-1

a. Wells in the Fire-Impacted Area



September 19, 2023

Wells in the Fire-Impacted Area Map



Wells in the Fire-Impacted Area Table

Well Number	Well Name	Well Owner/User	Year Drilled	Well Use	Well Type	Fire Impact
6-5240-001	Mill Shaft Pump C	Pioneer Mill c/o Kaanapali Land Management Corp.	1897	ABN	SHF	Appears not impacted
6-5240-002	Lahaina Shaft-Pump B	Wainee Land & Homes	1897	UNU	SHF	Appears not impacted
6-5240-003	Lahaina Shaft-Pump A	Wainee Land & Homes/ Launiupoko Irrigation Company	1897	INDMI	SHF	Appears not impacted
6-5240-004	Lahaina	State of Hawaii	1956	ABNLOS*		not located
6-5240-005	Lahaina UMC	Lahaina United Methodist Church	1989	IRRLA	ROT	Fire damage sustained
6-5240-007	Lahaina Recreation Center #1	County of Maui/ Department of Parks and Recreation	2002	IRRPA	ROT	Appears not impacted
6-5240-008	Lahaina Recreation Center #2	County of Maui/ Department of Parks and Recreation	1986	IRRPA		Appears not impacted
6-5240-009	Kahoma Irr	Opukea at Lahaina Condo Master	2006	IRRLA	ROT	Appears not impacted
6-5241-001	Lahaina Surf	Hale Mahaolu-Lahaina Surf	1985	IRRLA	ROT	Fire damage sustained
6-5341-001	Wahikuli Pump L	Pioneer Mill c/o Kaanapali Land Management Corp.	1897	UNU	SHF	Appears not impacted
6-5341-002	Front St. House	Front Street Affordable Housing Partners		UNU	DUG	Appears not impacted
6-5440-001	Wahikuli Irr	Hawaii Housing Finance & Development Corporation/ DHHL	1993	IRRLA	PER	Appears not impacted

DOCARE Well Inspection

1 Well 6-5240-001: pipes at Lahainaluna Rd / Kahua St



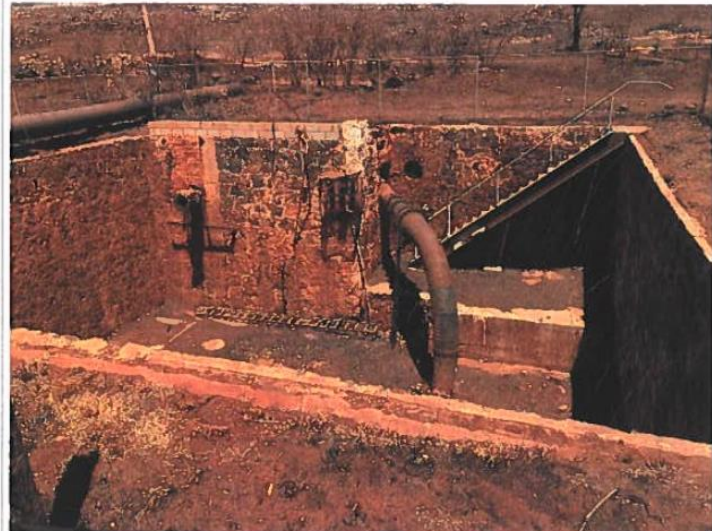
2 Well 6-5240-001 Under metal covers



3 Well 6-5240-002 Pump B



4 Well 6-5240-002 Pump B



DOCARE Well Inspection cont.

9 Well 6-5240-003 Pump A



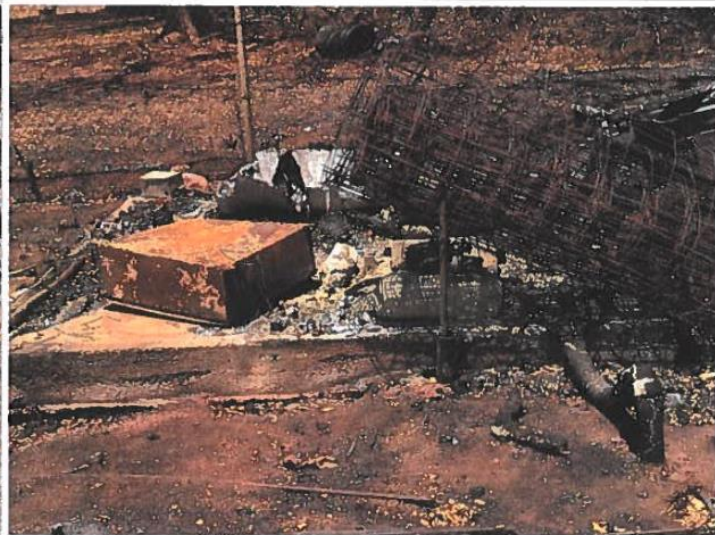
10 Well 6-5240-003 Pump A



11 Well 6-5240-005 (Methodist Church)



12 Well 6-5240-005: remnants of pump house

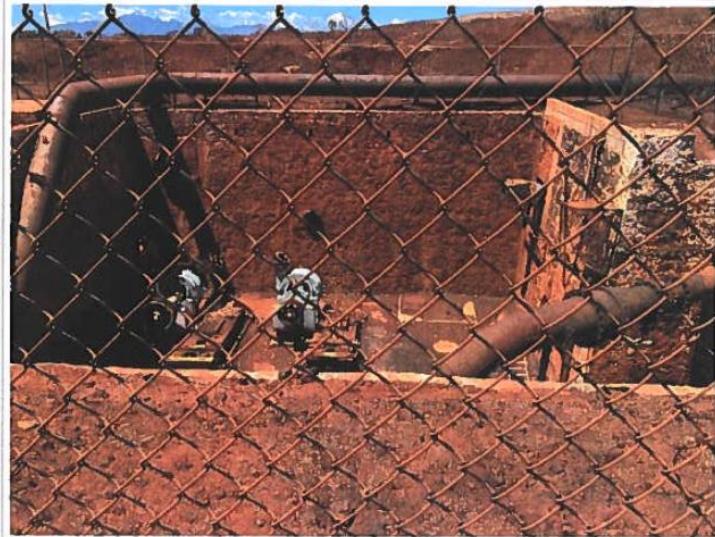


DOCARE Well Inspection cont.

5 Well 6-5240-002 Pump B



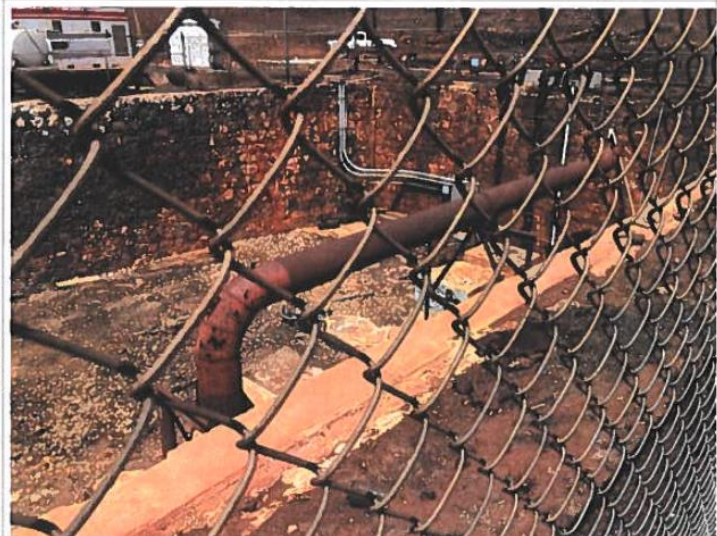
6 Well 6-5240-002 Pump B



7 Well 6-5240-003 Pump A



8 Well 6-5240-003 Pump A



DOCARE Well Inspection cont.

13 Well 6-5240-007 Baseball field, Ipu Amakua Ln.



14 Well 6-5240-007 , Under metal covers



15 Well 6-5240-008, Shaw St. and Honoapiilani Hwy



16 Well 6-5240-008, Shaw St. and Honoapiilani Hwy



DOCARE Well Inspection cont.

17 Well 6-5240-009, Limahana Cir



18 Well 6-5240-009, Limahana Cir



19 Well 6-5241-001: Lahaina Surf Bldg F Pump House



20 Well 6-5241-001: Lahaina Surf Bldg F pipes



DOCARE Well Inspection cont.

21 Well 6-5341-001 152 Ipukula Way



22 Well 6-5341-001 152 Ipukula Way



23 Well 6-5341-002 1056 Front St. Adj B-ball court



24 Well 6-5341-002 1056 Front St. Adj B-ball court



DOCARE Well Inspection cont.

25 Well 6-5440-001, Oil Road



26 Well 6-5440-001, Oil Road



27 Well 6-5440-001, Oil Road



28



Summary of Fire Impacts on Wells

- No well sources of the Maui Department of Water Supply's municipal water system have been affected.
- Launiupoko Irrigation Company (LIC) informed the Commission on August 26, 2023, that one of the pump controllers of one of the two pumps in Lahaina Shaft Pump A was damaged in the fire and is not operational.
- LIC is using the remaining pump in Lahaina Shaft A near 1000 gallons per minute (gpm) or 1.4 million gallons per day (MGD) during the day and reducing down to 700 gpm or 1 MGD at night to deliver water to the lower reservoir (Makila Reservoir).
- DOCARE's inspection on September 3 and 4, 2023 appears that only 2 of the 13 wells in the fire impacted area have sustained fire damage.

Update on Water Resources in the Lahaina Aquifer Sector Area

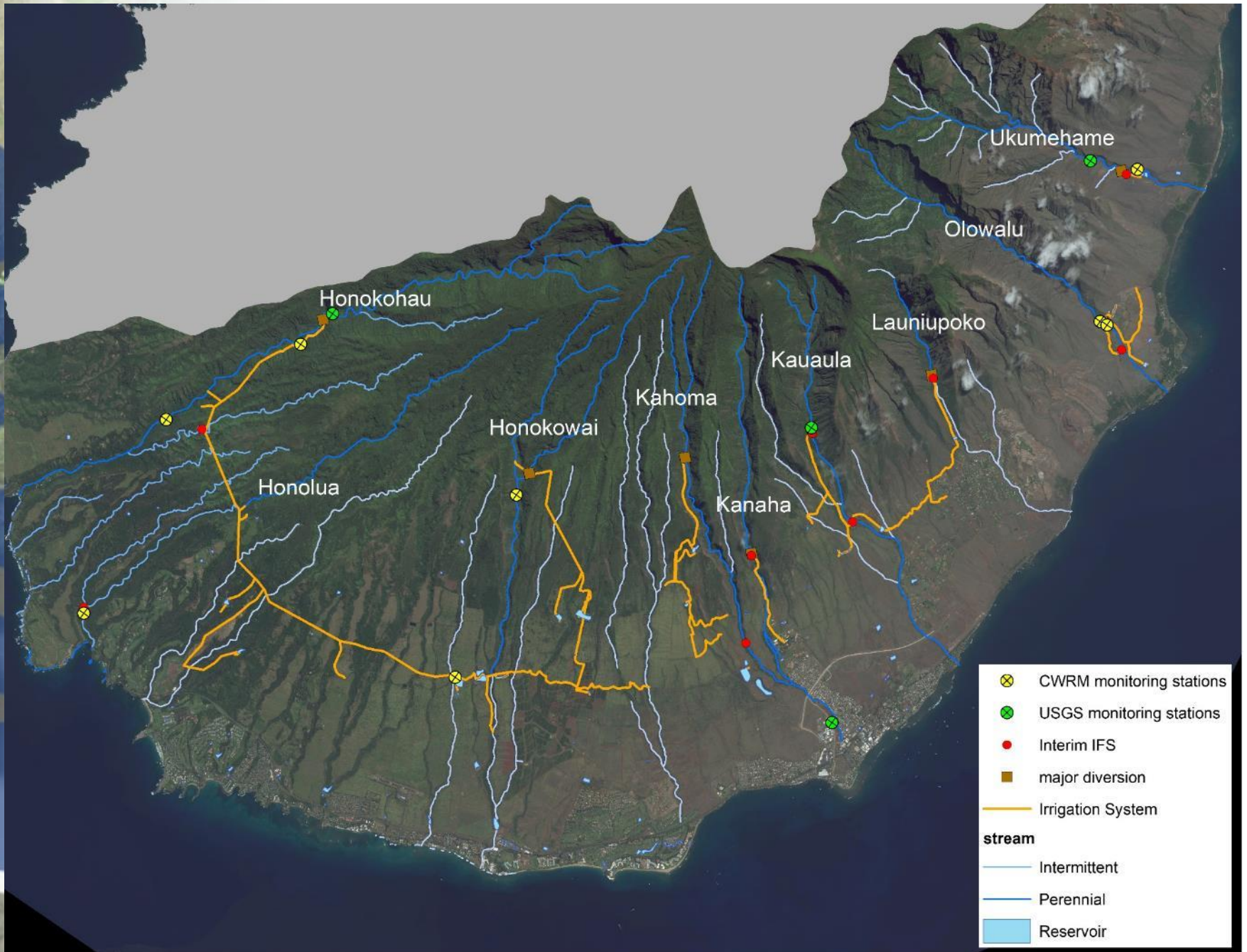
Agenda Item C-1

b. Interim Instream Flow Standards

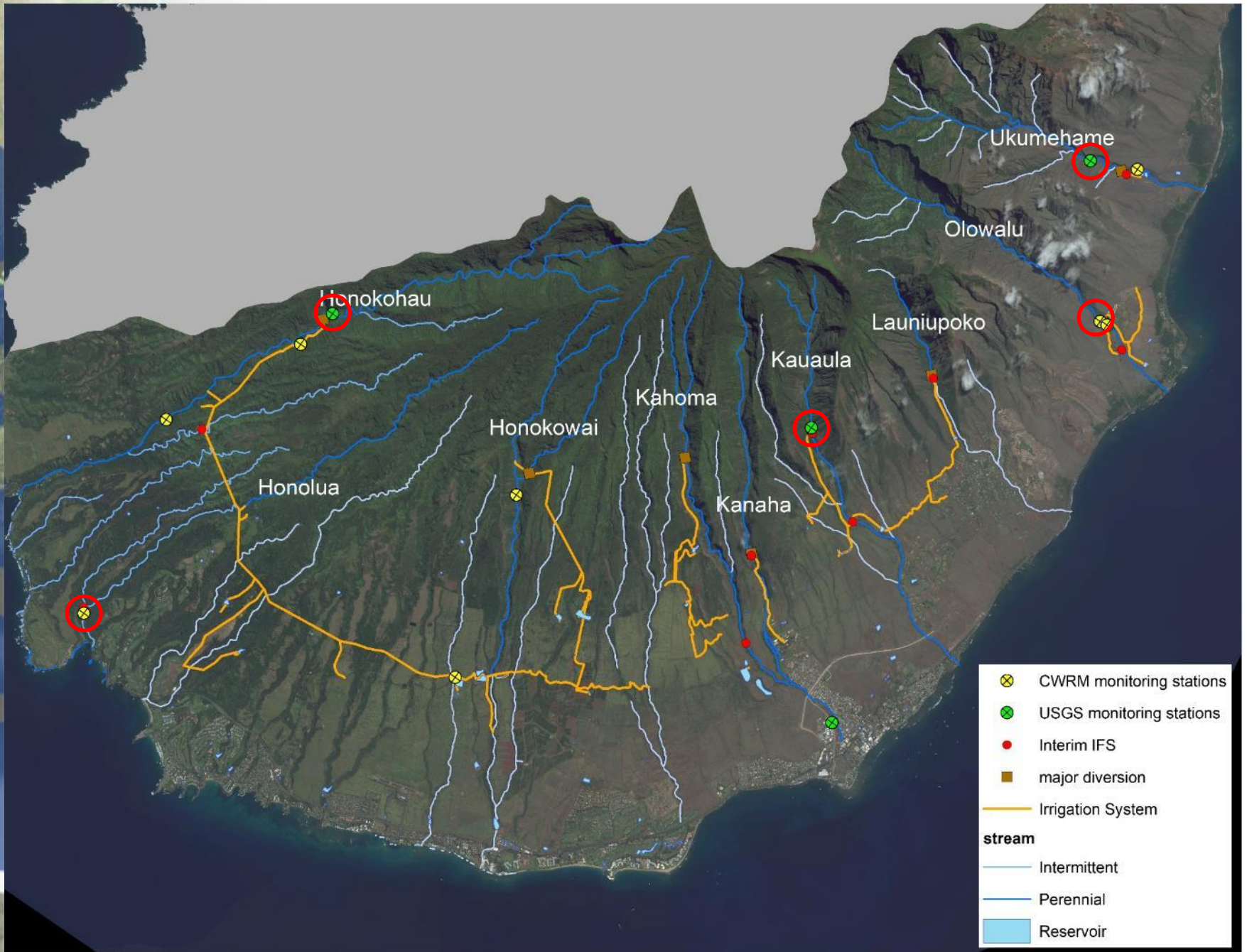


September 19, 2023

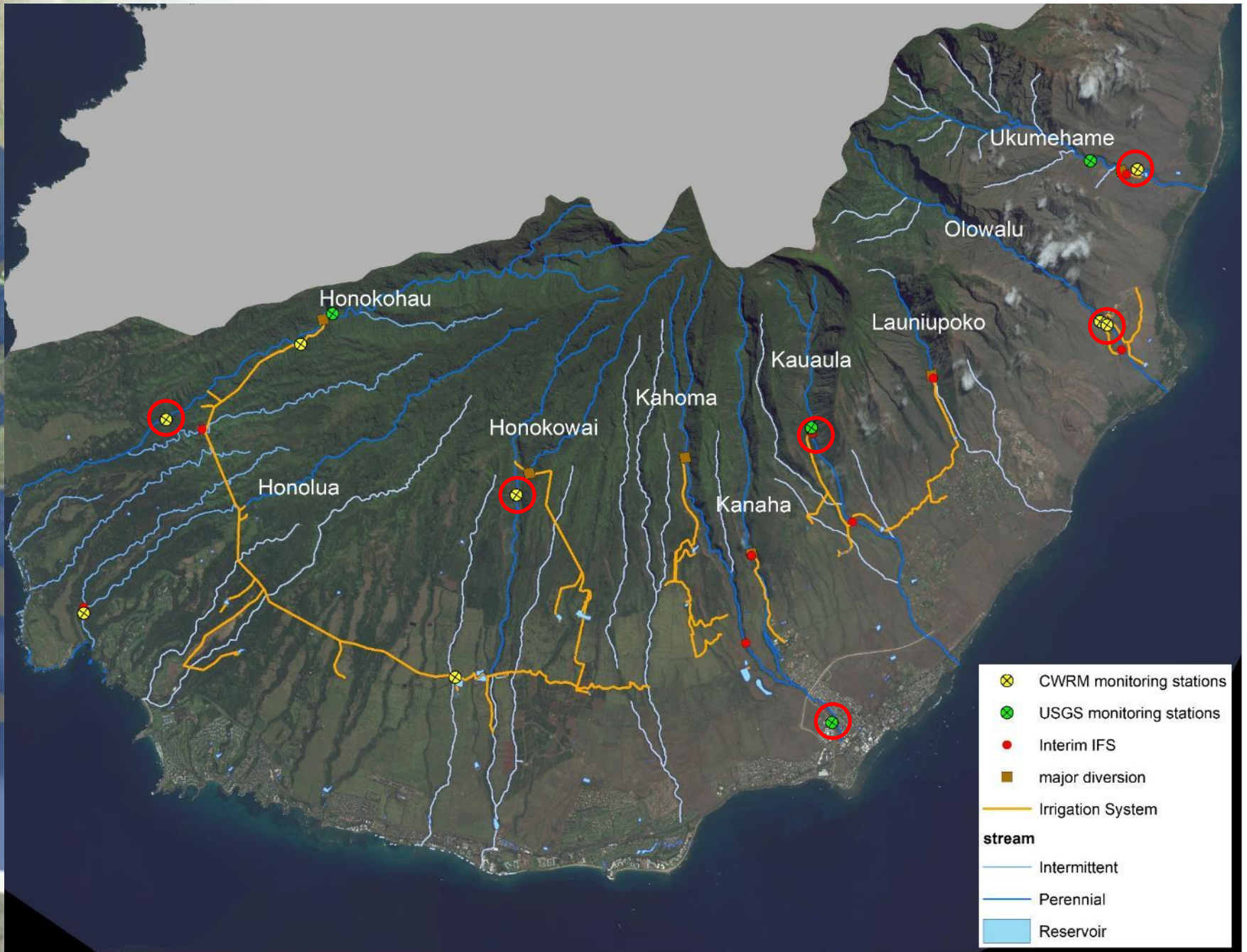
Streamflow Monitoring in West Maui



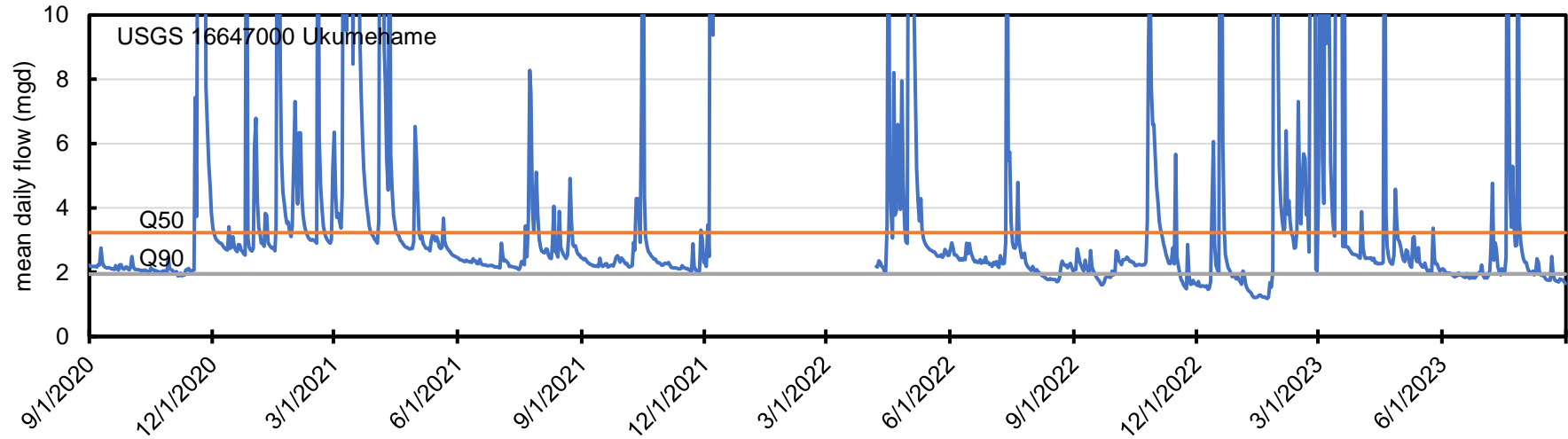
Natural Streamflow Monitoring in West Maui



Regulated Streamflow Monitoring in West Maui



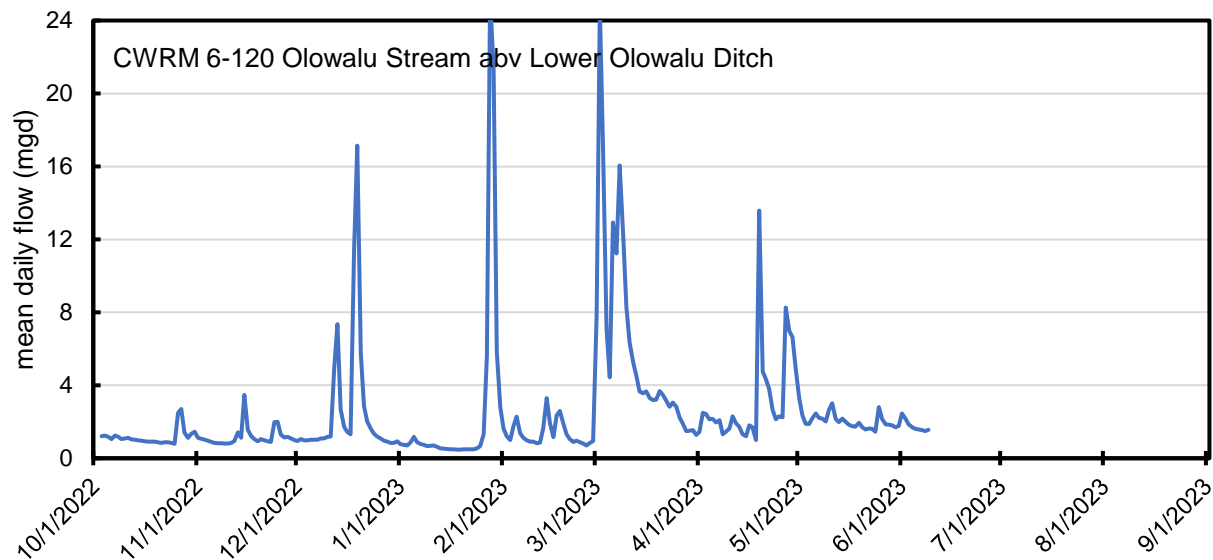
Ukumehame Stream above Ukumehame Ditch Intake



	Q50	Q60	Q70	Q80	Q90	Q95
1984-2013 USGS 2014-5087	5.0 (3.23)	4.5 (2.91)	4.0 (2.59)	3.6 (2.33)	3.2 (2.07)	3.0 (1.94)
2020-2023 USGS 16647000 Ukumehame	3.9 (2.51)	3.6 (2.35)	3.5 (2.24)	3.3 (2.12)	3.0 (1.92)	2.7 (1.76)
percent difference	-22%	-19%	-14%	-9%	-7%	-8%

