Status of the Combined Petition to Amend the Interim Instream Flow Standards and Allegation of Waste by Moloka'i No Ka Heke for Streams in the Surface Water Hydrologic Units of Waikolu (4003), Kawela (4037), Kaunakakai (4039), and Manawainui (4041), and Reservation of Non-potable Water For The Department of Hawaiian Home Lands, Moloka'i

Item C-1
February 15, 2022

Ayron M. Strauch
Stream Protection and Management Branch

Overview of Presentation

- EarthJustice 2019 Petition to Amend Instream Flow Standards and Waste Complaint
- Molokai Properties Mountain Water System
  - Intakes
  - Meters
  - Streamflow
  - Non-potable water use
- Molokai Irrigation System
  - Intakes and wells
  - Meters
  - Streamflow
- DHHL non-potable water reservation
- Proposed Recommendations

EarthJustice Petition filed July 2019

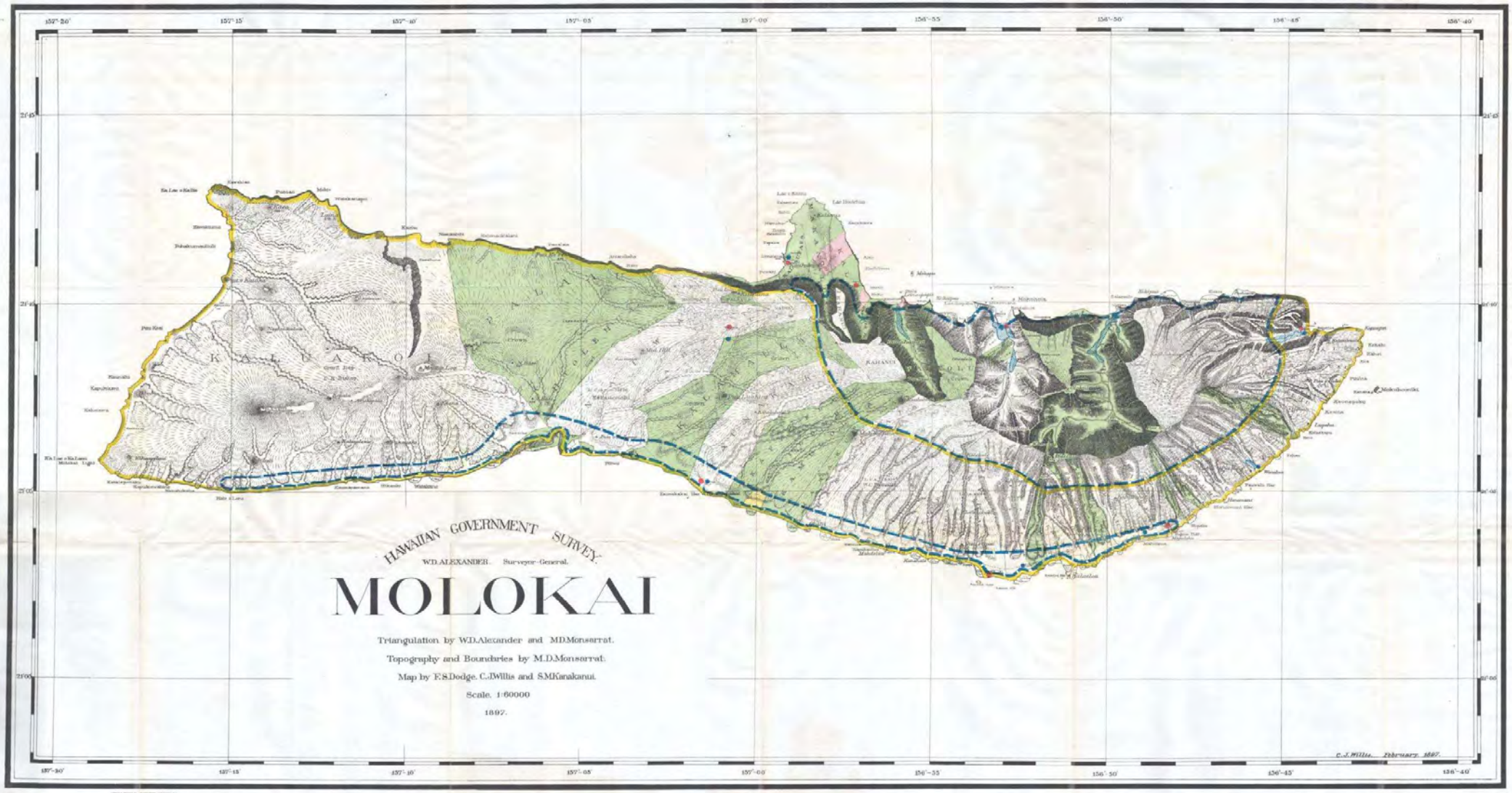
1. **Petitions the Commission to establish interim instream flow standards for Kawela, Kaunakakai, Manawainui, and Waikolu Streams and their tributaries**