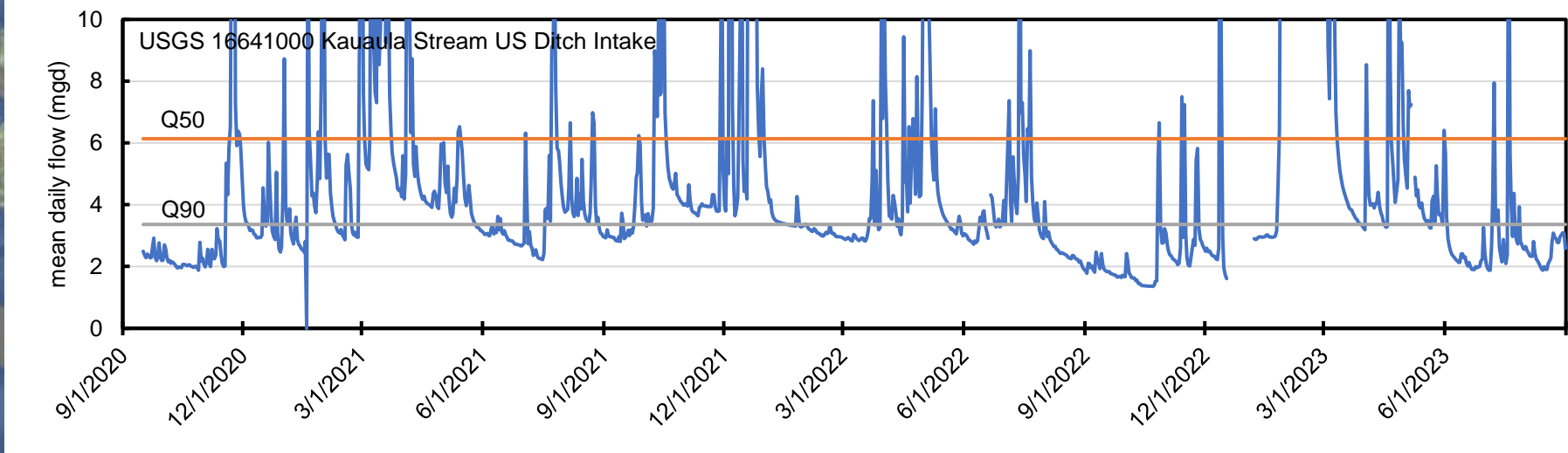
station costs \$24,000 per year

Olowalu Stream above Lower Olowalu Ditch Intake



	Q50	Q60	Q70	Q80	Q90	Q95
1984-2013 USGS 2014-5087	4.0 (2.59)	3.1 (2.00)	2.4 (1.55)	1.9 (1.23)	1.3 (0.84)	1.0 (0.65)
2022-2023 CWRM 6-120 Olowalu	3.9 (2.51)	3.6 (2.35)	3.5 (2.24)	3.3 (2.12)	3.0 (1.92)	2.7 (1.76)

Kau'aula Stream above Kau'aula Ditch Intake

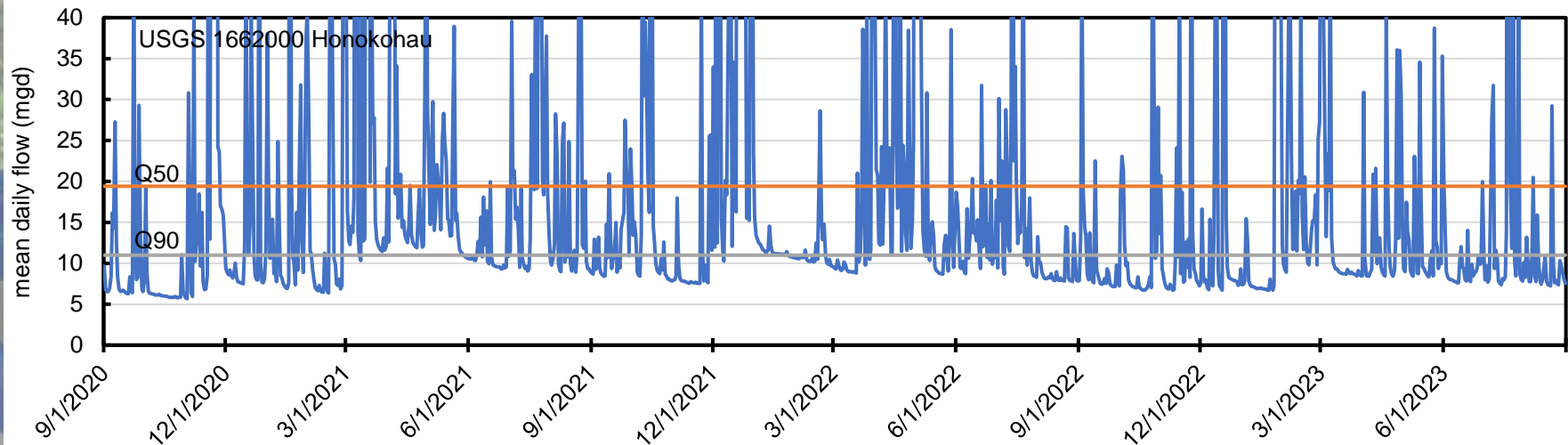


	Q50	Q60	Q70	Q80	Q90	Q95
1984-2013 USGS 2014-5087	9.5 (6.14)	8.1 (5.20)	7.1 (4.59)	6.2 (4.01)	5.2 (3.36)	4.8 (3.10)
2020-2023 Kauaula Stream abv intake	5.2 (3.35)	4.8 (3.08)	4.5 (2.88)	3.8 (2.46)	3.2 (2.09)	3.0 (1.91)
percent difference	-45%	-41%	-37%	-39%	-38%	-38%

station cost \$24,000 per year

Honokōhau Stream above Aotaki Weir

USGS station installed in 1912

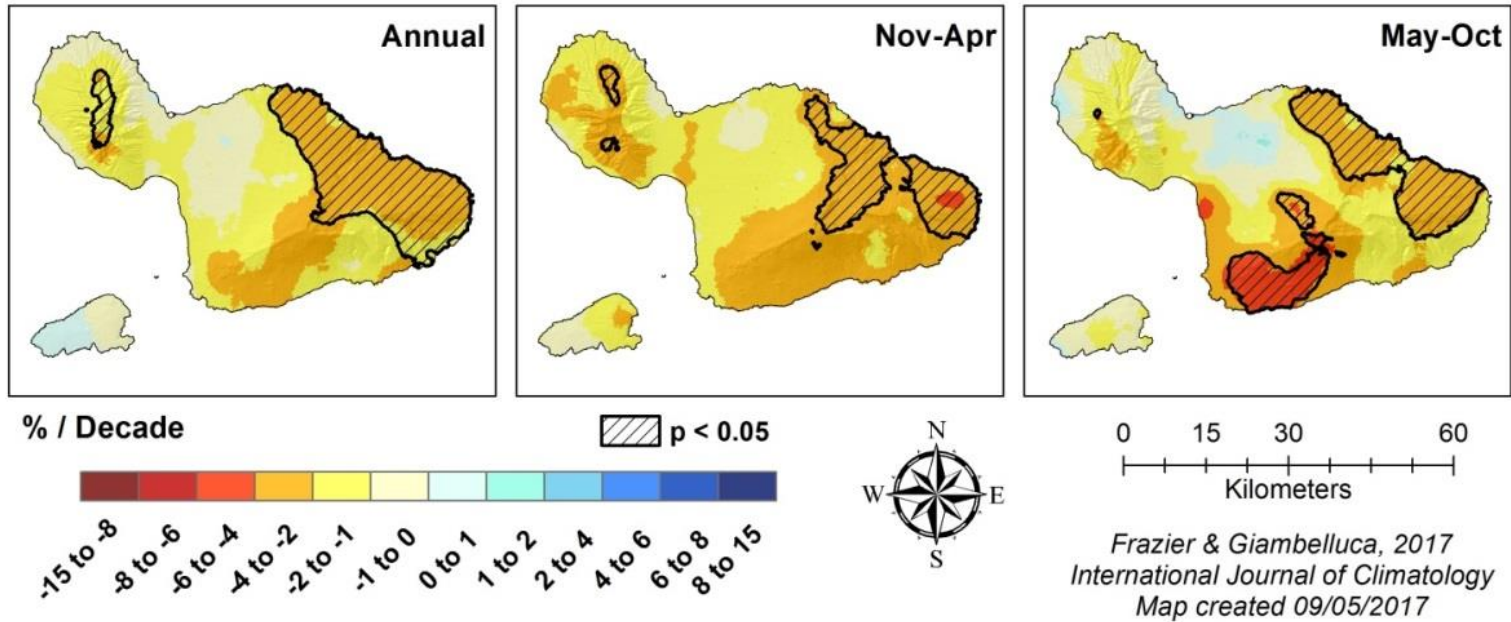


	Q50	Q60	Q70	Q80	Q90	Q95
1984-2013 USGS 2016-5103	21 (13.6)	19 (12.3)	16 (10.3)	14 (9.0)	12 (7.8)	11 (7.1)
2022-2023 USGS 16620000 Honokohau	16 (10.7)	15 (9.6)	14 (8.7)	12.4 (8.0)	11 (7.3)	10 (6.7)
percent difference	-21%	-22%	-16%	-11%	-6%	-6%

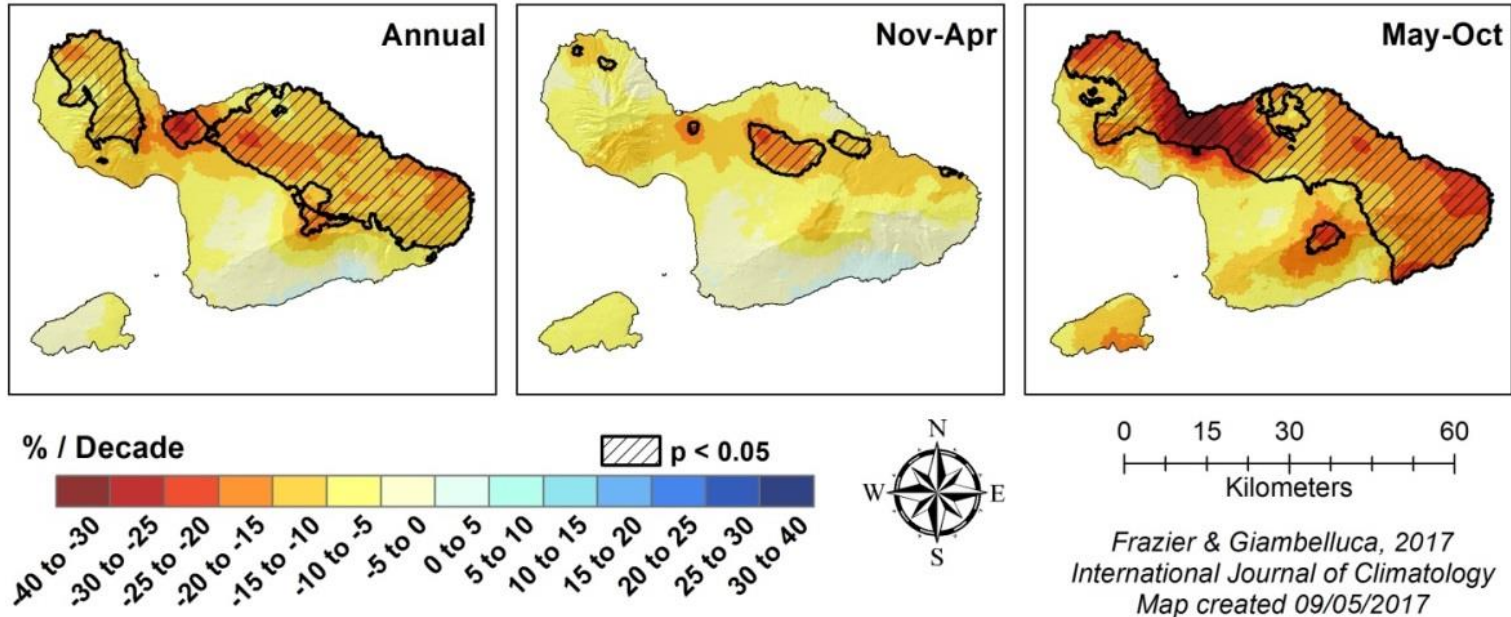
station cost \$29,000 per year

Why is there less water?

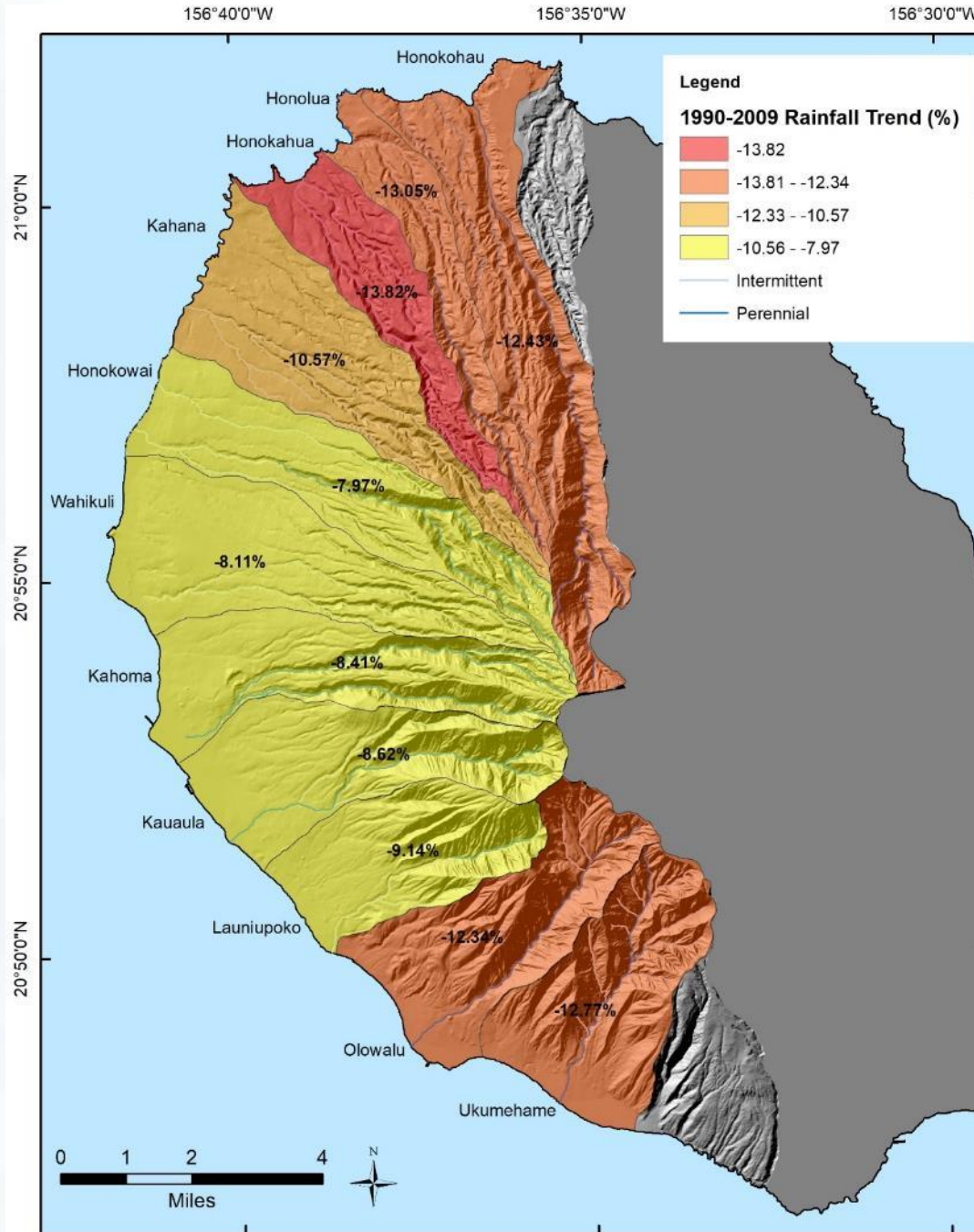
Maui & Kaho'olawe Rainfall Trends: 1920-2012



Maui & Kaho'olawe Rainfall Trends: 1983-2012

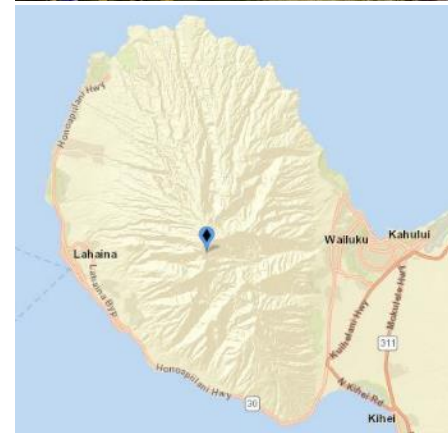
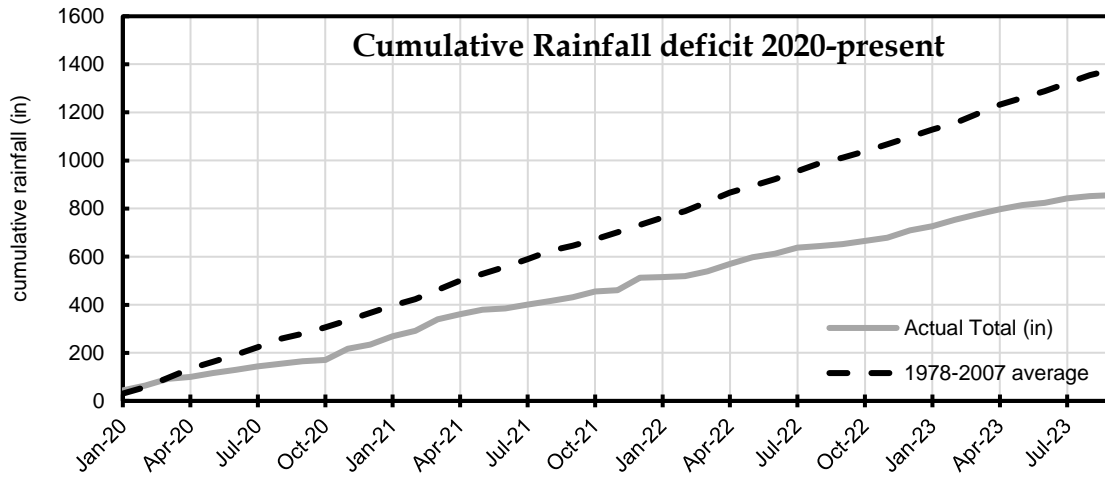
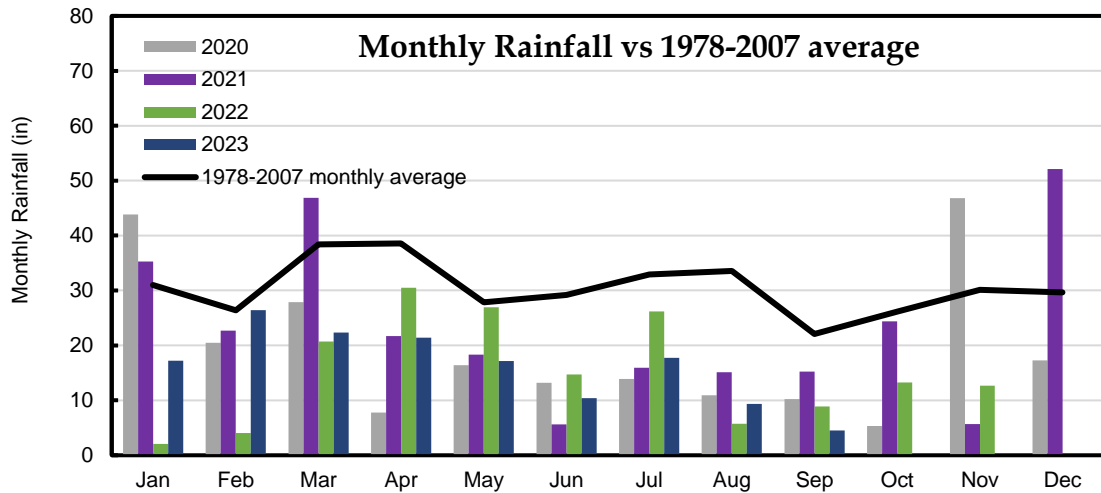


Decline in Rainfall from 1990-2009 by Hydrologic Unit



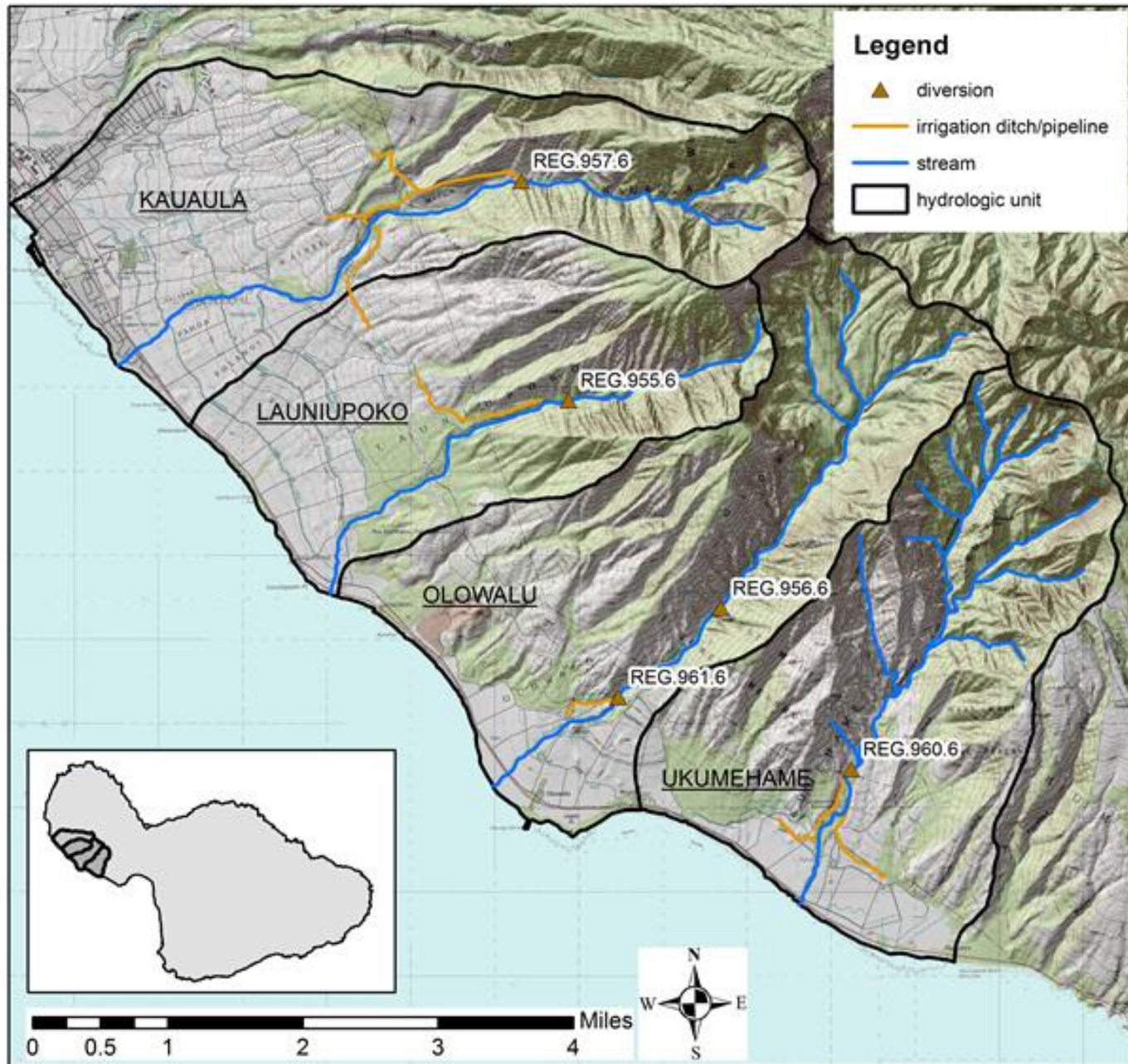
*data provided by A. Frazier

Recent Trends in Rainfall on Pu'u Kukui USGS 205327156351102

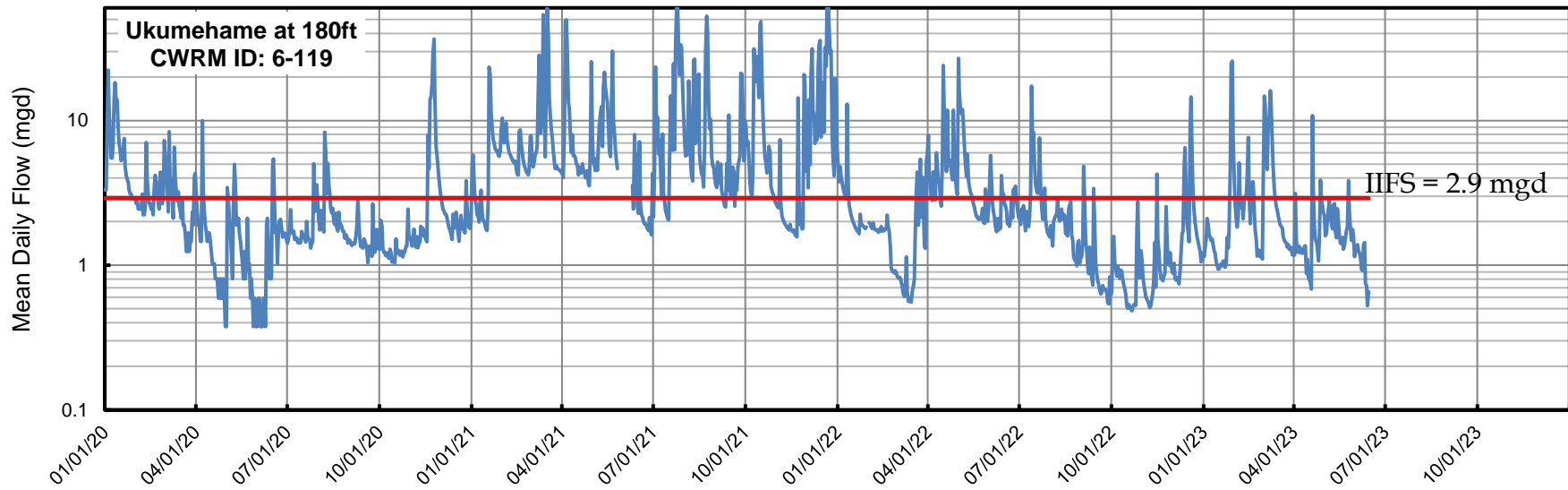


station cost \$13,000 per year

West Maui IIFS Phase 1 (March 2018)



Ukumehame Stream below Ukumehame Ditch

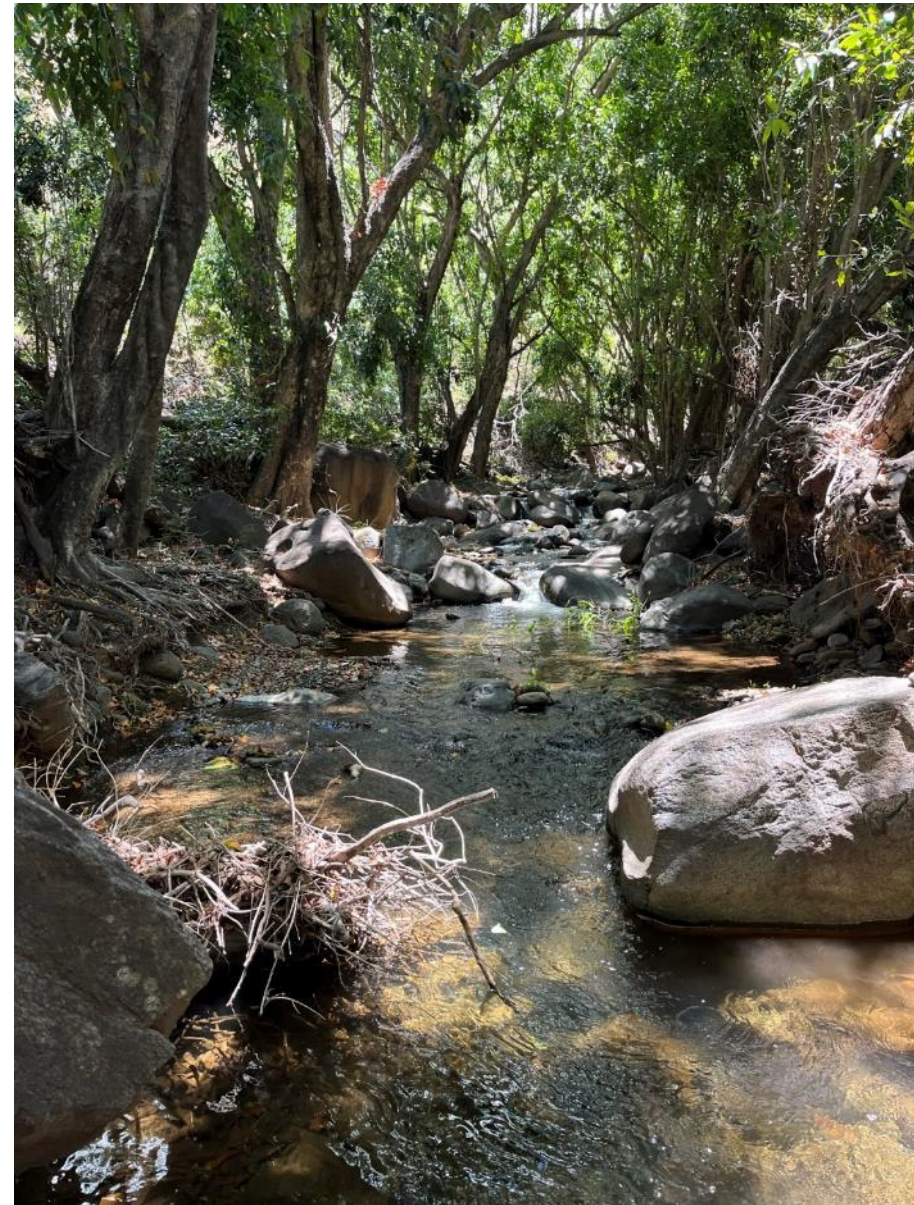


station cost \$8,000 per year

Ukumehame Stream in July 2023



Lower Ukumehame Stream (at 10 ft)
Q = 1.21 cfs (0.78 mgd)



Upper Ukumehame Stream (at 430 ft)
Q = 2.93 cfs (1.90 mgd) 06/26/2023

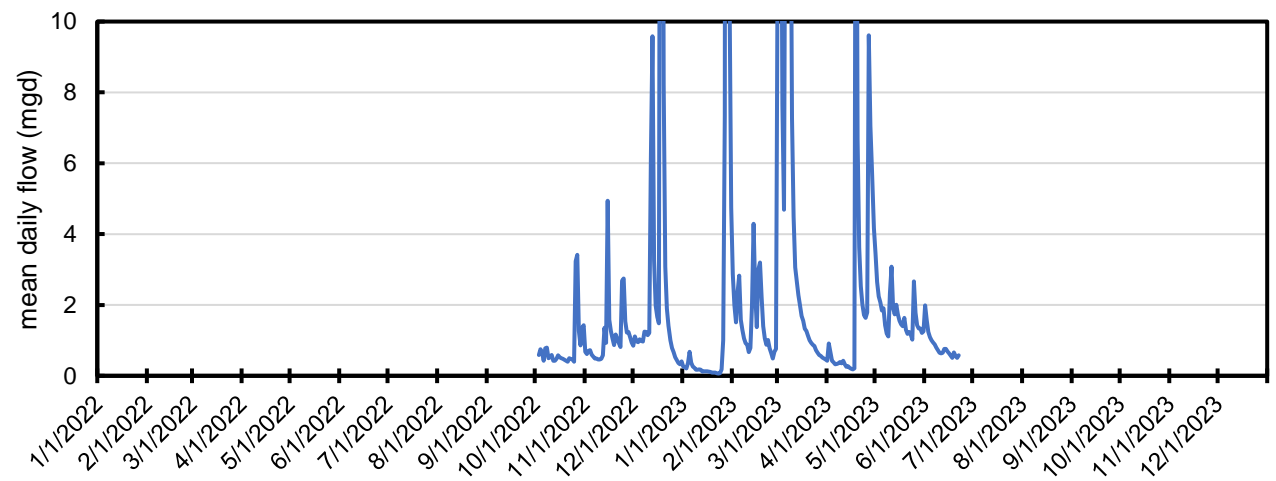
Ukumehame Stream



Olowalu Stream at Lower Olowalu Ditch Intake



Olowalu Stream below Lower Olowalu Ditch Intake



station cost \$10,000 per year

Olowalu Stream



Lower Olowalu Stream
Q = 1.97 cfs (1.27 mgd)



Upper Olowalu Stream
Q = 2.93 cfs (1.90 mgd)

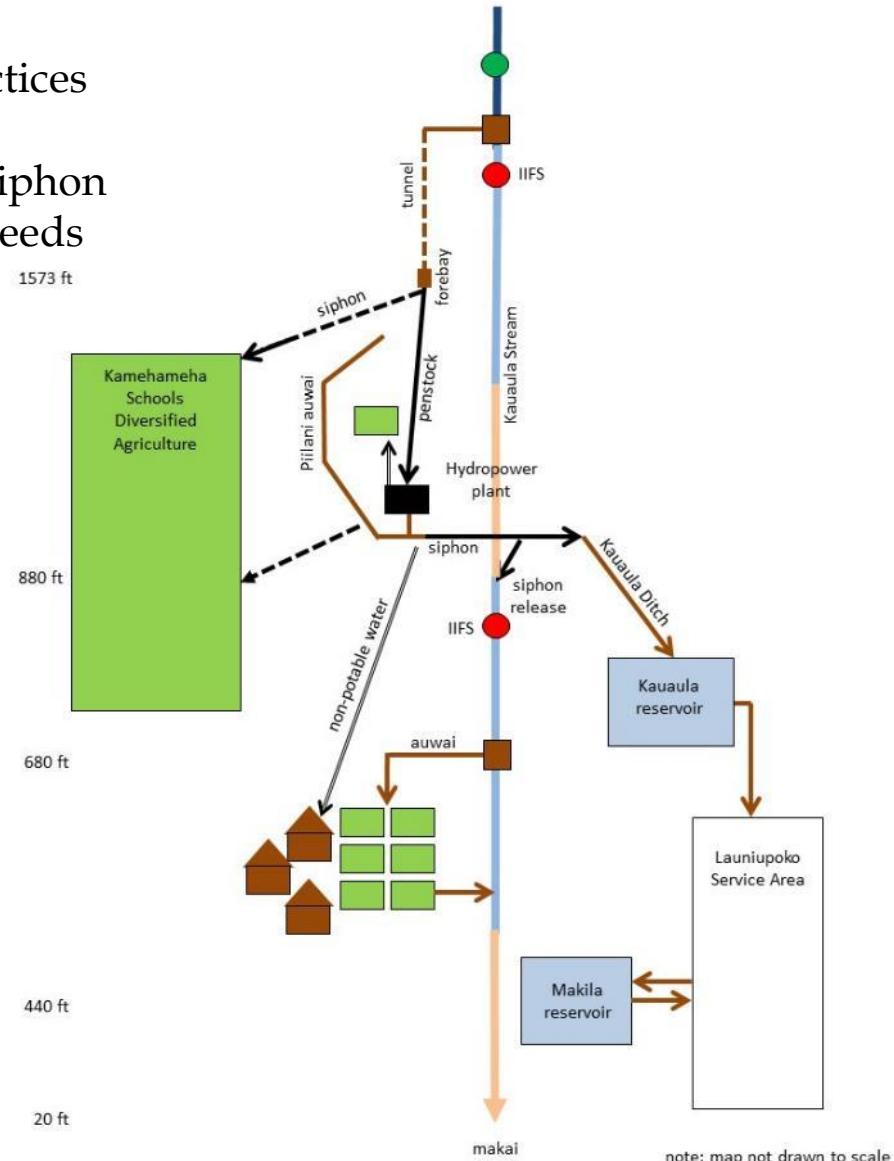
06/07/2023

Kaua'ula Stream

Current IIFS suspended by Water Commission Action in 2022

Insufficient water to simultaneously meet:

- IIFS at Diversion
- Kapu Ohana Traditional and Customary Practices
- Kuleana families domestic needs
- Traditional and Customary Practices below Siphon
- Kamehameha Schools Tenants Agricultural needs



**Kaua'ula Stream
at Kau'aula Ditch Intake
July 7, 2023**

**4.2 cfs (2.71 mgd)
flowing over dam**



**Kaua'ula Stream
at Siphon July 7, 2023**

Upstream View



No flow at siphon

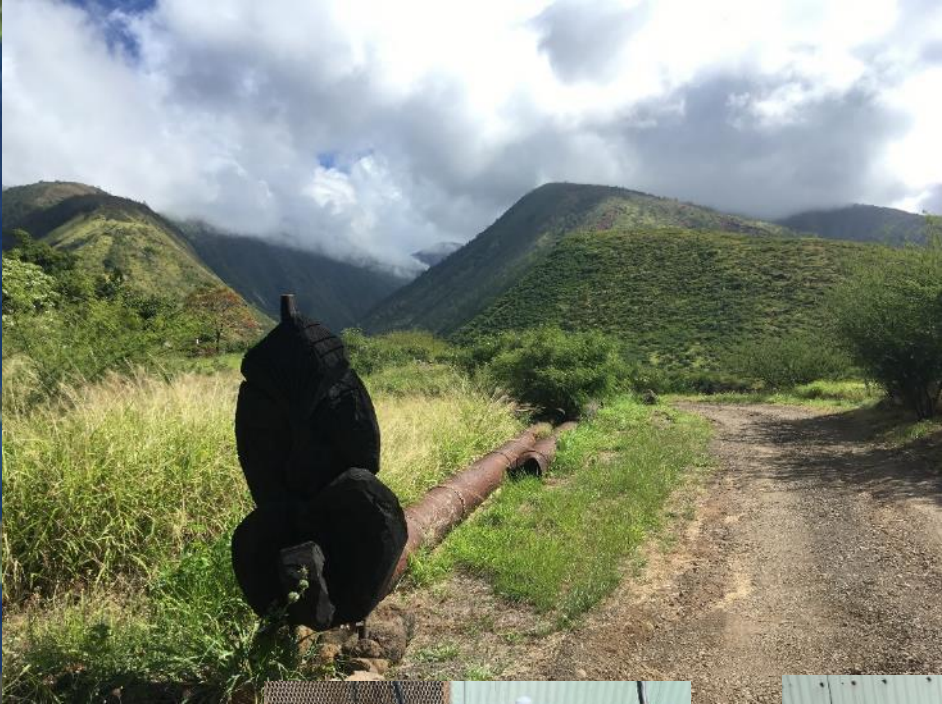
Downstream View



No flow at siphon

Kaua'ula Valley

Kapu Ohana Traditional and Customary Practices dependent on diverted streamflow



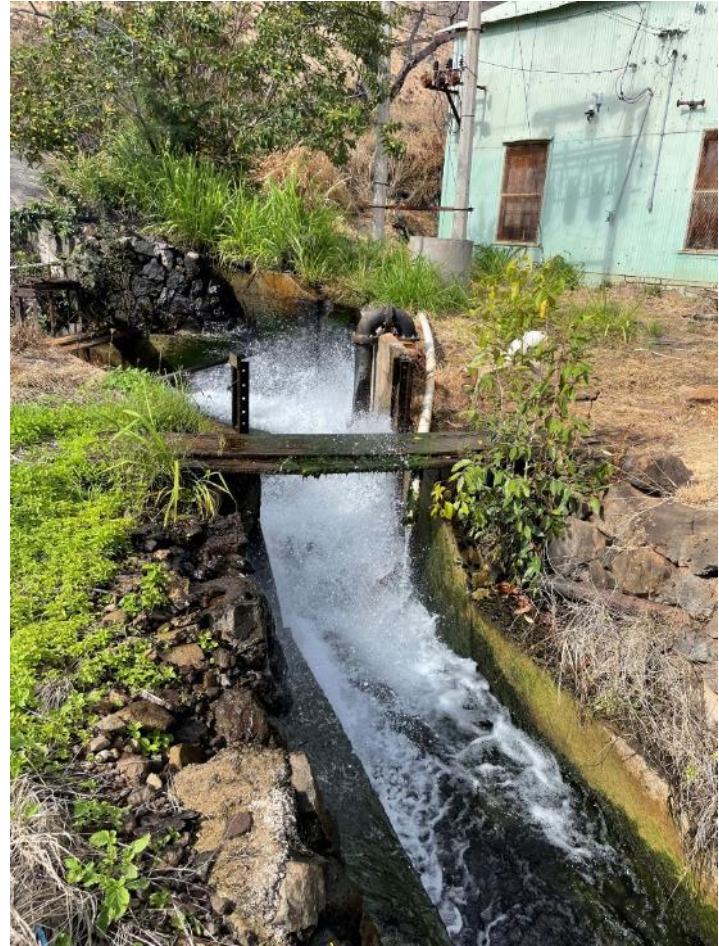
**Kaua'ula Stream
above Waimana 'Auwai**



Waimana 'Auwai Lo'i Complex



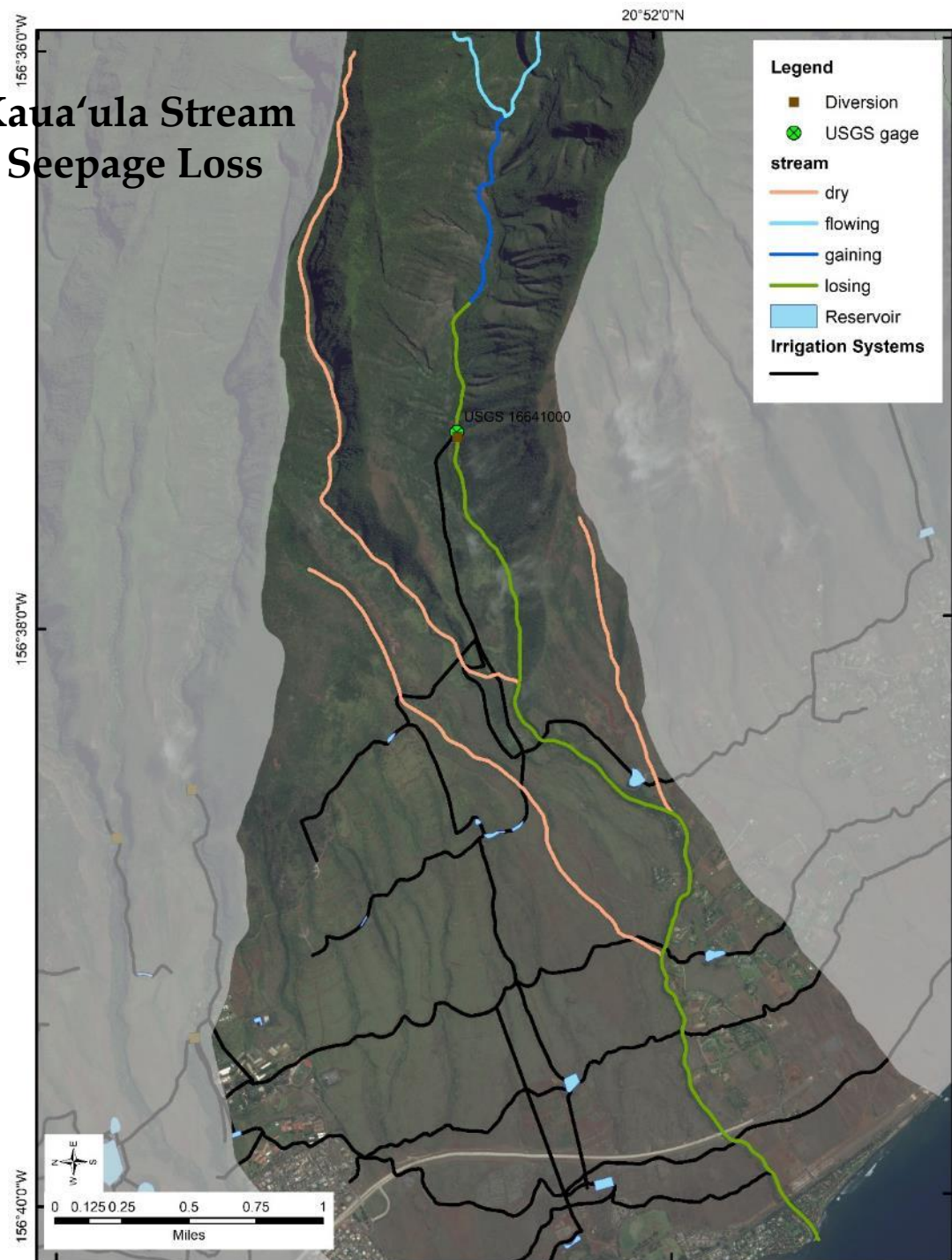
Kaua'ula Valley domestic use filter station



Kaua'ula Stream biota below siphon

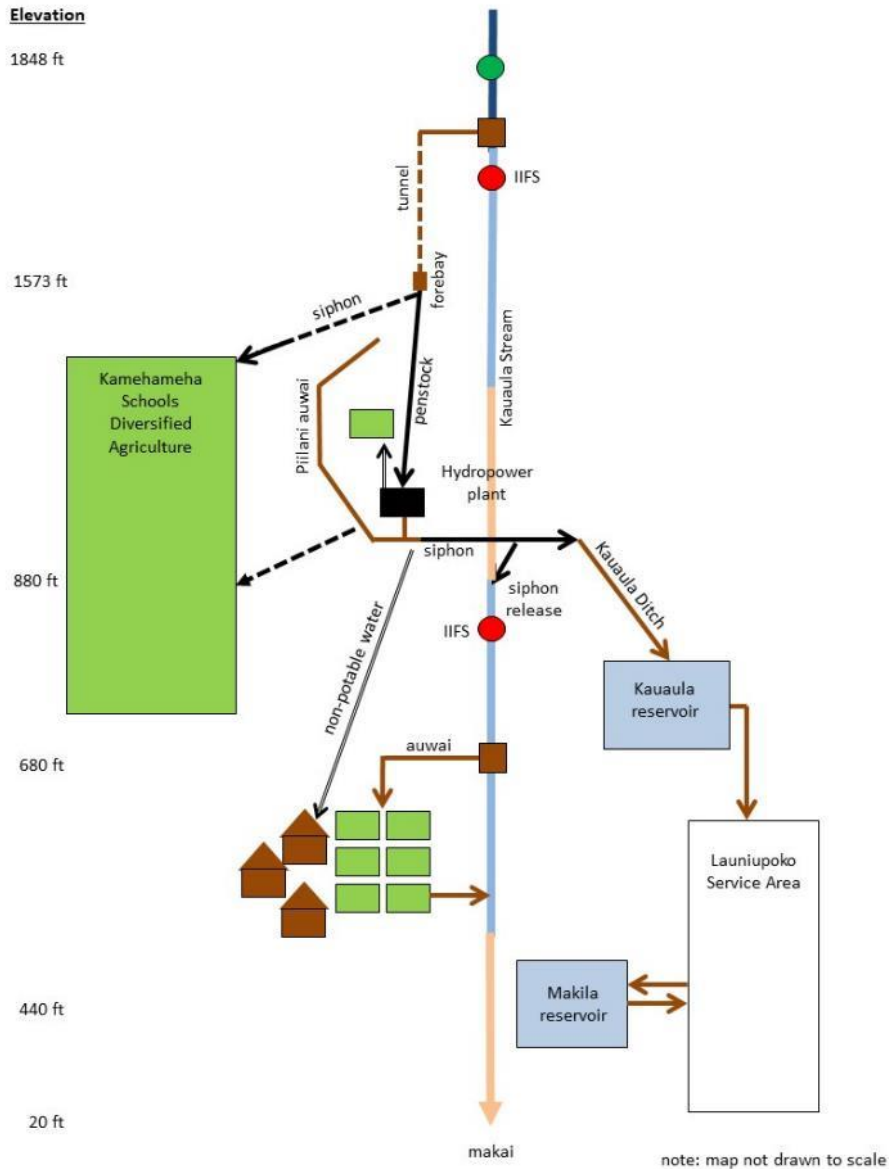


Kaua'ula Stream Seepage Loss

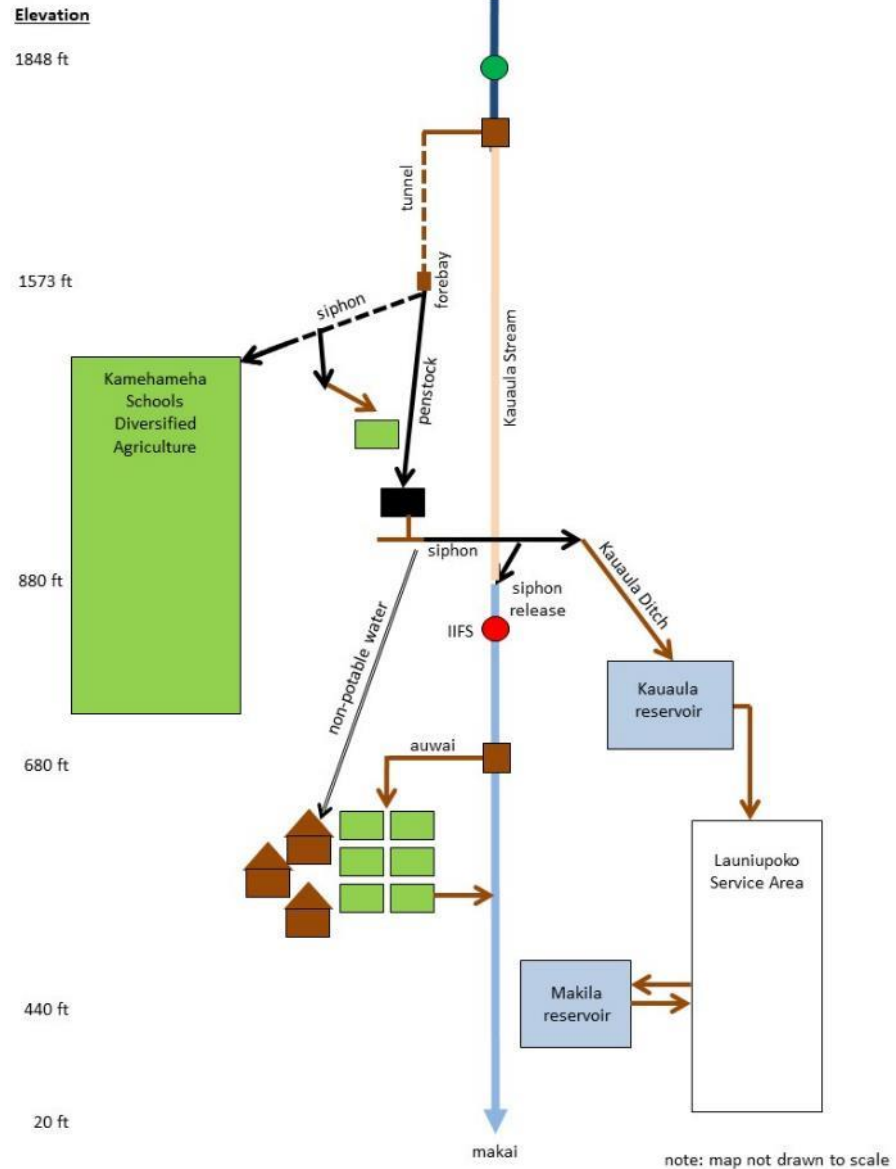


2018 Kaua'ula Stream IIFS and 2023 proposed modifications

Kaua'ula Stream Current Conditions

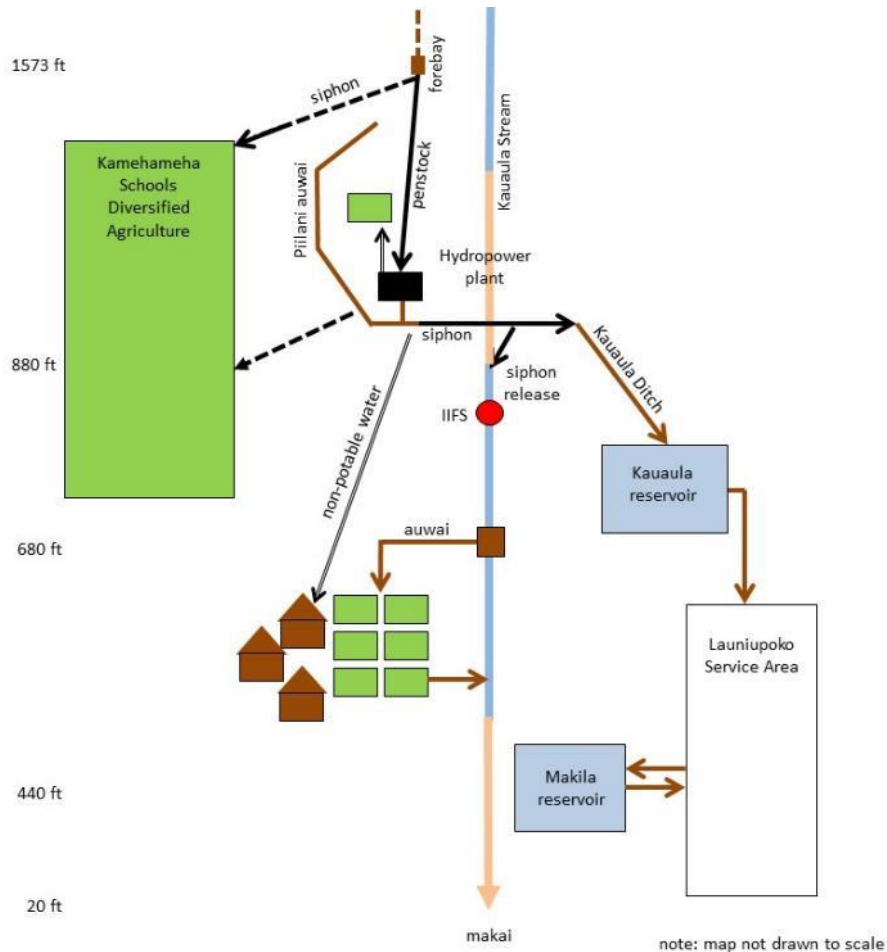


Kaua'ula Stream Proposal- July 2023

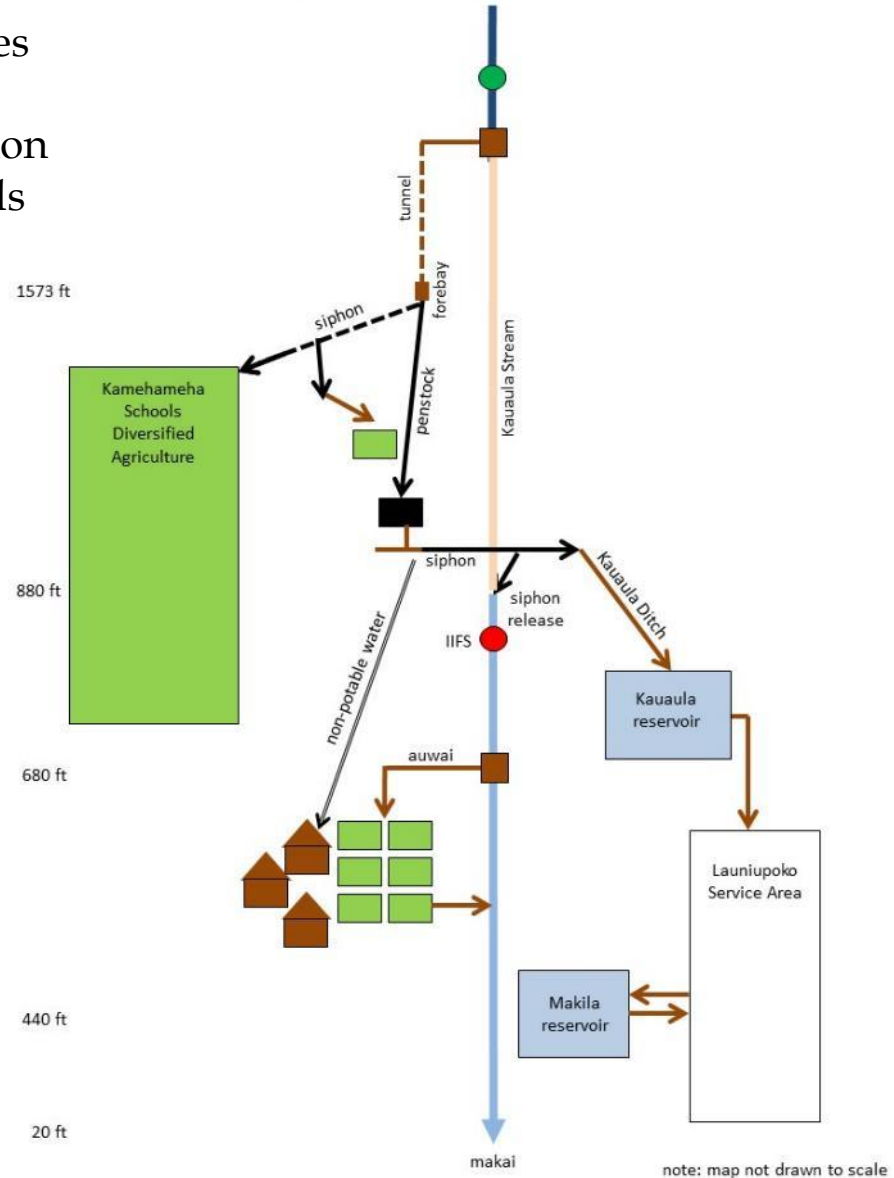


2018 Kaua'ula Stream IIFS and 2023 proposed modifications

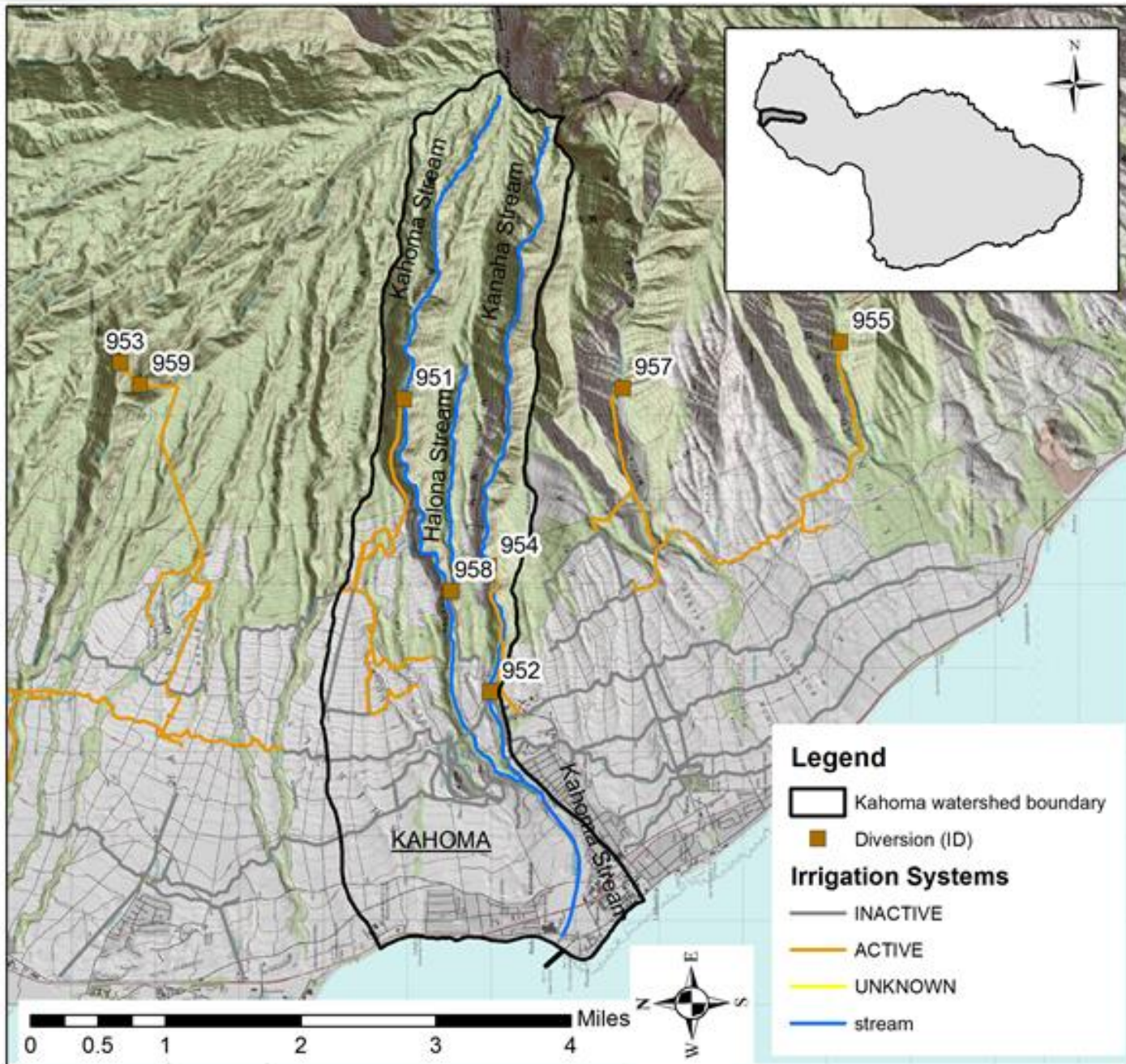
- IIFS below siphon
- Kapu Ohana Traditional and Customary Practices
- Kuleana families domestic needs
- Traditional and Customary Practices below Siphon
- Kamehameha Schools Tenants Agricultural needs



am Proposal- July 2023



West Maui IIFS Phase II: Kahoma and Kanahā Streams



Kanahā Stream

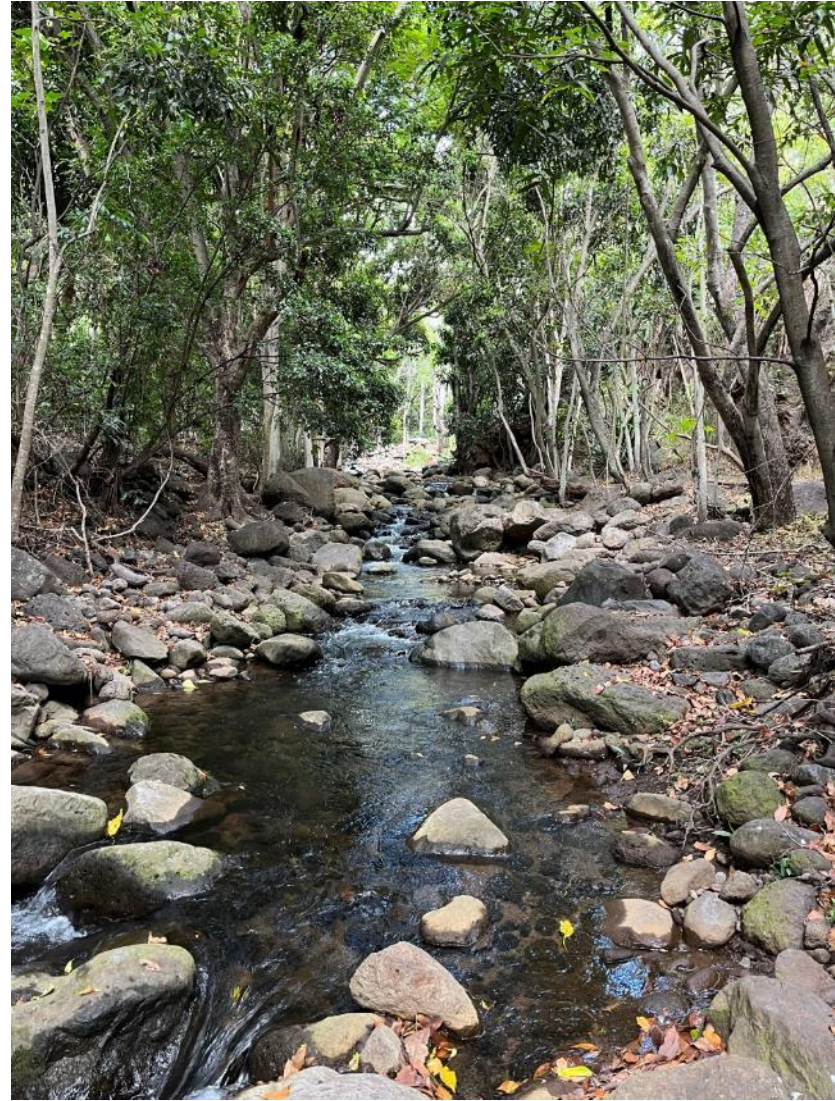
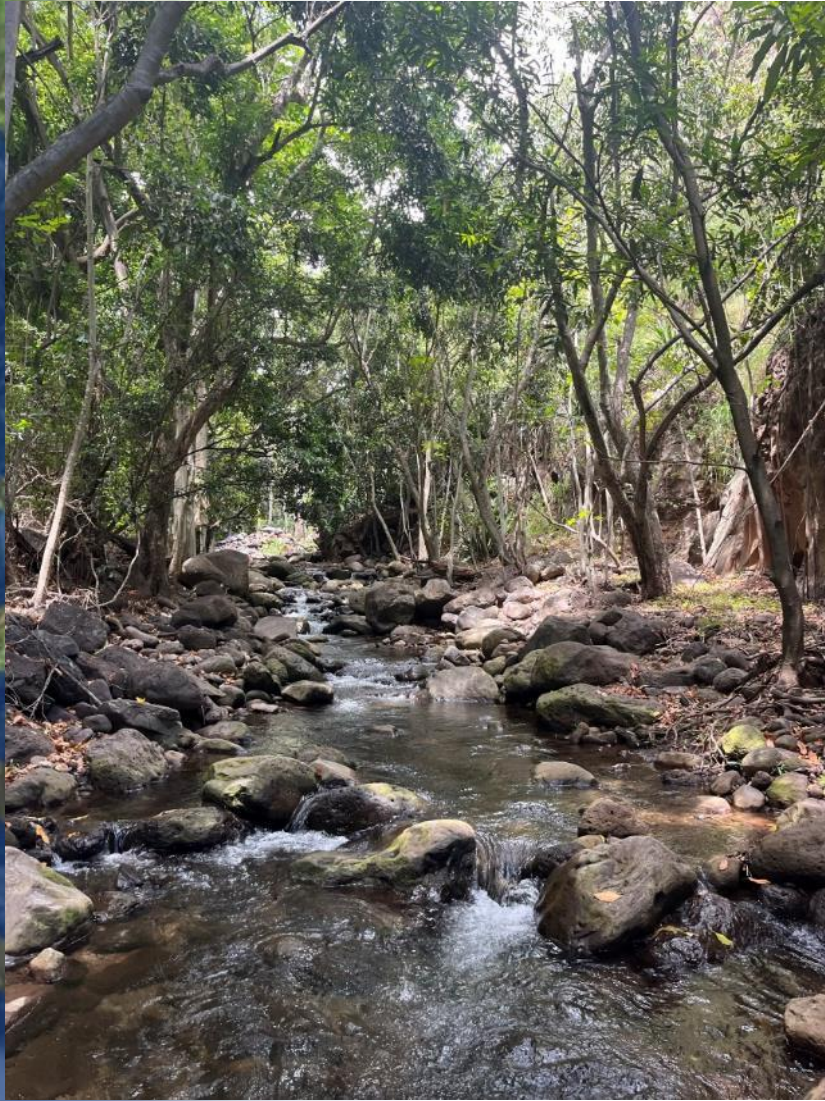
Feeds Maui Co. DWS
Lahaina WTF



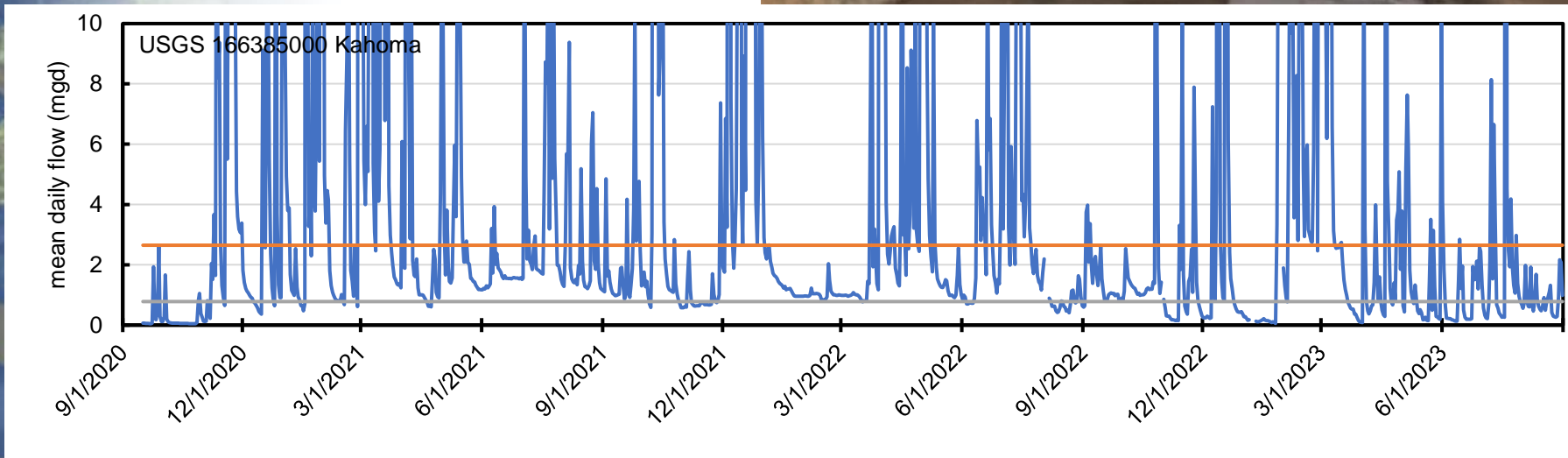
Kahoma Stream at Diversion



Kahoma Stream below Kahoma Diversion



Kahoma Stream in Lahaina



	Q50	Q60	Q70	Q80	Q90	Q95
1984-2013 USGS 2014-5087*	4.1 (2.65)	3.9 (2.52)	3.7 (2.39)	3.2 (2.07)	1.2 (0.78)	0.3 (0.19)
2022-2023 USGS 166385000 Kahoma	2.2 (1.41)	1.7 (1.12)	1.4 (0.93)	1.0 (0.67)	0.4 (0.28)	0.2 (0.15)
percent difference	-47%	-56%	-61%	-68%	-64%	-21%

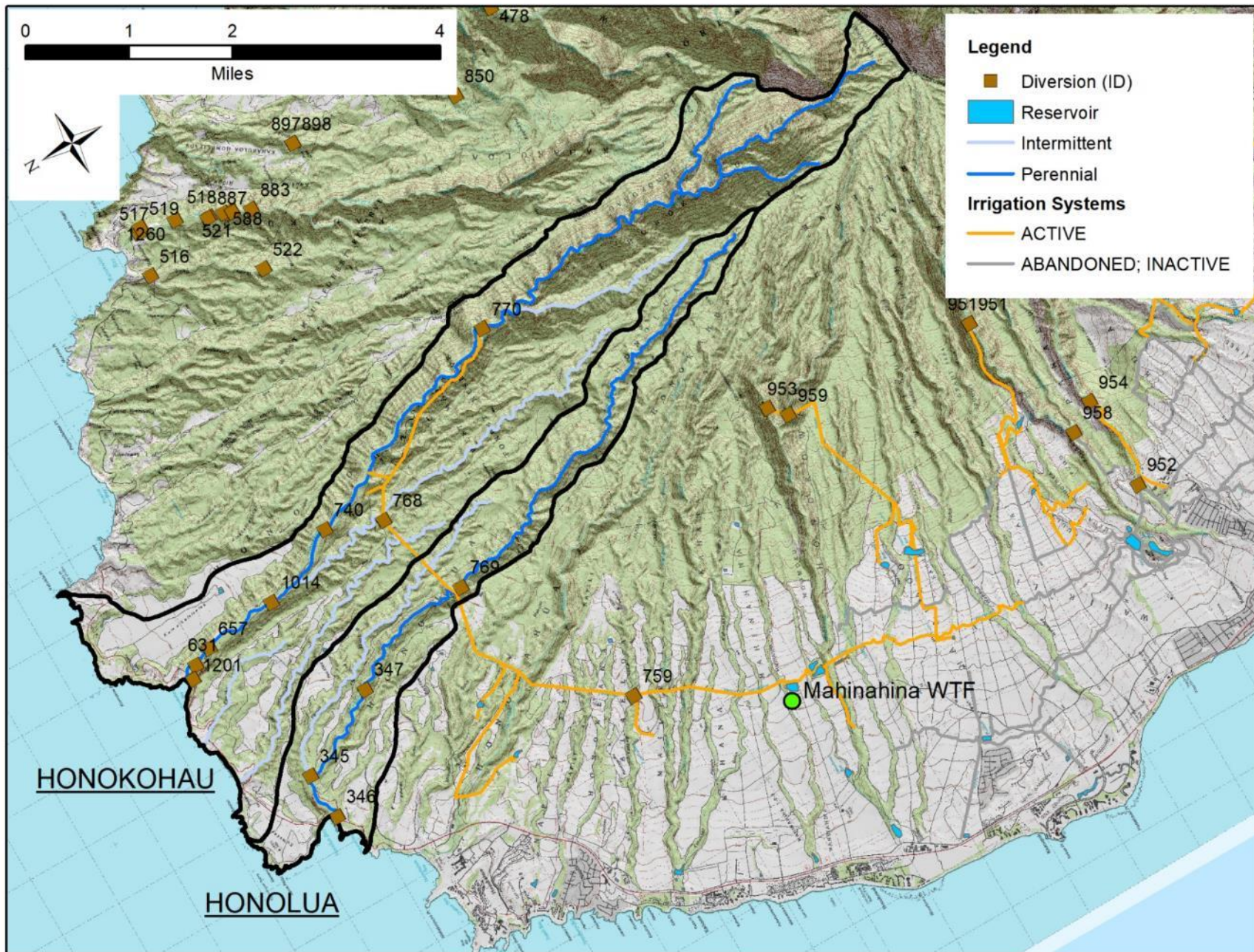
*for same location based on seepage losses

station cost \$24,000 per year

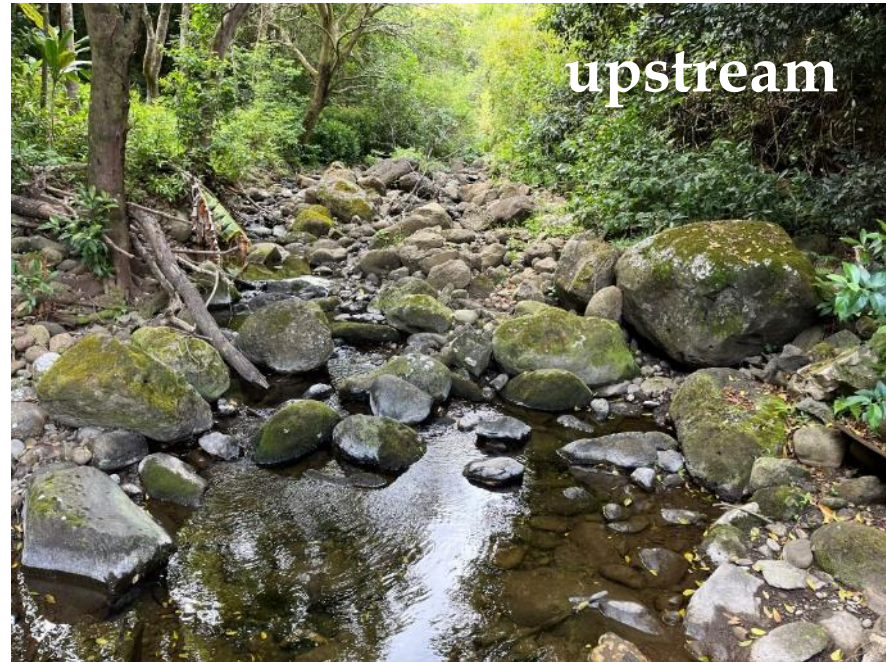
Kahoma Stream Unregistered Diversions



West Maui Phase IIFS Phase III: Honokōhau and Honolua



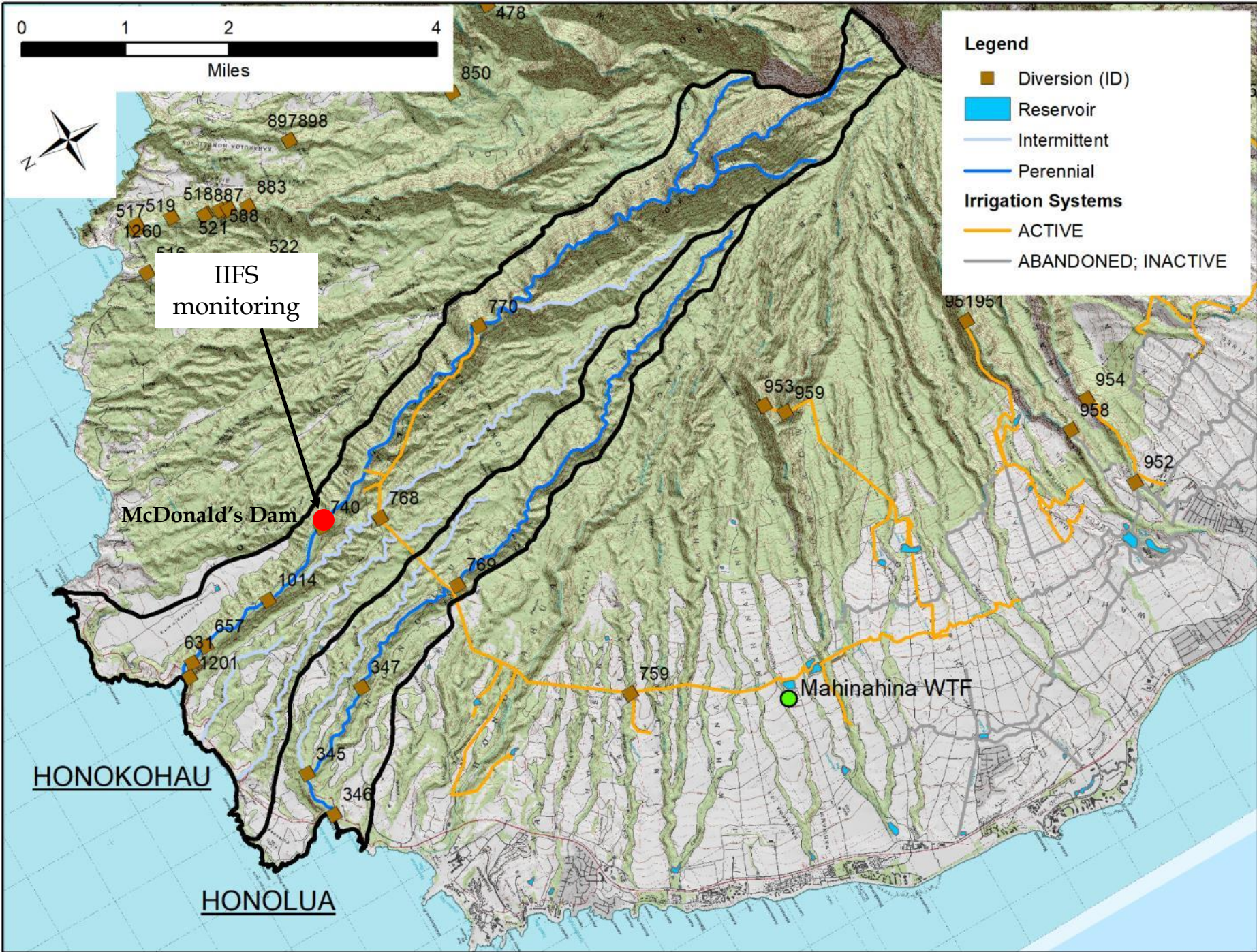
Honolua at Honokōhau Ditch diversion abandoned in 2021



Aotaki Weir/Diversion 770 (Honokōhau Ditch Intake #1)

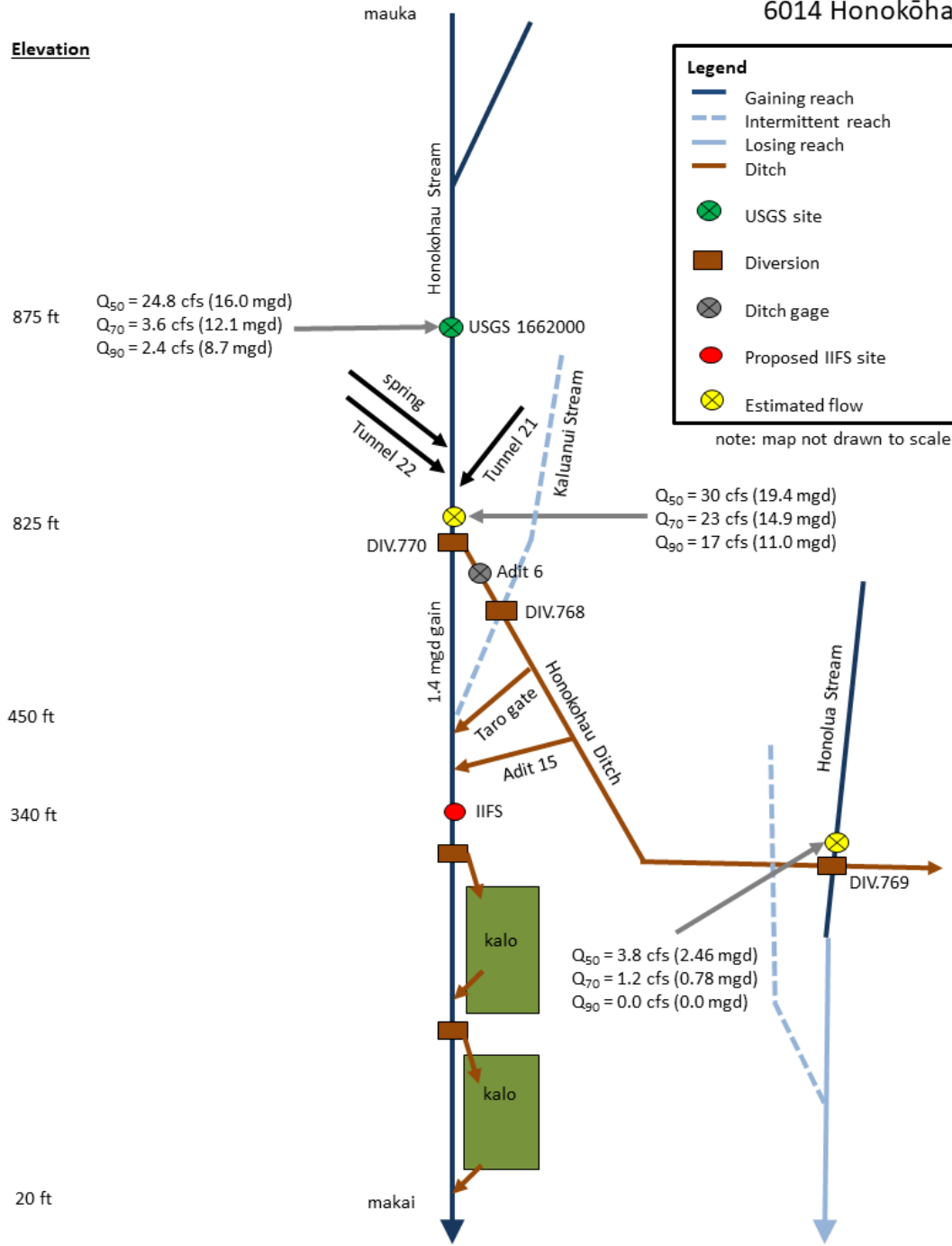
→ Following 2018 TS Lane/Olivia, mauka to makai flow around diversion





6014 Honokōhau

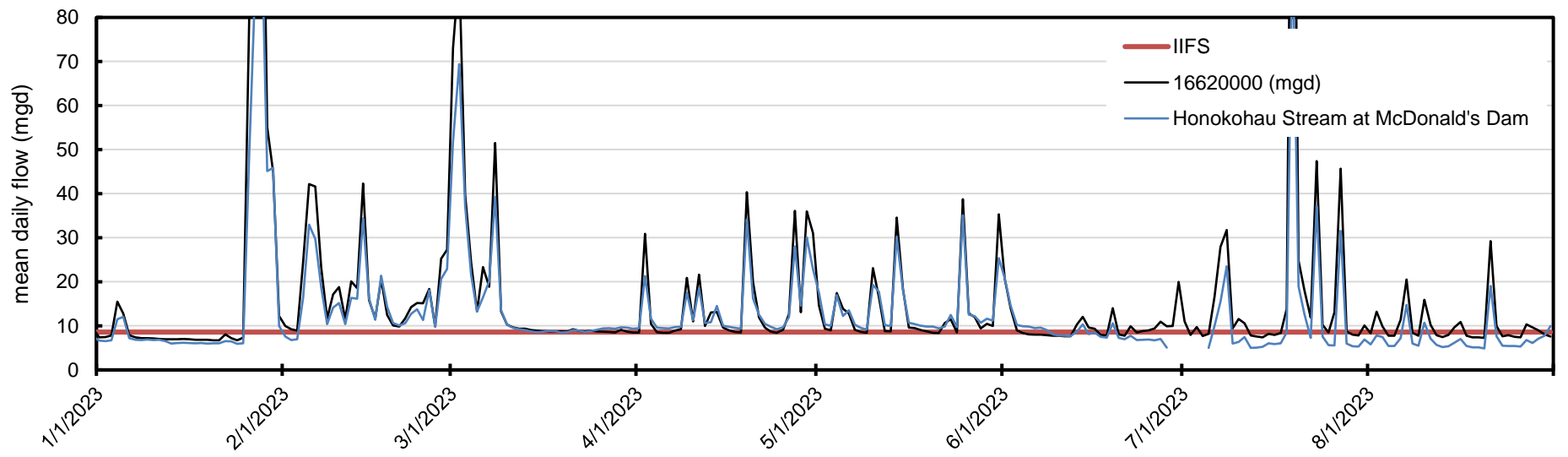
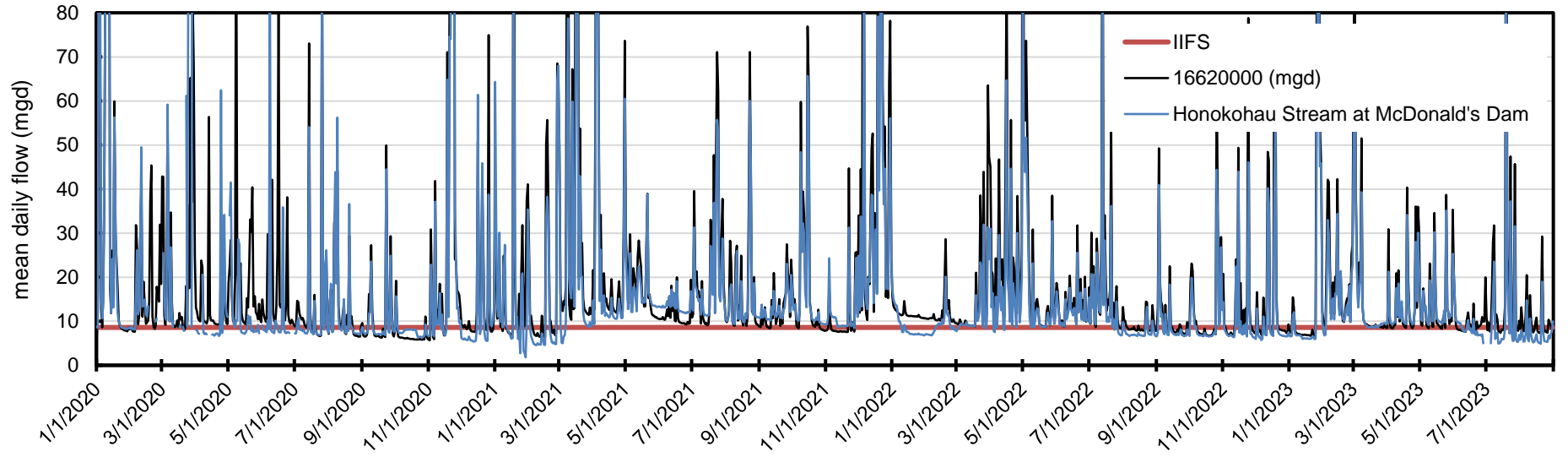
Elevation



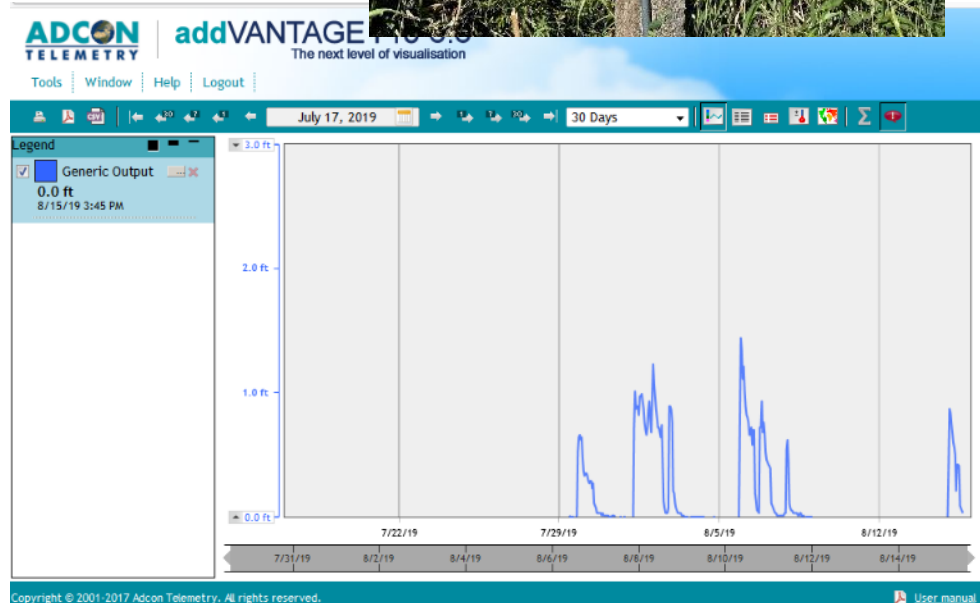
Honokōhau Stream at MacDonald's Dam



Honokōhau Stream at MacDonald's Dam



Honokōhau Ditch at Māhinahina Weir



Update on Water Resources in the Lahaina Aquifer Sector Area

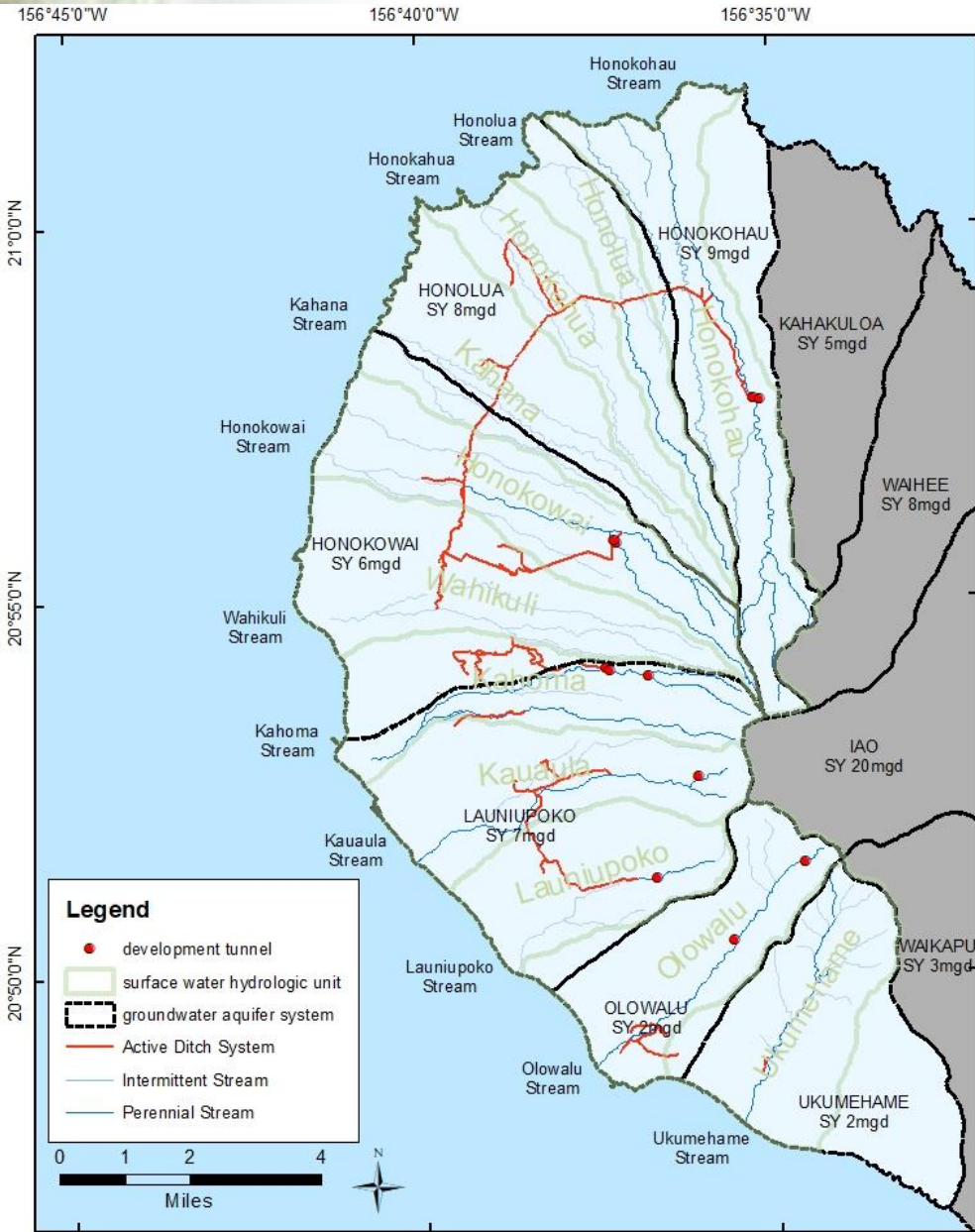
Agenda Item C-1

c. Water Management Area & Water Use Permit Applications



September 19, 2023

Water Management Area



- On June 15, 2023, the Commission adopted the **chairperson's recommendation** to designate the Lahaina Aquifer Sector Area both as surface water and ground water management area.
- Basis for designation is **harm to ground water quantity and quality by saltwater intrusion, serious historic and ongoing disputes over current and planned uses of water occurring, climate uncertainty and potential drought and decline in rainfall and recharge.**
- Surface and ground water interaction and connection that should be managed in an **integrated manner.**

Water Management Area – Findings

CWRM has affirmative duties under art. XI section 1, 7 and art. XII section 7 of the Hawai'i Constitution:

- Even though the Commission fulfilled its primary duty to establish **interim IFS** in the Lahaina ASA, **public trust uses** are **threatened** or remain **unfulfilled**. There have been multiple violations of the interim IFS.
- Lack of available stream water and streamflow to cultivate lo'i kalo and to exercise **traditional and customary Native Hawaiian practices** that rely on **water in its natural state**, mauka to makai flow, and healthy native stream fauna.
- The non-potable water needs of 2 mgd for current and foreseeable development and use of **Hawaiian Home Lands** as set forth in section 221 of the Hawaiian Homes Commission Act may be impacted by other off-stream non-potable uses in Kapalua and Kā'anapali.
- Designation **expands the tools** available to the Commission to proactively **protect** water resources and regulate **reasonable and beneficial uses of water**, including public trust purposes. The water use permit application process requires water users to disclose the purposes and amounts of their uses, which then are subject to the Commission's determination as to how to protect public trust uses affected by it.

Water Management Area – Findings cont.

State Water Code HRS § 174C-45 Surface water criteria:

- Criterion (1) “*diminishing surface water supply for future needs*” was met because of the rainfall data has shown a constant decline of rainfall over the last decades.
- Criterion (3) “*serious disputes*” was met because of the historic and ongoing conflicts over surface water use in Ukumehame, Olowalu, Launiupoko, Kaua’ula, Kahoma, Kanahā, and Honokōhau.

State Water Code HRS § 174C-44 Ground water criteria:

- Criterion (1) “*increase in water use or authorized planned use may reach 90% of SY*” was met for Honokōwai and Launiupoko aquifer.
- Criterion (2) “*actual or threatened water quality degradation determined by DOH*” was met for Honokōwai aquifer and DOH also noted legacy contaminants.
- Criterion (3) “*diminishing ground water supply for future needs*” was met because USGS projected a reduction in recharge of ground water in the Lahaina ASA range between 6.8-67.0%.
- Criterion (5) “*chloride contents of existing wells are increasing*” was met.
- Criterion (7) “*serious disputes*” was met because ground water is used to offset diminished stream water and has resulted in conflicts.
- Criterion (8) “*water development projects that have received any federal, state, or county approval may result, in the opinion of the Commission, in one of the above conditions*” was met because multiple approved well construction permit holders were not included in the authorized planned use calculations of Maui County.

Water Management Area – Findings cont.

Hawai'i Supreme Court Case Law:

In Waiāhole I, the Hawai'i Supreme Court has held that there is a direct interrelationship between surface and ground waters and that the Commission can consolidate the regulation of a single system because it comports with the Commission's function of comprehensive water planning and management.

- The Honokōhau ditch system crosses multiple surface and ground water hydrologic units, namely Honokōhau, Honolua, Honokahua, Kahana, Honokōwai, and Wahikuli. Honokōhau Stream water is diverted to provide for non-potable needs in these units and to supplement potable needs that the underlying groundwater units of Honokōwai and Honolua cannot provide.
- The ditch system also transfers development tunnel water from Kahoma across the ground water hydrologic unit boundary between Launiupoko and Honokōwai.
- A crossover between surface water hydrologic units also exists between Kahoma and Kaua'ula and Kaua'ula and Launiupoko.
- Streams in West Maui have strong interactions with the groundwater. Surface water and ground water interactions in these aquifers are assumed to have a one-to-one relationship for management purposes.

Water Management Area - Ground Water Withdrawals

Aquifer System	SY	2020 12-MAV	2021 12-MAV	Develop. tunnel discharge	APU*	total existing + APU	% SY	other perm. well capacity	total incl. other perm. well capacity	% SY
Ukumehame	2	0.042	0.065	0	1.08	1.145	57%	0	1.145	57%
Olowalu	2	0.082	0.069	0.1	0.003	0.167	8%	0.065	0.167	8%
Launiupoko	7	1.637	1.303	3.91	1.036	6.249	89%	1.433	7.682	110%
Honokōwai	6	3.48	4.008	2.5	2.533	9.041	151%	0	9.041	151%
Honolulu	8	2.131	2.534	0	1.969	4.503	56%	0	4.503	56%
Honokōhau	9	0	0	3.75	0.001	3.751	42%	0	3.751	42%

Aquifer system	12-MAV August 2022-23
Ukumehame	0.082
Olowalu	0.392
Launiupoko	2.252
Honokōwai	4.274
Honolulu	2.244
Honokōhauwai	0

- **DHHL** has an approved groundwater **reservation** of 770.000 gpd from the Honokōwai Aquifer that is included in the APU of 2.533 MGD.
- Launiupoko Irrigation Company installed pumps in skimming well Lahaina Shaft A, which uses 0.559 MGD on 12-MAV (water use reported for July 1.243 MGD).
- Olowalu Water Company installed a pump in skimming well Olowalu Pump N, which uses 0.303 on 12-MAV (water use reported for July 0.238 MGD).

Water Management Area - Well Applications Pending Completion

Note: Maui Oceanview, LP has submitted an additional well application for 6-5839-007 Pulelehua 3 in November 2022.

Table 20. Current Well Applications Pending Completion

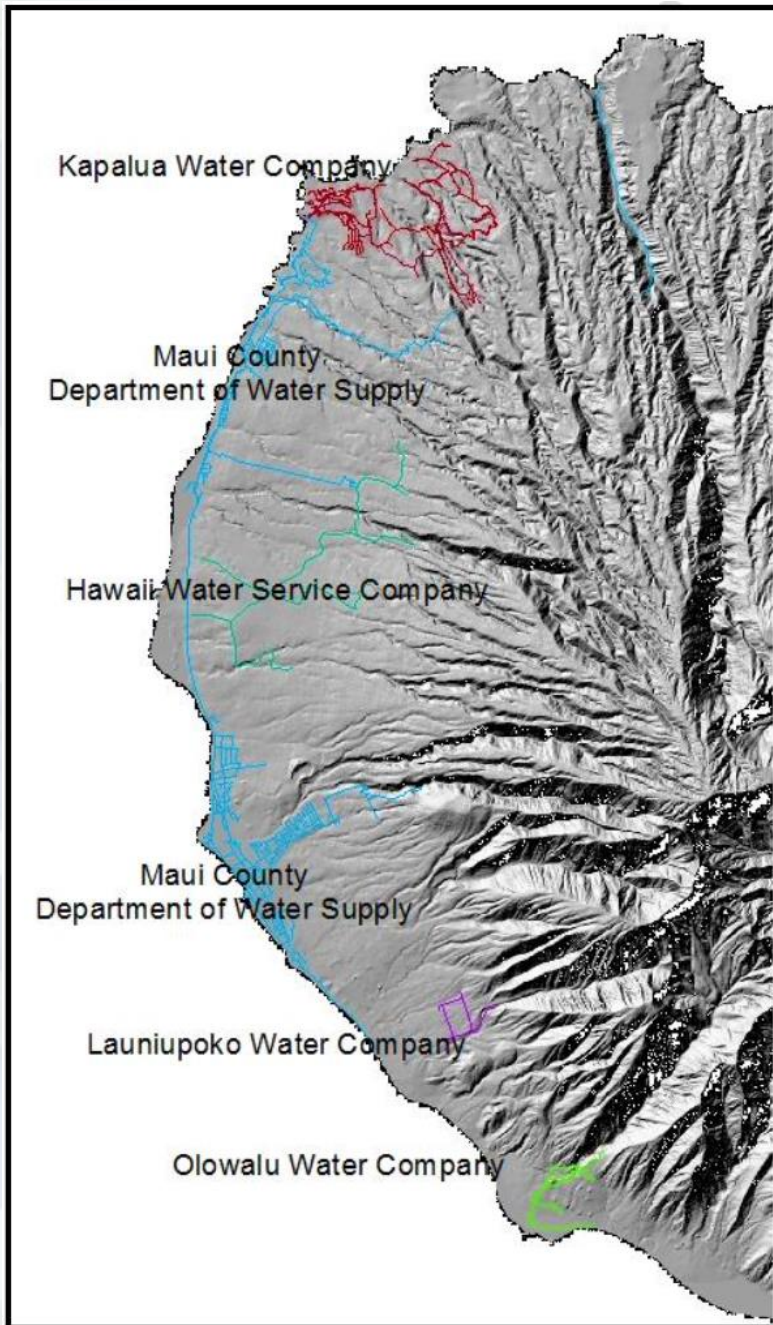
Aquifer System/Well Number	Well Name	Well Owner/Operator	Proposed capacity (mgd)	Proposed daily pumpage (gpd)	Well Use
Ukumehame					
6-4834-002	UKA-4	Ukumehame Water Association, Inc./Uka LLC	0.058	30,000	MUNPR
6-4834-003	UKA-5	Ukumehame Water Association, Inc./Uka LLC	0.504	250,000	MUNPR
Total			3.058	280,000	
Olowalu					
6-4936-004	Olowalu 2	Olowalu Water Company LLC	0.36	360,000	MUN
6-4936-005	Kahili*	Francis Cornelis & Nadja Cornelis Koole	0.065	9,000	DOM
Total			0.425	369,000	
Total *			0.065	9,000	
Launiupoko**					
6-5037-001	Jackson Rancheria*	Larry White (Jackson Rancheria Development Corp)	0.108	75,000	AGRCP
6-5038-001	Rock N Horse*	Ian Hollingsworth	0.115	100,000	DOM
6-5137-002	Maria Lynn Moyer Memorial*	Timothy & Harline Moyer Trust	0.058	5,000	DOM
6-5138-004	Mitchell*	Mitchell Family Trust	0.072	24,000	IRR
6-5138-005	LIC-2*	LIC	0.72	700,000	AGR
6-5139-004	Rogers*	Matthew Rogers (Kahalawai Holdings LLC)	--***	--***	--***
6-5239-001	Ku'ia Estate*	Gunars Valkirs (Maui Kuia Estate Chocolate Inc.)	0.36	270,000	AGRCP
Total			1.433	1174,000	
Total *			1.433	1174,000	
Honokōwai					
6-5639-004	DHHL Honokowai	Maui DWS/DHHL	1.008	680,000	MUN
Total			1.008	680,000	
Honolua					
6-5839-005	Pulelehua 1	Maui Oceanview, LP	0.864	280,000	MUN
6-5839-006	Pulelehua 2	Maui Oceanview, LP	0.864	280,000	MUN
Total			1.728	560,000	

*Other permitted well capacity (individual or irrigation wells) not accounted for in authorized planned use

**Not including requested pump installation permit for State Well No. 6-5240-003 Lahaina Shaft B.

***Not provided in well application

Water Management Area – Water Purveyors



- Maui DWS only accounts for ~23% of total water use in the Lahaina ASA.

2022 12-MAV GW + reasonable SW use

Maui DWS	Municipal Use	5,217 mgd	23%
Private	Potable Use	4,977 mgd	22%
Private	Non-potable Use	12,442 mgd	55%
Total potable demand		10,194 mgd	

- Maui DWS Mahinahina Water Treatment Facility depends on surface water from Honokōhau stream. However, two other end uses draw from Honokōhau ditch before Maui DWS can take water.

Water Management Area - Water Use: County DWS vs Large Private Systems

Data from June 2022:

System	Owner/Manager	Wells	12-MAV (mgd)	Active Development Tunnels	Stream Diversions	Estimated reasonable non-potable/potable use of SW (mgd)	estimated flow available at Q ₅₀ minus IIFS (mgd)	estimated flow available at Q ₉₀ minus IIFS (mgd)
Ukumehame	Uka, LLC	3	0.066	0	0	n/a	n/a	n/a
Ukumehame	Uka, LLC	0	n/a	0	1	0.092	0.33	0.00
Olowalu	Olowalu Water Company	1	0.067	0	1	0.487	0.58	0.00
Launiupoko non-potable	Launiupoko Irrigation Company	1	0.122	1	2	2.17	3.08	0.30
Mahanalua Nui	Launiupoko Water Company	3	0.373	0	0	n/a	n/a	n/a
Lahaina	Maui DWS	4	0.541	0	1	0.243/1.70	2.67	1.10
Kahoma	Kamehameha Schools	0	n/a	2	1	0.113	0.26	0.00
Kaanapali non-potable	Kaanapali Land Management	1	0.093	2	2	1.648	3.49 ^a	2.32 ^a
Kaanapali	Hawaii Water Service	9	3.897	0	0	n/a	n/a	n/a
Napili-Kaanapali	Maui DWS	2	1.943	2	1	2.10	12.2	2.4
Kapalua	Hawaii Water Service	3	0.574	0	0	n/a	n/a	n/a
Kapalua non-potable	Maui Land & Pineapple/Hawaii Water Service	0	n/a	2	1	7.52/2.10	12.2	2.4

^ano interim instream flow standard established

Note: Olowalu Water Company and Launiupoko Irrigation Company have installed pumps in **two skimming wells**.

Honokōhau Hydrologic Unit



Honokōhau Stream at Div 770
 → used to meet demands across multiple hydrologic units



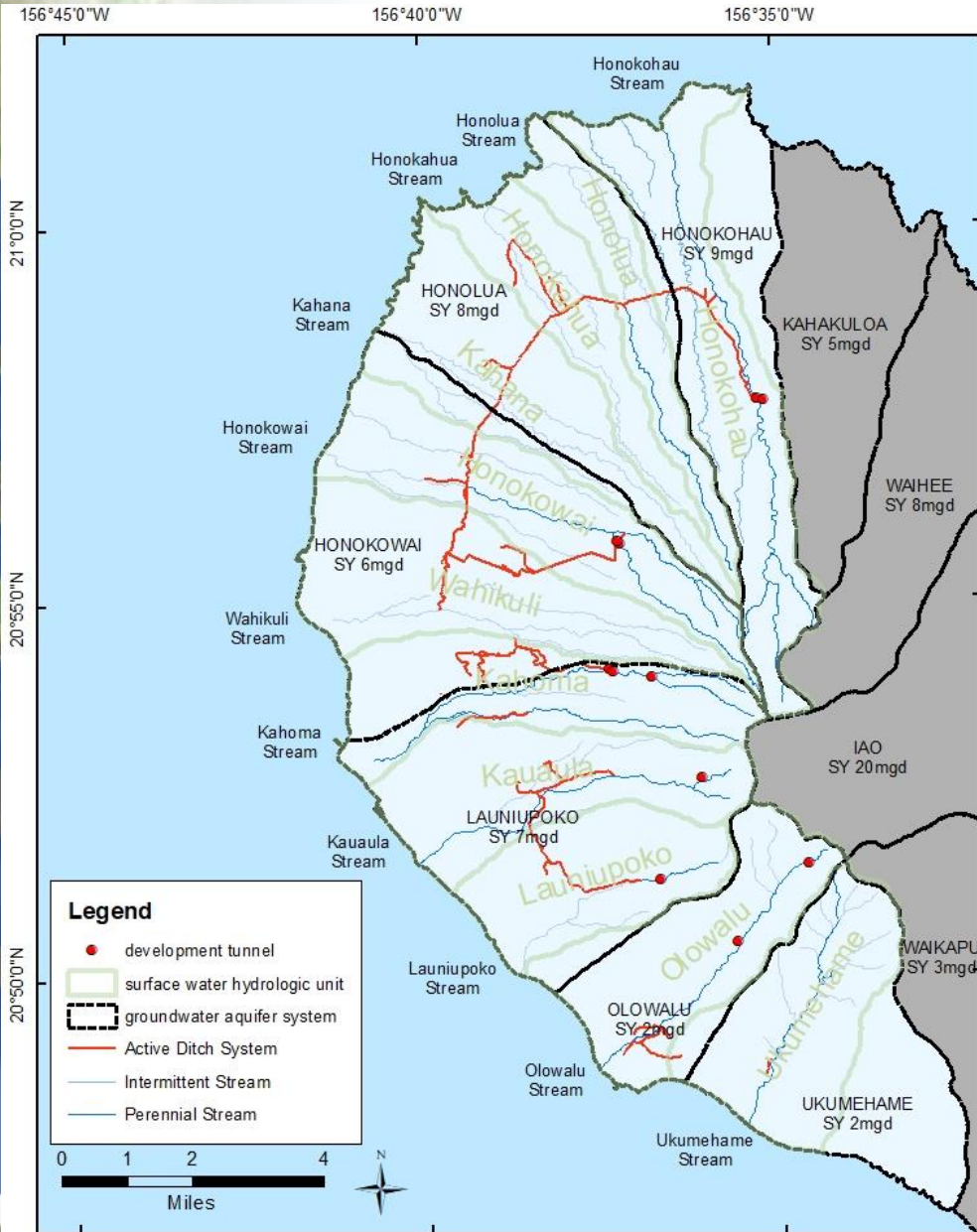
Honokōwai Hydrologic Unit

Honokōhau Ditch at Mahinahina
 → potable and non-potable use
 → Maui DWS, DHHL, Private uses

Water Management Area – Integrated Surface and Ground Water Systems



Water Management Area & Water Use Permits



- The **effective date** of the **designation** for the Lahaina Aquifer Sector Area was on **August 6, 2022**.
- Applications for **water use permits** to continue an existing use of surface or ground water had to be filed within 1 year from the effective date of designation, August 5, 2023, and were **due on August 7, 2023**.
- The Commission sent **two notices** to existing users who declared their uses, registered stream diversions or wells, and to persons who had obtained stream diversion works or well construction and pump installation permits to file water use permits applications to continue their existing uses.

Water Management Area & Water Use Permits cont.

- On August 9, 2023, Lt. Governor Sylvia Luke **suspended** the **State Water Code**, Hawaii Revised Statutes Chapter 174C, to the extent necessary to respond to the emergency in the third proclamation to the wildfires.
- On September 9, 2023, Governor Josh Green, M.D., **reinstated** the **State Water Code** in the seventh proclamation to the wildfires.
- The **designation** of the Lahaina Aquifer Sector Area as a surface and ground water management area remains **in effect**.
- Commission staff has **input** the received surface- and groundwater use permit application (SWUPA and GWUPA) for existing and new uses in the Commission data base **only** but has **refrained** from processing the applications further to avoid reaching out to applicants who are affected by the devastating Lahaina fires.

Water Use Permits Received

Total of 115 applications received by September 15, 2023:

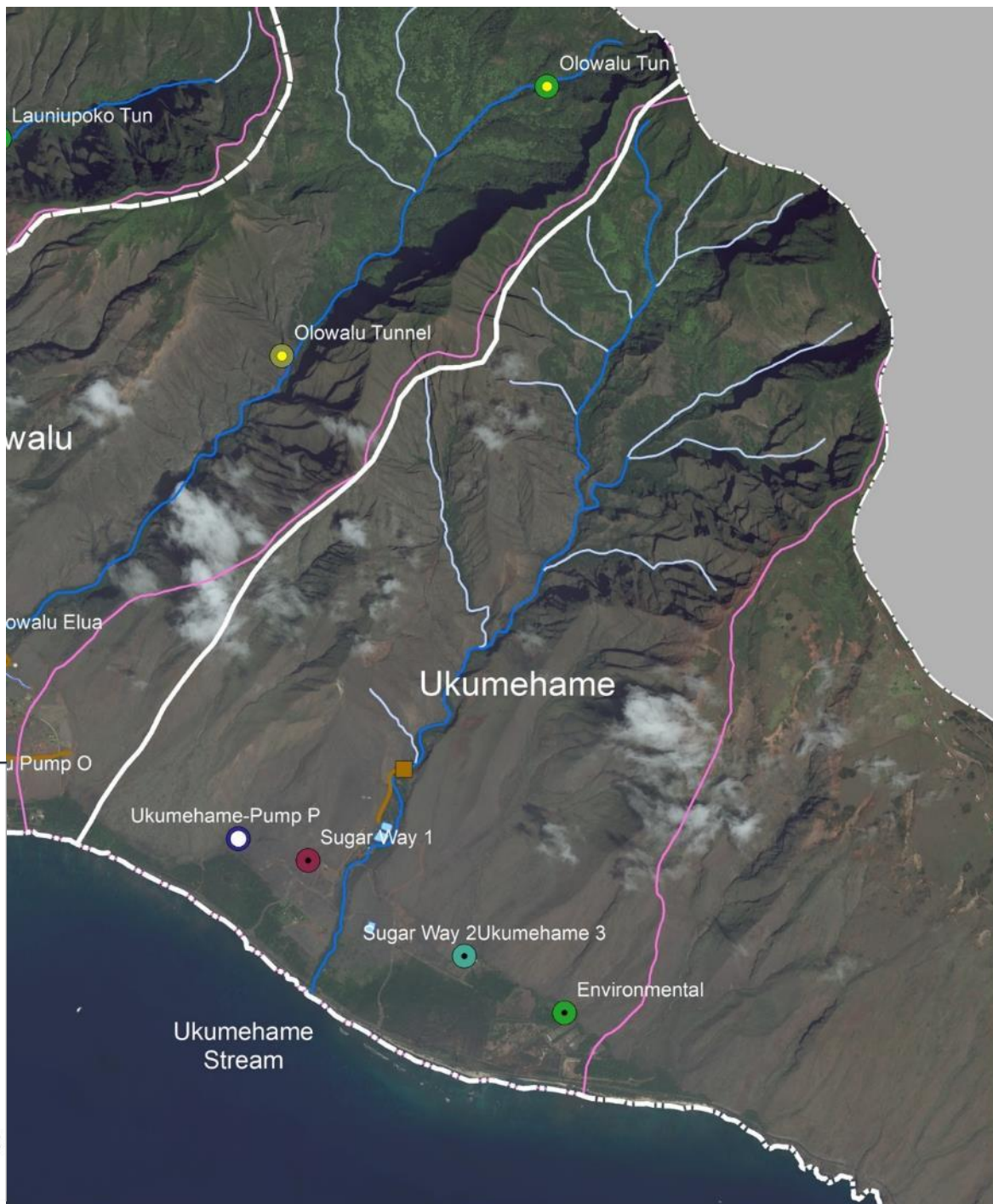
Public Trust Purpose/ Type of Permit	GWUPA-E*	GWUPA-N**	SWUPA-E	SWUPA-N
Total # of permits	36	15	57	7
Appurtenant Rights			41	3
Domestic Use	3		39	
Traditional & Customary Native Hawaiian Practice			32	3
Water in its Natural State				1
DHHL	1			

* -E stands for existing use

** -N stands for new use

Integrated Surface and Ground Water Units Ukumehame

Well Use	Unique Well Types
● ABN	○ SHF
● AGR	● TUN
● DOM	■ major diversion
● IND	— Irrigation System
● IRR	stream
● MUN	— Intermittent
● OBS	— Perennial
● OTH	■ Reservoir
● UNU	□ surface water hydro unit
	□ groundwater hydro unit



Water Use Permits Received – Ukumehame Aquifer & Hydrologic Unit

GWUPA-E

GWUPA #	Applicant	Well #	Well Name	Domestic Use	T&C Rights	DHHL
1129	Ukumehame Water Association, Inc (Carlsmith Ball)	6-4835-002; 6-4835-003; 6-4835-004;	Ukumehame Sugar Way 1; Ukumehame Sugar Way 2; Ukumehame 3	x		
1132	Ukumehame Water Association, Inc (Cades Schutte)	6-4835-003; 6-4835-004	Ukumehame Sugar Way 2; Ukumehame 3			

GWUPA-N

GWUPA #	Applicant	Well #	Well Name	Domestic Use	T&C Rights	DHHL
1133	Ukumehame Water Association, Inc	6-4835-003; 6-4835-004	Ukumehame Sugar Way 2; Ukumehame 3			
1134	Ukumehame Water Association, Inc	6-4834-003	Ukumehame Well 5			
1136	Ukumehame Water Association, Inc	6-4834-002	Ukumehame Well 4			

SWUPA-E

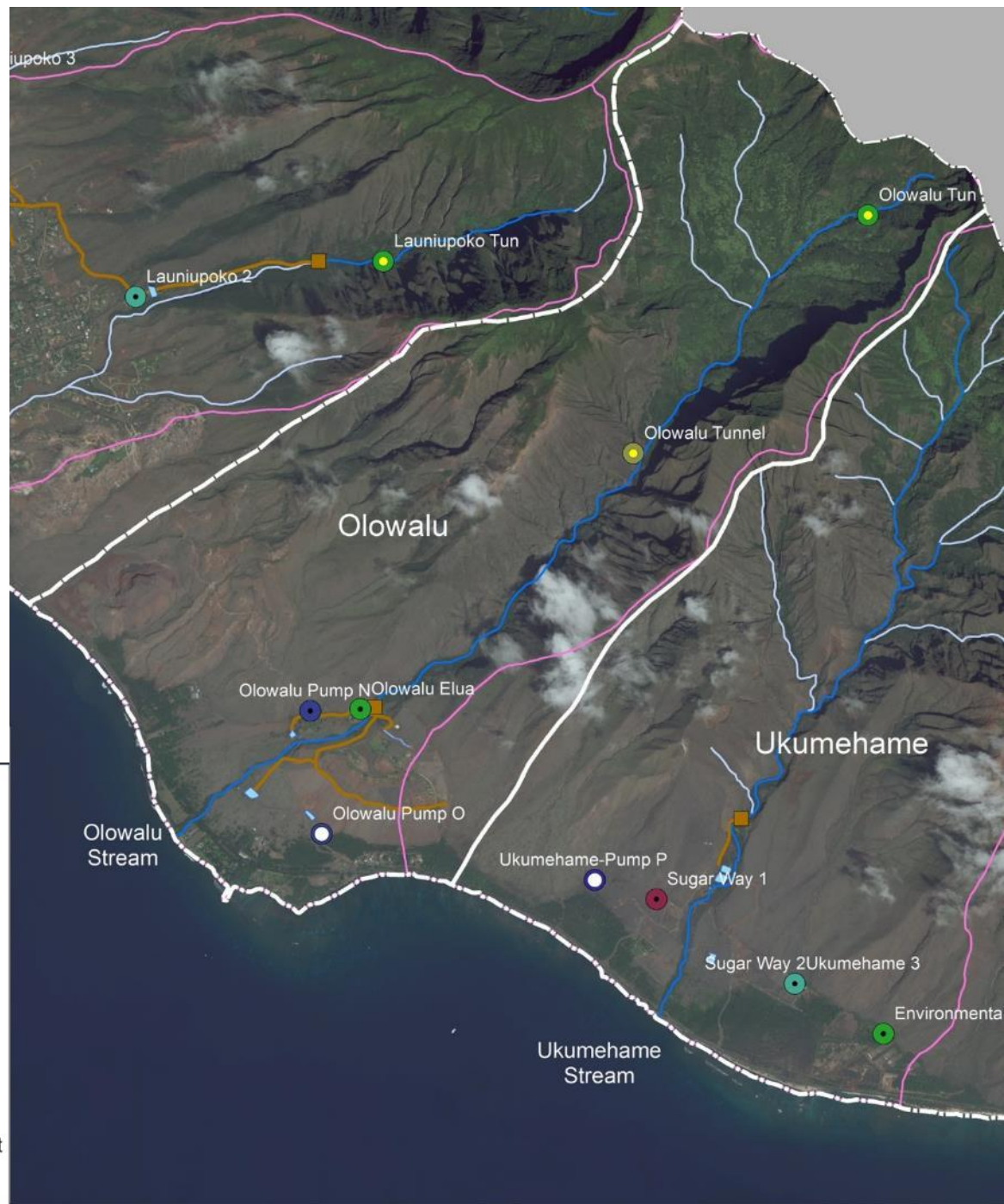
SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6061.6	West Maui Land Co Inc/ Ukumehame Water Association Inc	Ukumehame Stream					
6110.6	Rose Marie Duey	Ukumehame Stream	x	x	x		

SWUPA-N

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6062.6	West Maui Land Co Inc/ Ukumehame Water Association Inc	Ukumehame Stream					

Integrated Surface and Ground Water Units Olowalu

Well Use	Unique Well Types
● ABN	○ SHF
● AGR	● TUN
● DOM	■ major diversion
● IND	— Irrigation System
● IRR	stream
● MUN	— Intermittent
● OBS	— Perennial
● OTH	■ Reservoir
● UNU	□ surface water hydro unit
	□ groundwater hydro unit



Water Use Permits Received - Olowalu Aquifer & Hydrologic Unit

GWUPA-E

GWUPA #	Applicant	Well #	Well Name	Domestic Use	T&C Rights	DHHL
1135	Olowalu Water Company	6-4936-001	Olowalu Elua			
1141	Olowalu Water Company	6-4937-001	Olowalu Pump N			
1149	Nancy McGee	6-4936-003	McGee			

GWUPA-N

GWUPA #	Applicant	Well #	Well Name	Domestic Use	T&C Rights	DHHL
1137	Olowalu Water Company	6-4936-001	Olowalu Elua			
1138	Olowalu Water Company	6-4937-001	Olowalu Pump N			
1139	Olowalu Water Company	6-4837-001	Olowalu Pump O			
1140	Olowalu Water Company	requested	OWC 2			

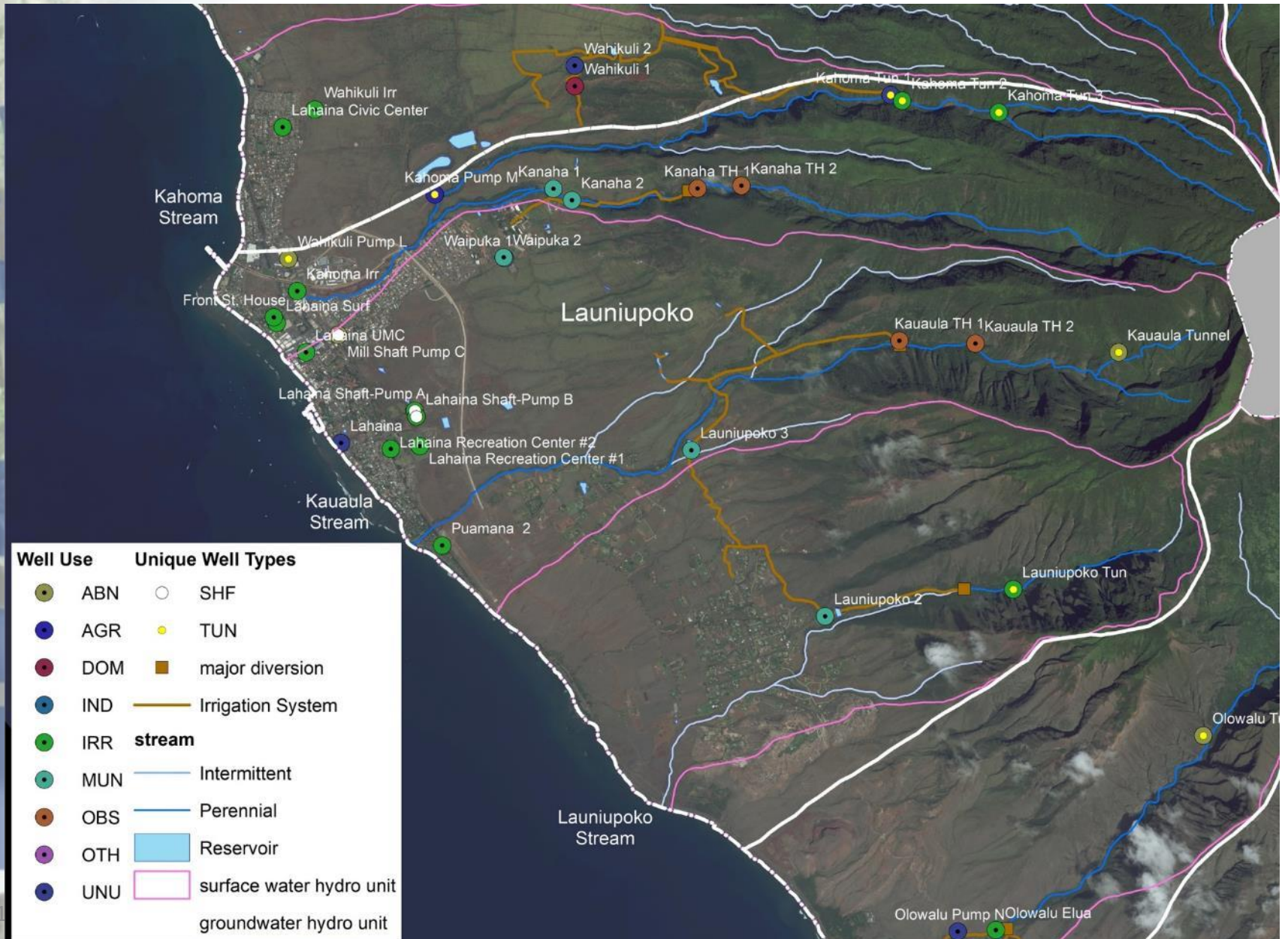
SWUPA-E

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6063.6	West Maui Land Co Inc/ Olowalu Water Co	Olowalu Stream					

SWUPA-N

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6064.6	West Maui Land Co Inc/ Olowalu Water Co	Olowalu Stream					

Integrated Surface and Ground Water Units - Launiupoko, Kaua'ula and Kahoma



Water Use Permits Received - Launiupoko Aquifer & Hydrologic Unit and Kahoma & Kaua'ula Hydrologic Units

GWUPA-E

GWUPA #	Applicant	Well #	Well Name	Domestic Use	T&C Rights	DHHL
1127	Puamana Community Association	6-5140-001; 6-5138-002	Puamana 1 & 2			
1128	Makila Kai LLC	6-5138-002	Makila Kai			
1143	Launiupoko Water Company	6-5137-001; 6-5138-001; 6-5238-001	Launiupoko 2; Launiupoko 1; Launiupoko 3			
1147	Launiupoko Irrigation Company	6-5240-003	Lahaina Shaft Pump A			
1148	Launiupoko Irrigation Company	6-5139-001	LIC 1			
1150	Maui Ku'ia Estate Chocolate, Inc	6-5239-001	Ku'ia Estate			
1155	Kahoma Land Co LLC	6-5437-002	Kahoma Tunnel			
1156	Makila Land Co	6-5236-001	Kaua'ula Tunnel			
1157	Maui DWS	6-5339-001; 6-5339-002	Waipuka 1; Waipuka 2			
1158	Maui DWS	6-5339-003; 6-5339-004	Kanaha 1; Kanaha 2			
1162	Maui County Parks and Recreation	6-5240-007	Lahaina Recreation Center 1			
1163	Maui County Parks and Recreation	6-5240-008	Lahaina Recreation Center 2			
1166	Craig Duvall	6-5138-003	Duvall	x		
1169	Ron Fetsch Trust	6-5139-003	Strombeck			

Water Use Permits Received - Launiupoko Aquifer & Hydrologic Unit and Kahoma & Kaua'ula Hydrologic Units cont.

GWUPA-N

GWUPA #	Applicant	Well #	Well Name	T&C Domestic Use Rights DHHL
1142	Launiupoko Water Company	6-5238-001	Launiupoko 3	
1144	Launiupoko Water Company	6-5138-001	Launiupoko 1	
1145	Launiupoko Irrigation Company	6-5240-003	Lahaina Shaft Pump A	
1146	Launiupoko Irrigation Company	6-5240-002	Lahaina Shaft Pump B	
1175	Maui Ku'ia Estate Chocolate, Inc	6-5239-001	Ku'ia Estate	
1177	Launiupoko Irrigation Company	requested	LIC 2	
1178	Launiupoko Irrigation Company	6-5139-001	LIC 1	

SWUPA-E

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights DHHL	Natural State
6048.6	Hans and Emily Michel	Kanaha Stream	x		x	
6059.6	Kahoma Land Company LLC	Kahoma Stream				
6073.6	Cheriden K. Kamohalii	Kahoma Stream	x	x		
6074.6	Bree Camara	Kahoma Stream	x	x	x	
6075.6	Etan K. Krupnick	Kahoma Stream	x	x	x	
6077.6	Matthew Akiona	Kahoma Stream		x	x	
6078.6	Kainoa & Risa Casco	Kahoma Stream	x	x	x	
6080.6	Andrew Chee	Kahoma Stream	x	x	x	
6081.6	Joshua Guth	Kahoma Stream		x	x	
6082.6	Harmony Casco & Justin De Leon	Kahoma Stream		x		
6084.6	Patrick & Naomi Guth	Kahoma Stream	x	x	x	
6085.6	Joshua Dean	Kahoma Stream	x	x	x	
6086.6	Maui DWS	Kanaha Stream				
6098.6	Andrew & Jordan Chee	Kahoma Stream	x	x	x	
6113.6	Suzette Felicilda	Kahoma Stream	x	x	x	
6114.6	Kalepa 'Ohana	Kahoma Stream		x	x	
6131.6	Brian Daniel Bailey	Kahoma Stream	x	x	x	

Water Use Permits Received – Launiupoko Aquifer & Hydrologic Unit and Kahoma & Kaua’ula Hydrologic Units cont.

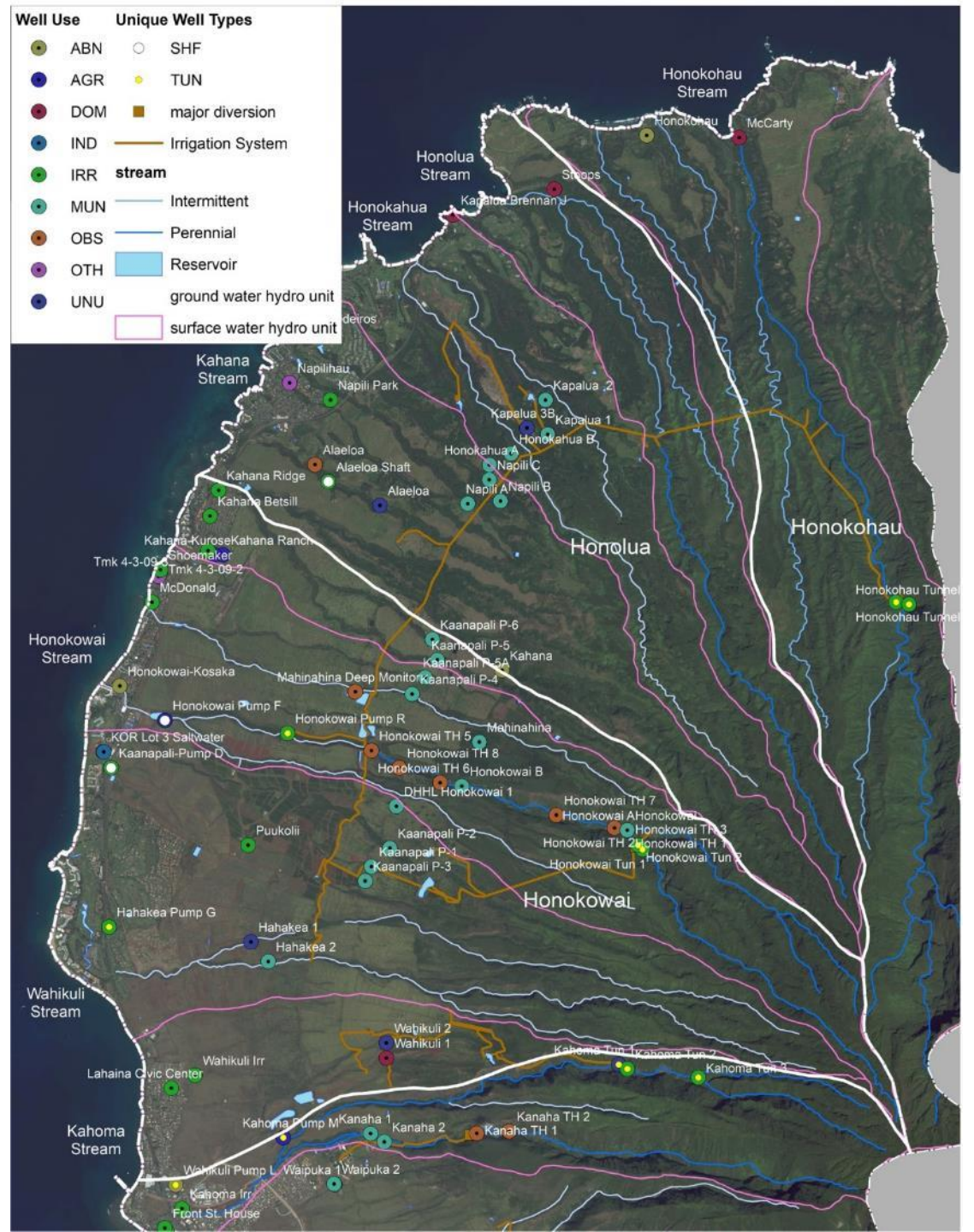
SWUPA-E

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	Natural DHHL State
6065.6	West Maui Land Co Inc/ Launiupoko Irrigation Co	Kaua’ula Stream				
6067.6	West Maui Land Co Inc/ Launiupoko Irrigation Co	Launiupoko Stream				
6068.6	Kamehameha Schools	Kaua’ula Stream		x	x	
6109.6	Samantha Dizon	Kaua’ula Stream	x	x	x	
6117.6	Ke’eaumoku Kapu (Amaa)	Kaua’ula Stream	x	x	x	
6118.6	Ke’eaumoku Kapu (Olala)	Kaua’ula Stream	x	x	x	
6124.6	Charlie & Lauren Palakiko	Kaua’ula Stream	x	x	x	

SWUPA-N

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	Natural DHHL State
6060.6	Kahoma Land Company LLC	Kahoma Stream				
6066.6	West Maui Land Co Inc/ Launiupoko Irrigation Co	Kaua’ula Stream				
6069.6	Kamehameha Schools	Kaua’ula Stream		x	x	
6130.6	Nā ‘Aikāne o Maui, Inc	Kaua’ula Stream		x	x	x

Integrated Surface and Ground Water Units – Honokōwai, Honolua & Honokōhau Aquifer and Hydrologic Units



Water Use Permits Received - Honokōwai & Honolua & Honokōhau Aquifer and Hydrologic Units

GWUPA-E

GWUPA #	Applicant	Well #	Well Name	Aquifer	Domestic Use	T&C Rights	DHHL
1131	Susan Kean (John M Kean Trust)	6-0038-001	Kapalua Brennan J	Honolua	x		
1151	AOAO Villas at Kahana Ridge	6-5840-004	Kahana Betsill	Honokōwai			
1152	Nanea Ocean Resort Community Association, Inc	6-5641-003; 6-5641-004	KOR Lot 3 Saltwater & Backup	Honokōwai			
1153	Kahana Ridge HOA	6-5840-002	Kahana Ridge	Honokōwai			
1154	Daniel Levy	6-5741-001	McDonald	Honokōwai			
	TY Management Corporation	6-5938-002; 6-5938-003	Kapalua 1; Kapalua 2	Honolua			
1159	Maui DWS	6-5938-001; 6-5838-001; 6-5838-002; 6-5838-004	Honokahua B; Napili A; Napili B; Napili C	Honolua			
1160	Maui DWS	6-5938-002; 6-5938-003	Kapalua 1; Kapalua 2	Honolua			
1161	Lars Wernars Trust	6-5840-003	Kahana Ranch	Honokōwai			
1164	Maui County Parks and Recreation	6-5441-002	Lahaina Civic Center	Honokōwai			
1165	Maui County Parks and Recreation	6-5939-002	Napili Park	Honokōwai			
1168	DHHL	6-5440-001	Wahikuli Irrigation	Honokōwai			x

*table continues on next slide

Water Use Permits Received - Honokōwai & Honolulu & Honokōhau Aquifer and Hydrologic Units cont.

GWUPA #	Applicant	Well #	Well Name	Aquifer	Domestic Use	T&C Rights	DHHL
1170	Hawaii Water Service Co, Inc	6-5938-002; 6-5938-003	Kapalua 1; Kapalua 2	Honolua			
1171	Kaanapali Land Management Co	6-5537-001; 6-5537-002; 6-5540-001	Honokowai Tunnel 1; Honokowai Tunnel 2; Puukolii	Honokōwai			
1172	Hawaii Water Service Co, Inc	6-5539-001; 6-5539-002; 6-5539-003	P1; P2; P3	Honokōwai			
1173	Hawaii Water Service Co, Inc	6-5738-001; 6-5739-001; 6-5739-002; 6-5739-004	P-5; P-4; P-6; P-5A	Honokōwai			
1174	Hawaii Water Service Co, Inc	6-5540-003	Hahakea 2	Honokōwai			

GWUPA-N

GWUPA #	Applicant	Well #	Well Name	Aquifer	Domestic Use	T&C Rights	DHHL
1176	Kahoma Land Co LLC	6-5439-001	Wahikuli 1	Honokōwai			

SWUPA-E

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6079.6	Thomas Pace	Honolua Stream	x	x	x		
6107.6	John Carty	Honolua Stream	x	x	x		

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6071.6	Kaanapali Land Management Corp	Honokōwai Stream					

Water Use Permits Received - Honokōwai & Honolulu & Honokōhau Aquifer and Hydrologic Units cont.

SWUPA-E

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6070.6	Kaanapali Land Management Corp	Honokōhau Stream					
6072.6	Hawaii Water Service	Honokōhau Stream					
6076.6	Shirley C. Chung	Honokōhau Stream	x				
6083.6	Patrick & Naomi Guth	Honokōhau Stream	x	x	x		
6096.6	Maui DWS	Honokōhau Stream					
6097.6	TY Management Corporation (Kapalua Golf Courses)	Honokōhau Stream					
6103.6	Charmane Ai Yamada	Honokōhau Stream	x	x	x		
6104.6	Piimauna Aiwohi	Honokōhau Stream	x	x	x		
6105.6	Joseph Bingham	Honokōhau Stream	x				
6106.6	Job Keanuenu Cabato	Honokōhau Stream	x	x	x		
6108.6	Chun Ohana	Honokōhau Stream	x	x	x		
6111.6	Edmission & Kapahulehua	Honokōhau Stream	x	x			
6112.6	Larrick Kapule Eubank	Honokōhau Stream	x	x			
6115.6	Karyn & Maka Kanekoa	Honokōhau Stream	x	x	x		

*table continues on next slide

Water Use Permits Received - Honokōwai & Honolua & Honokōhau Aquifer and Hydrologic Units cont.

SWUPA-E

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6116.6	Steven Kapaku	Honokōhau Stream	x	x			
6119.6	Keith Kauhane	Honokōhau Stream	x	x	x		
6120.6	Keith Keahi	Honokōhau Stream	x	x	x		
6121.6	Kirk Lai	Honokōhau Stream	x	x	x		
6122.6	James Kimo Lindsey	Honokōhau Stream			x		
6123.6	Gretchen Losano	Honokōhau Stream	x	x	x		
6125.6	Ehuehuokekai Pali	Honokōhau Stream	x	x	x		
6126.6	Lorraine Schattenburg	Honokōhau Stream	x	x			
6127.6	Leona Shim	Honokōhau Stream	x	x	x		
6128.6	Kainoa Wilson	Honokōhau Stream	x	x	x		
6129.6	Malia Wong	Honokōhau Stream	x	x	x		
6132.6	Willie Wood	Honokōhau Stream	x	x			

SWUPA-N

SWUPA #	Applicant	Source	Domestic Use	Appurtenant Rights	T&C Rights	DHHL	Natural State
6102.6	Karyn and Maka Kanekoa	Honokōhau Stream		x	x		

Update on Water Resources in the Lahaina Aquifer Sector Area

Agenda Item C-1

d. Water Resource Alternatives



September 19, 2023

Proposed Alternative Water Sources in West Maui

Option 1: Expand R1 Use

Expansion of Recycled Water Use Distribution
and Reservoir Improvements

Option 2: Repurposing Existing Source

Honokōwai Development Tunnel

Option 1: Expand R1 Use

Lahaina Recycled Water Reservoir and Distribution Improvements

Benefits

- Increased storage of recycled water for distribution
- Reduced reliance on surface water for non-potable needs
- Reduced groundwater injection of recycled water
- Increased storage of non-potable water for agriculture and fire fighting

FIGURE 1-1: LAHAINA WWRF LOCATION AND SERVICE AREA
LAHAINA WASTEWATER RECLAMATION FACILITY



Facility Location and Service Area

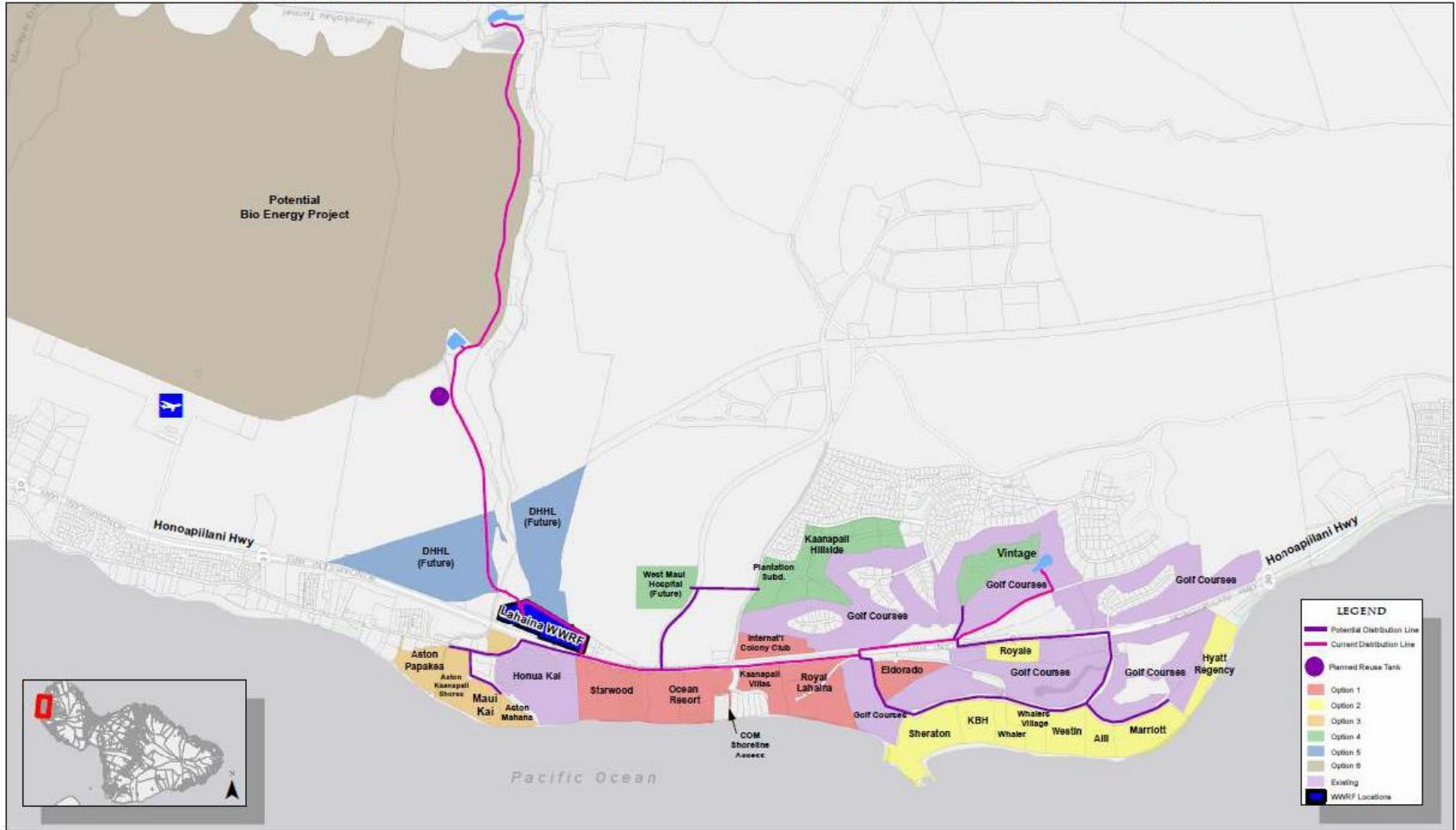
1 inch = 0.65 miles
 1 inch = 3,439 feet



Figure 1-1
 Page - 4

FIGURE 3-1: WEST MAUI POTENTIAL R-1 RECYCLED WATER EXPANSION OPTIONS

WEST MAUI POTENTIAL R-1 RECYCLED WATER EXPANSION OPTIONS



LEGEND

- Potential Distribution Line
- Current Distribution Line
- Planned Reuse Tank
- Option 1
- Option 2
- Option 3
- Option 4
- Option 5
- Option 6
- Existing
- WWRP Locations

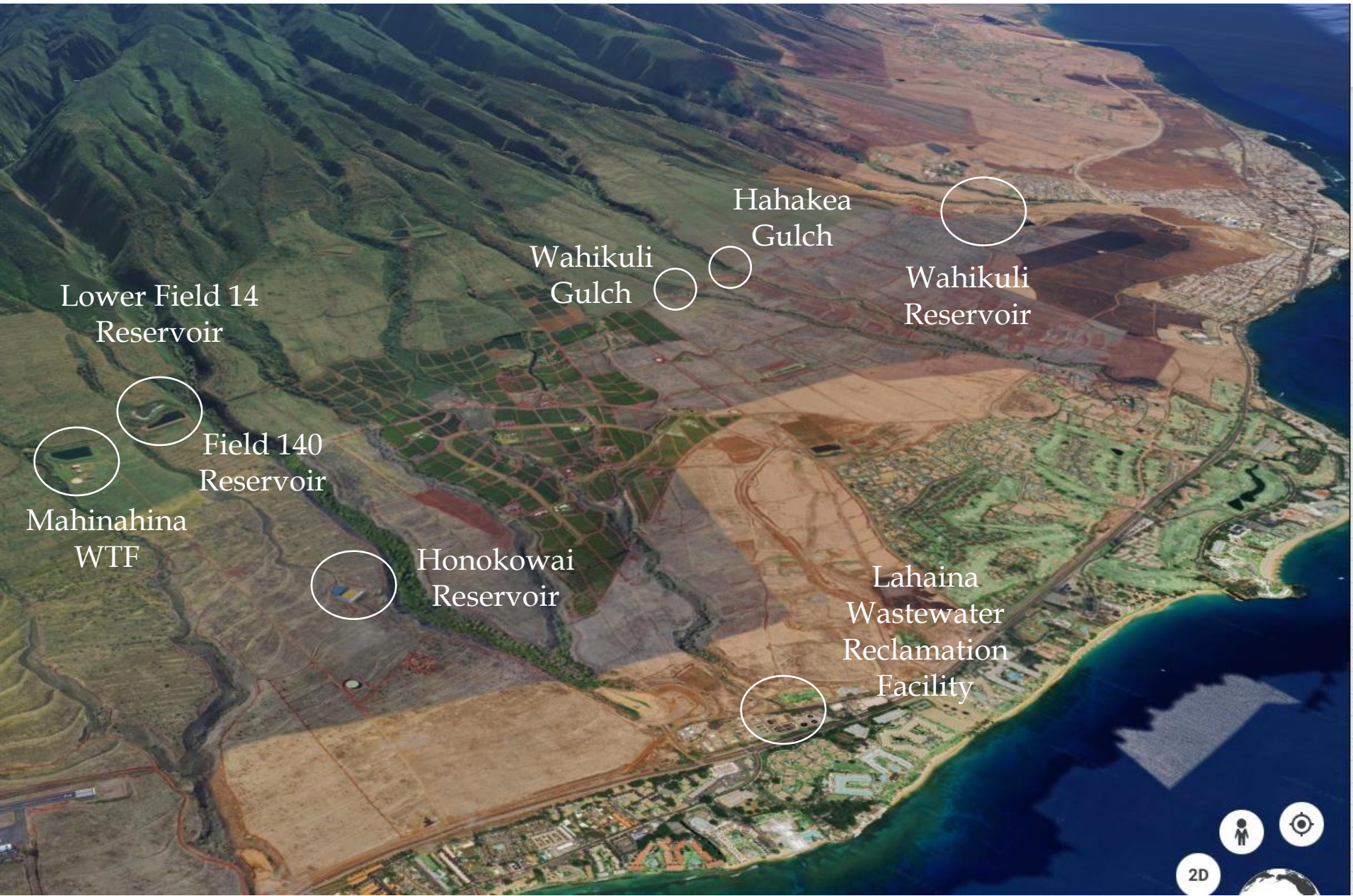


1 inch = 1,850 feet / 1 inch = 0.29 miles

Figure 3-1
Page 15



Created by Maui County Waterworks



Lower Field 14
Reservoir

Field 140
Reservoir

Mahinahina
WTF

Honokowai
Reservoir

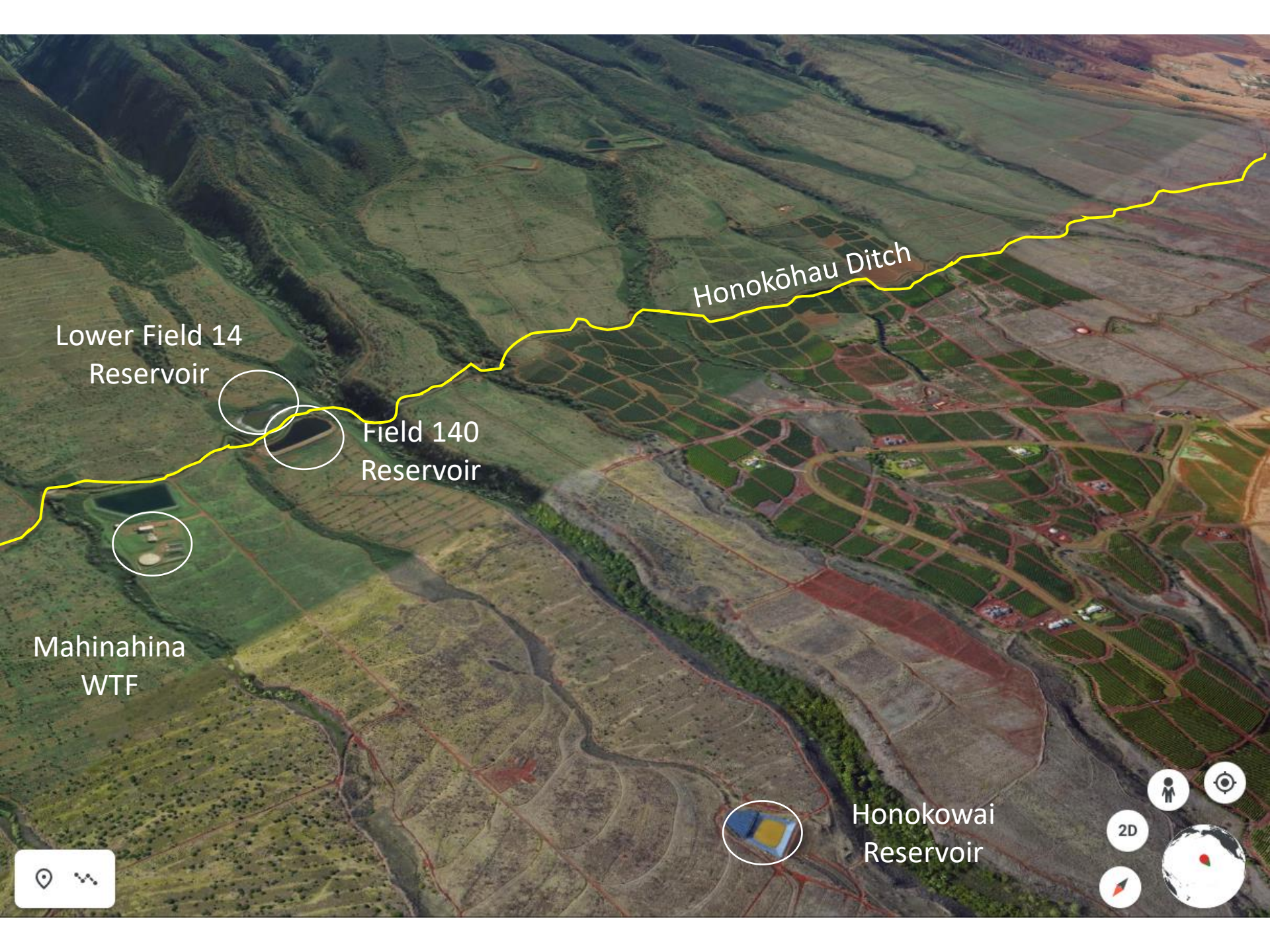
Wahikuli
Gulch

Hahakea
Gulch

Wahikuli
Reservoir

Lahaina
Wastewater
Reclamation
Facility

2D



Lower Field 14
Reservoir

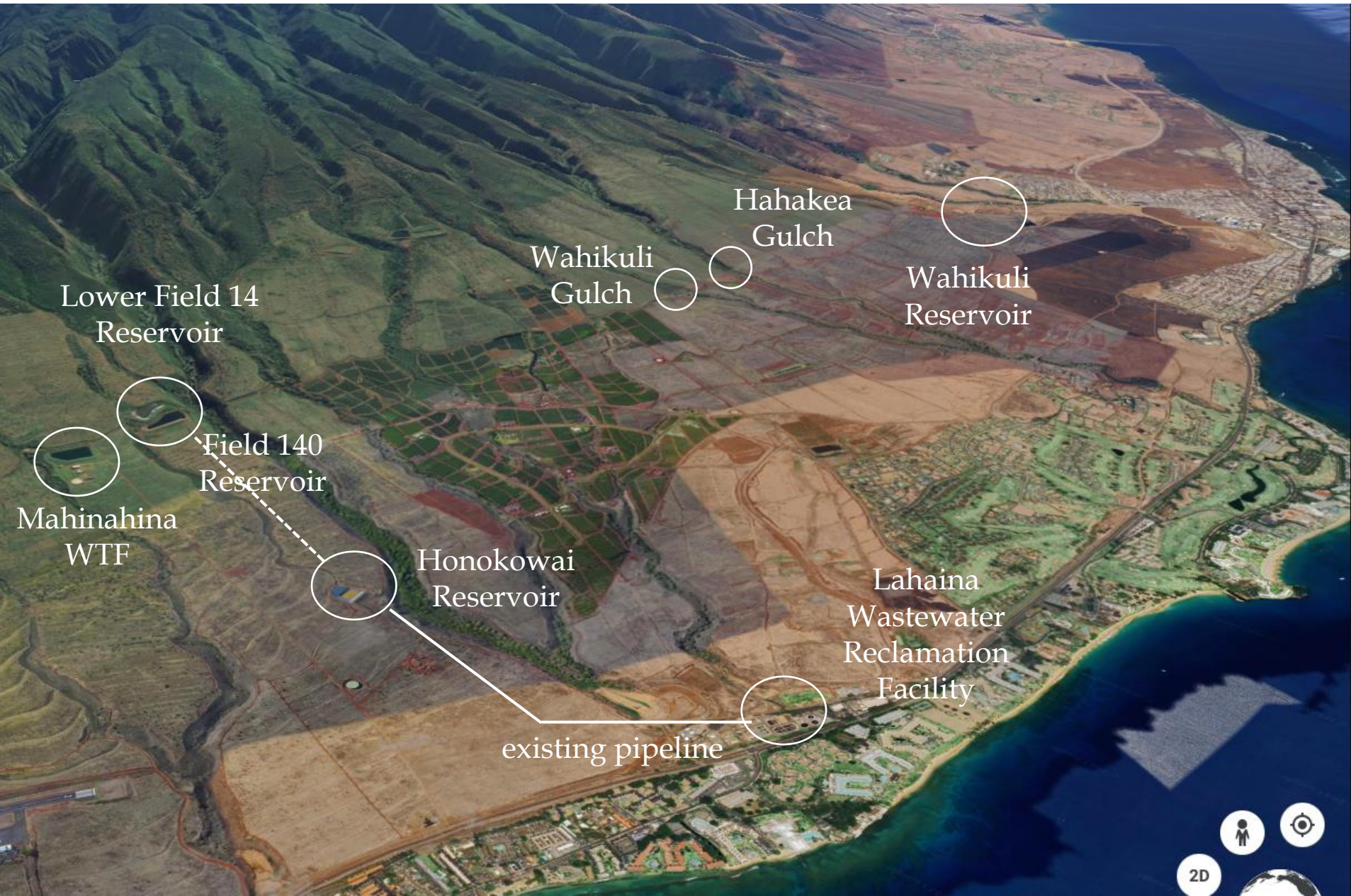
Field 140
Reservoir

Mahinahina
WTF

Honokōhau Ditch

Honokowai
Reservoir





Lower Field 14
Reservoir

Field 140
Reservoir

Mahinahina
WTF

Honokowai
Reservoir

Wahikuli
Gulch

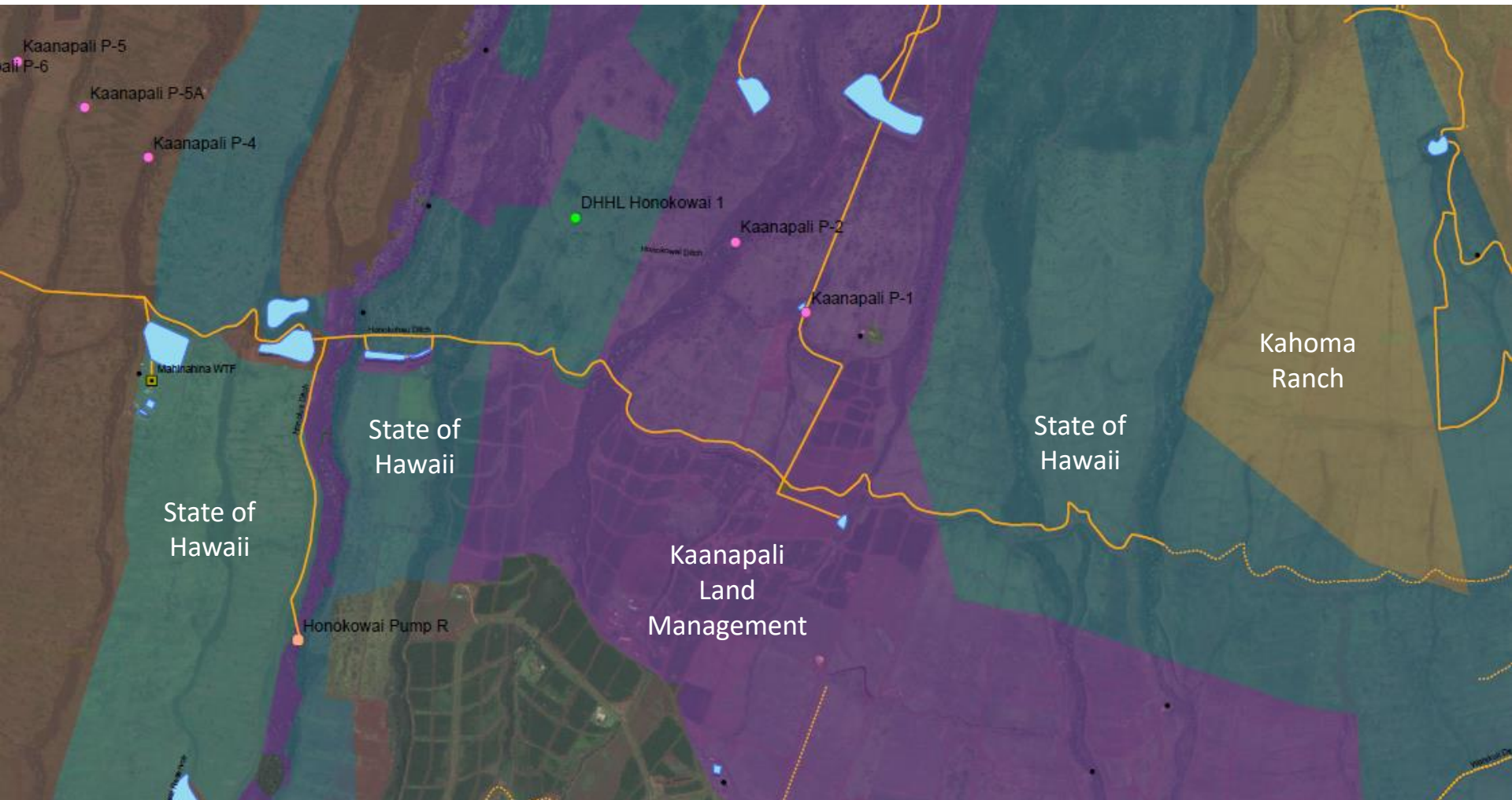
Hahakea
Gulch

Wahikuli
Reservoir

Lahaina
Wastewater
Reclamation
Facility

existing pipeline





Field 140 Reservoir



Field 140 Reservoir



Field 140 Reservoir



Honokōhau Ditch



Honokōhau Ditch at Field 140 Reservoir



Honokōhau Ditch at Honokōwai Siphon





Honokōhau Ditch at Ka'anapali
Land Management



Honokōhau Ditch at Ka'anapali Land Management



Honokōhau Ditch at Ka'anapali
Land/State of Hawai'i Border





Honokōhau Ditch at
Wahikuli Flume

Honokōhau Ditch at
Hāhākea Siphon



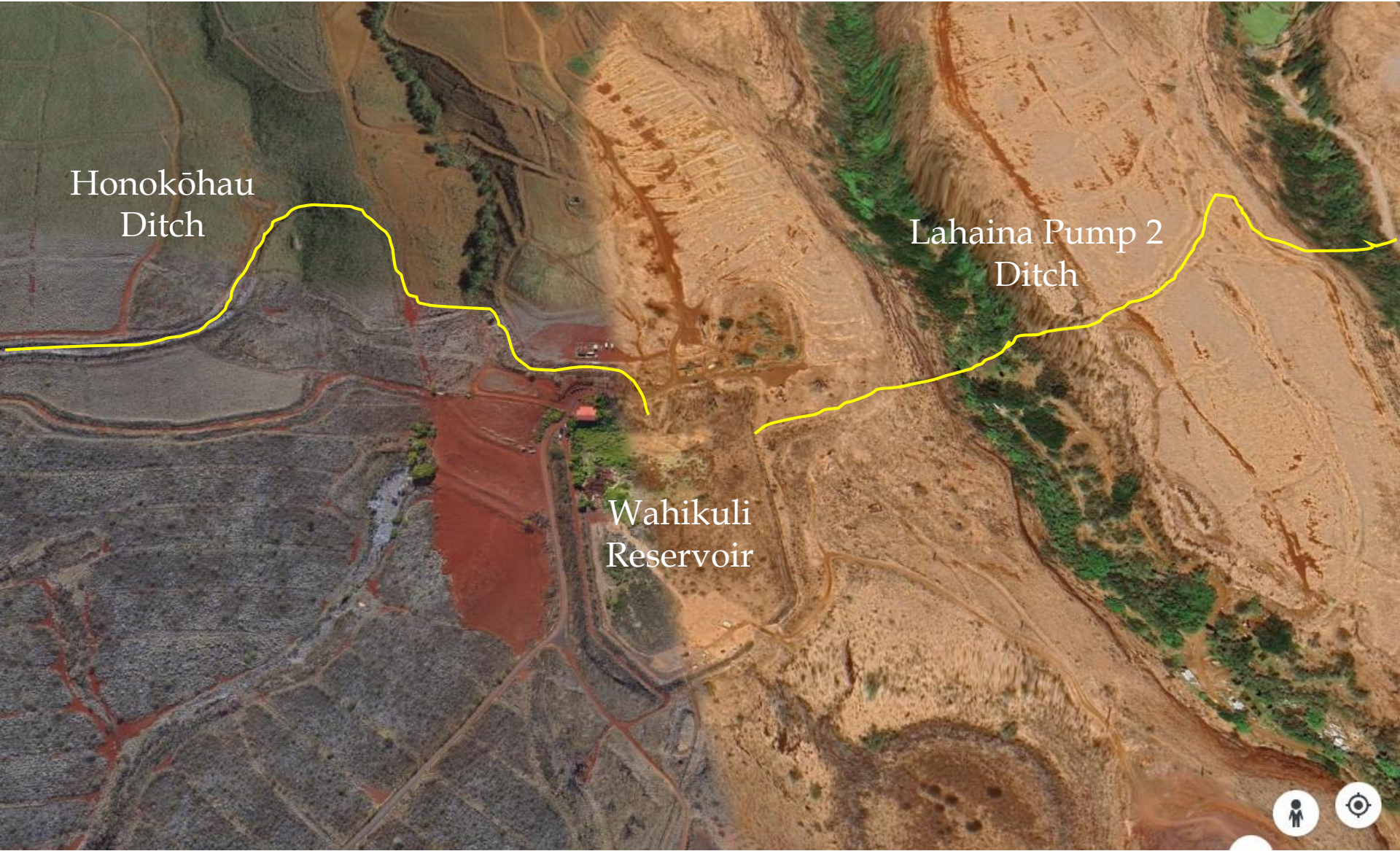
Honokōhau Ditch at
Hāhākea Siphon



Honokōhau
Ditch

Lahaina Pump 2
Ditch

Wahikuli
Reservoir





Lahaina Pump 2
Ditch







Option 1: Expand R1 Use

Pros

- Old pipelines/ ditches/ reservoirs already in place
- Gravity fed distribution system (once water is pumped to Field 140 reservoir)
- Increased storage of R1 water
- Ideal elevation/location to support fire fighting and agriculture
- Instream Flow Standard does not have to be modified
- County can charge for non-potable use to support maintenance
- Repurpose decommissioned Wahikuli Reservoir

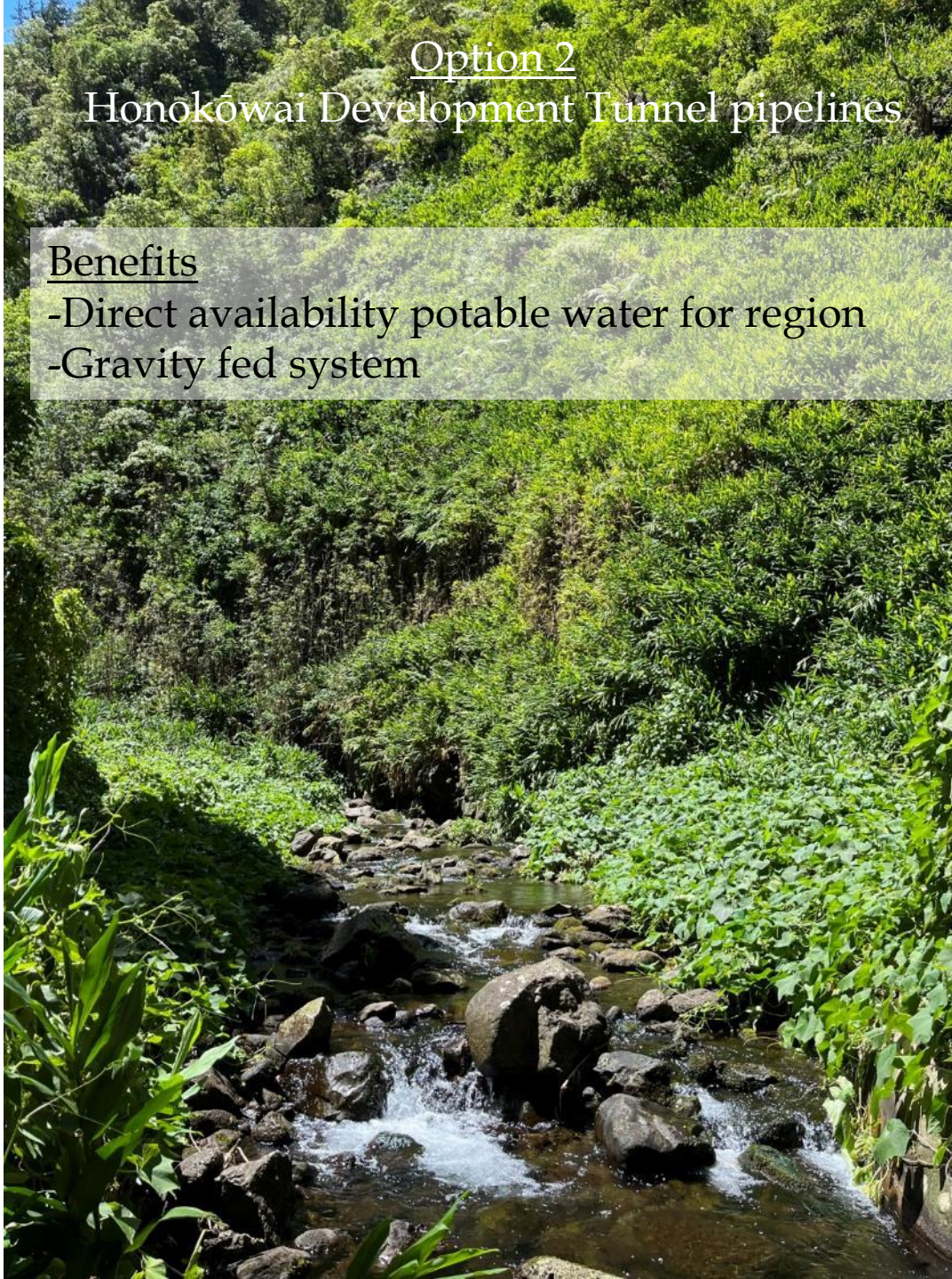
Cons

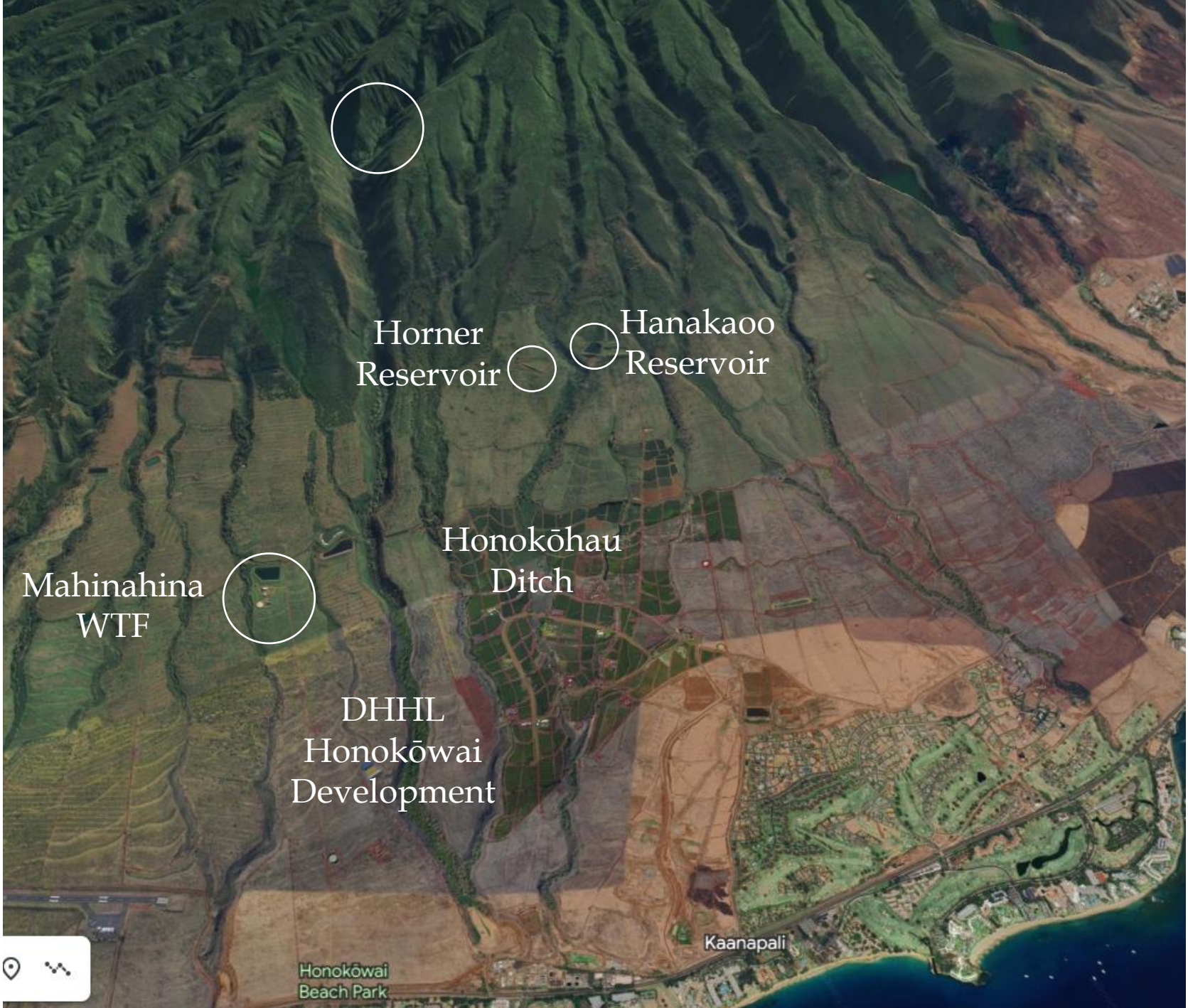
- Need to purchase Field 140 Reservoir
- Honokōhau Ditch crosses some privately-owned land
- Multiple gulches to cross adds cost/engineering (although accessible)

Option 2
Honokōwai Development Tunnel pipelines

Benefits

- Direct availability potable water for region
- Gravity fed system





Horner
Reservoir



Hanakaoo
Reservoir



Mahinahina
WTF

Honokōhau
Ditch

DHHL
Honokōwai
Development

Kaanapali

Honokōwai
Beach Park



Honokōwai Tunnel 20A



CWRM & USGS measurements:

03/03/1967	1.758 mgd
05/02/2012	1.900 mgd
06/06/2012	2.042 mgd
07/25/2012	2.210 mgd
07/15/2019	2.645 mgd
11/12/2019	1.951 mgd
08/10/2020	2.054 mgd
01/08/2021	1.926 mgd
01/31/2022	1.929 mgd
08/11/2022	1.809 mgd
09/22/2022	2.439 mgd
05/09/2023	2.468 mgd

Honokōwai Tunnel 20A



Honokōwai Tunnel 20B



Honokōwai Tunnel 20B



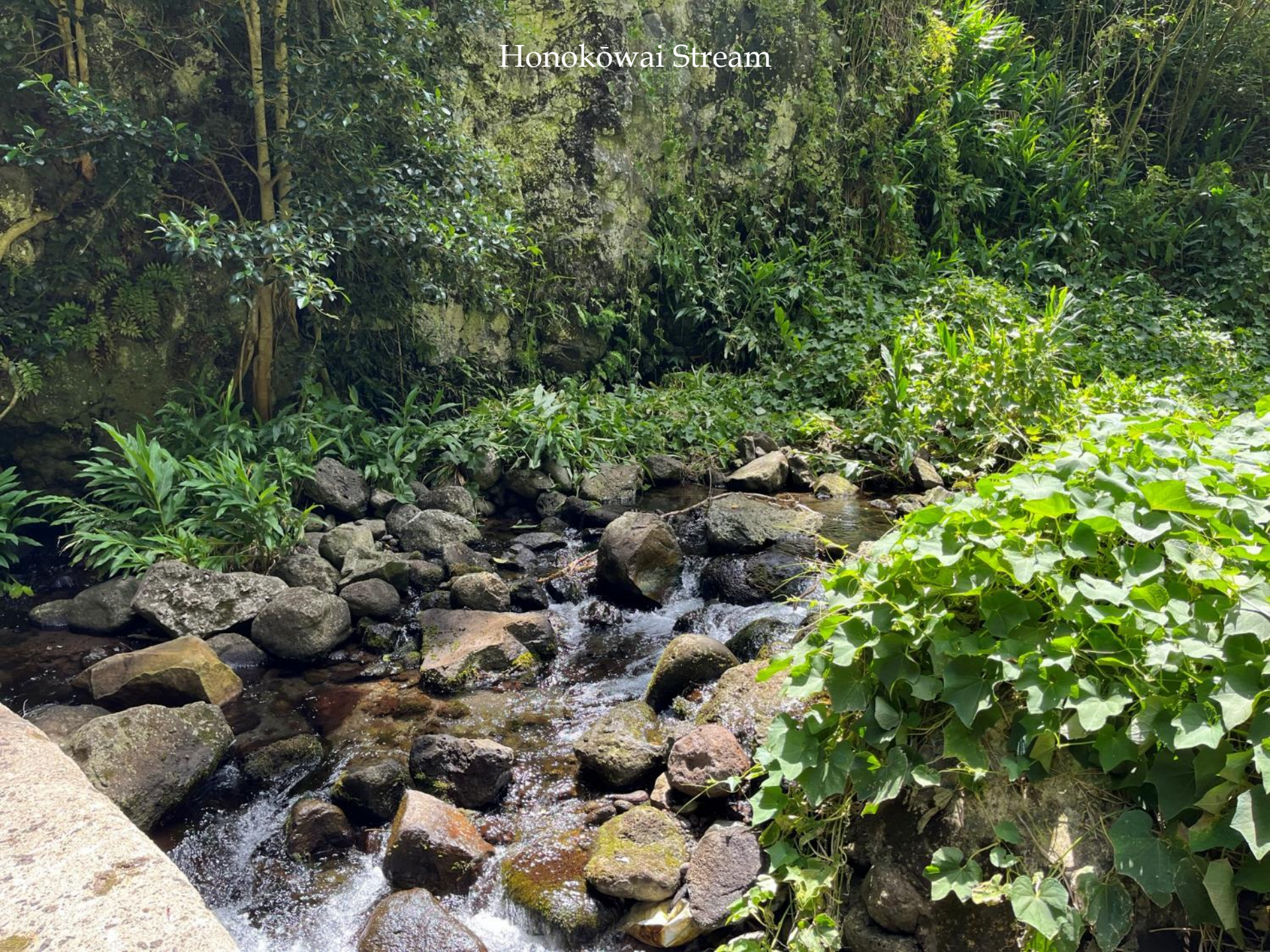
Honokōwai Tunnel 20B

CWRM measurements

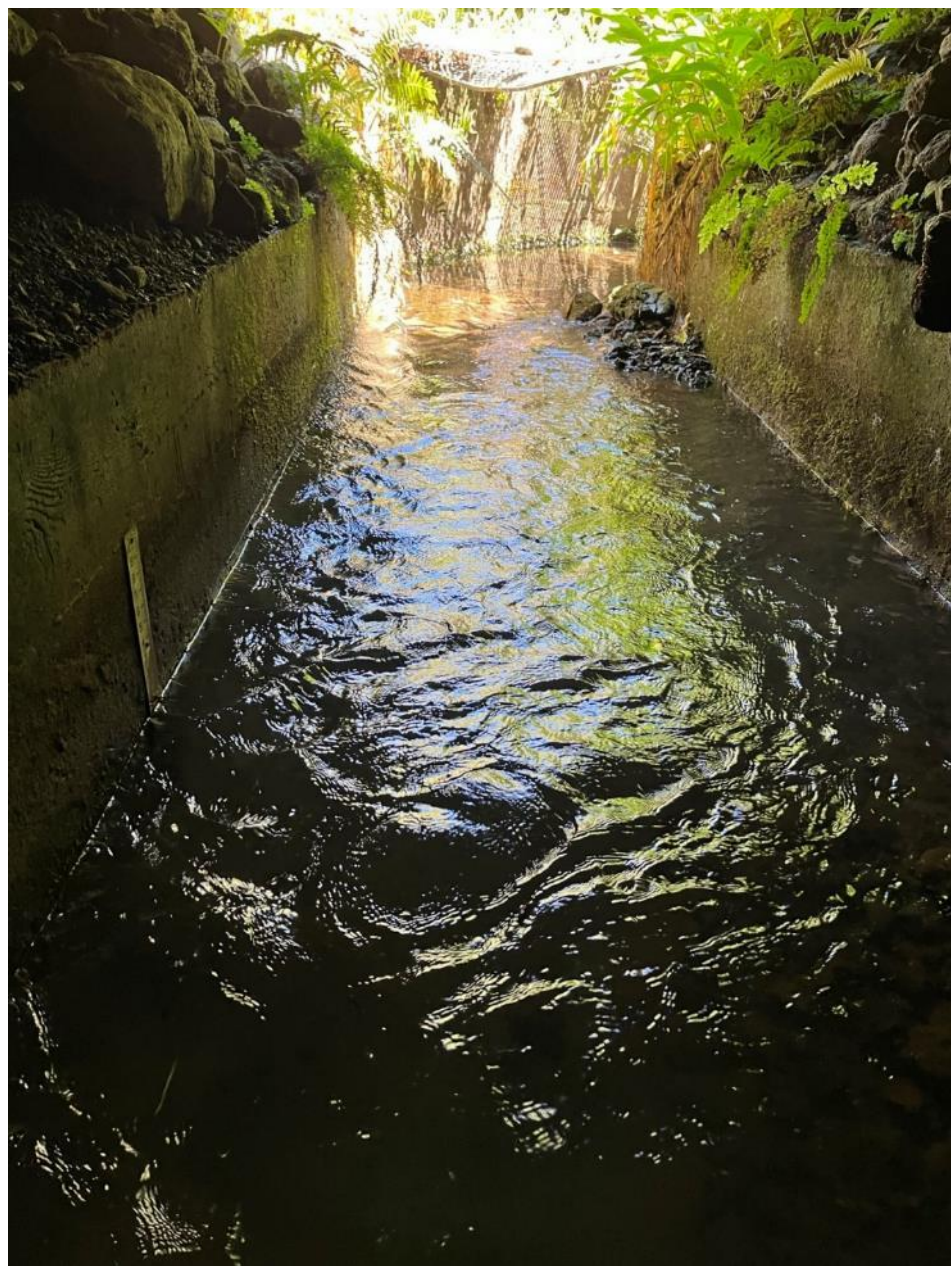
11/12/2019 0.637 mgd
02/14/2020 0.498 mgd
08/11/2022 0.646 mgd
09/22/2022 0.908 mgd
05/09/2023 0.867 mgd

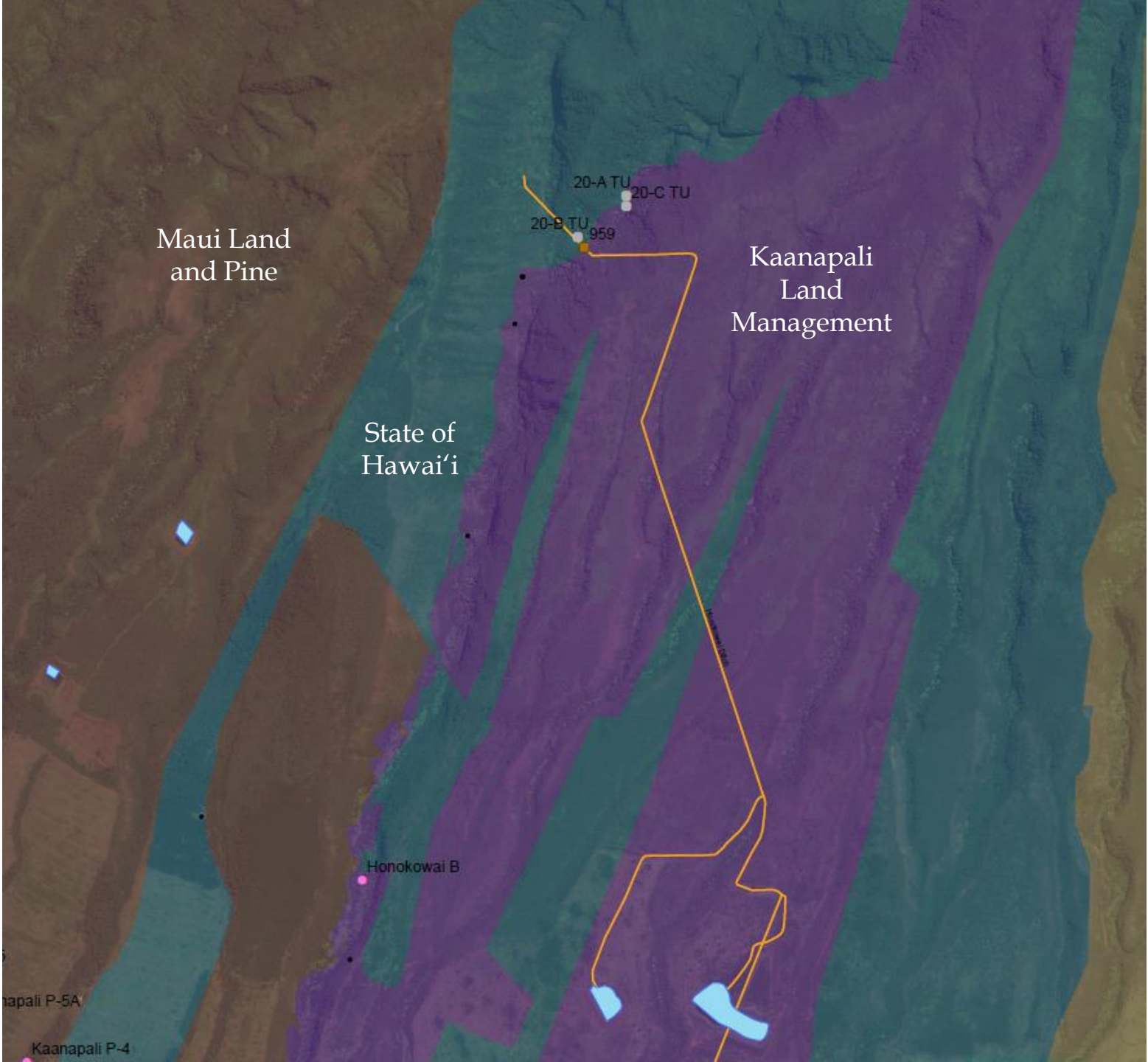


Honokōwai Stream



Honokōwai Ditch





Maui Land
and Pine

Kaanapali
Land
Management

State of
Hawai'i

20-A TU
20-C TU
20-B TU 959

Honokowai B

Kaanapali P-5A

Kaanapali P-4

Option 2: Honokōwai Development Tunnel Improvements

Pros

- Groundwater source already developed
- Water can flow by gravity to County System (reduced costs)
- Tunnel 20B on State Land (0.5-0.7 mgd)
- Instream Flow Standard does not have to be modified
- Can meet potable needs for DHHL in new developments

Cons

- Pipeline would need to cross some privately-owned land
- Access is challenging to run pipeline through tunnel into gulch