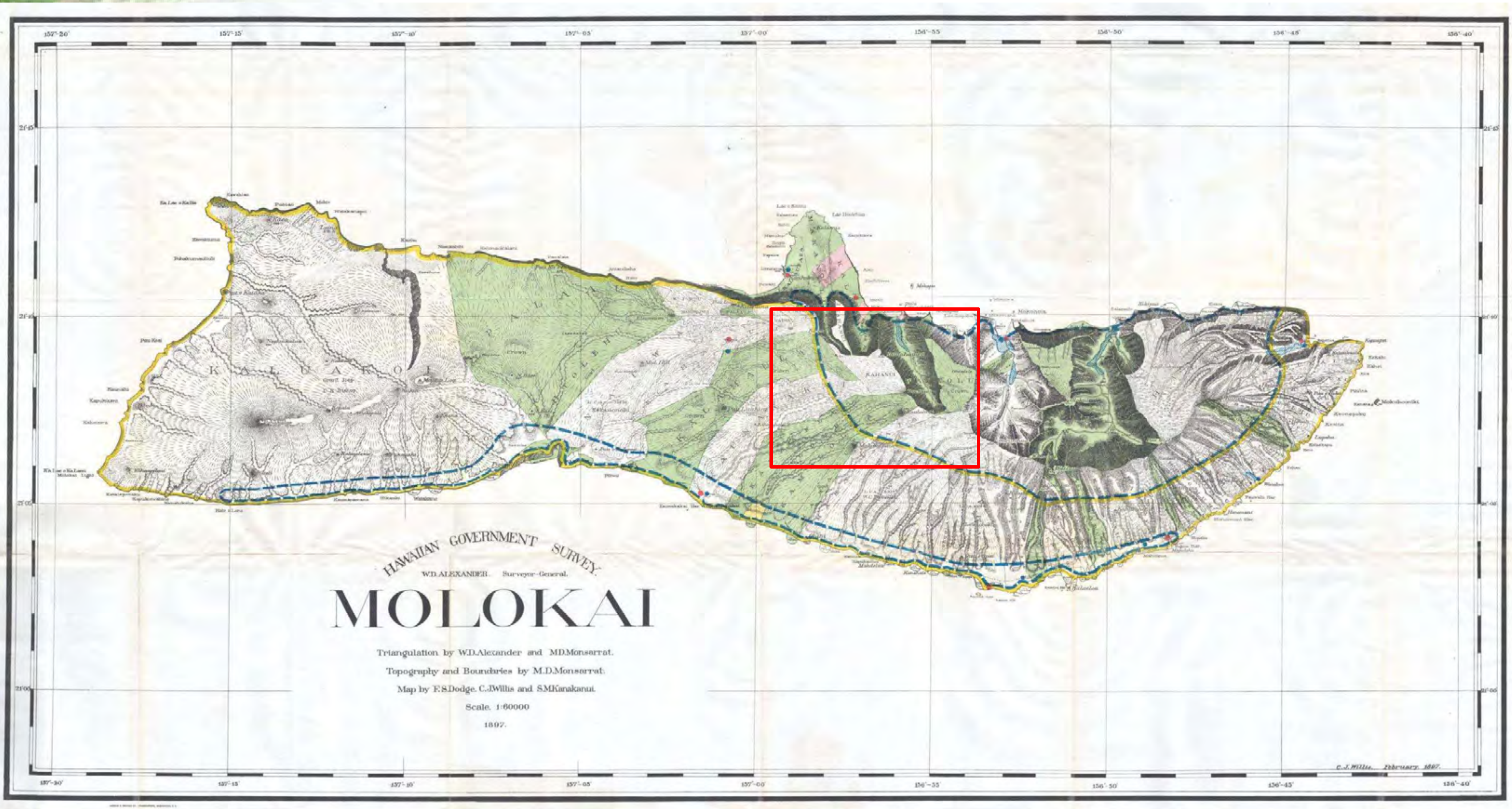
2. **Complaint against the waste of water by Molokai Ranch (Molokai Properties, Ltd)**

3. **Declaratory order enforcing the Commission's rules requiring the Ranch to follow the legally required procedures to report the termination of its water uses and the abandonment of diversions**

Summary

- **Streamflow diversions negatively affect water available for DHHL and instream uses**
- **Streamflow diverted 7-10x in excess of metered uses**
- **Recommendations: Combination of instream flow standards, diversion abandonments, and DHHL reservations will balance instream and non-instream public trust uses while maintaining existing non-public trust uses.**





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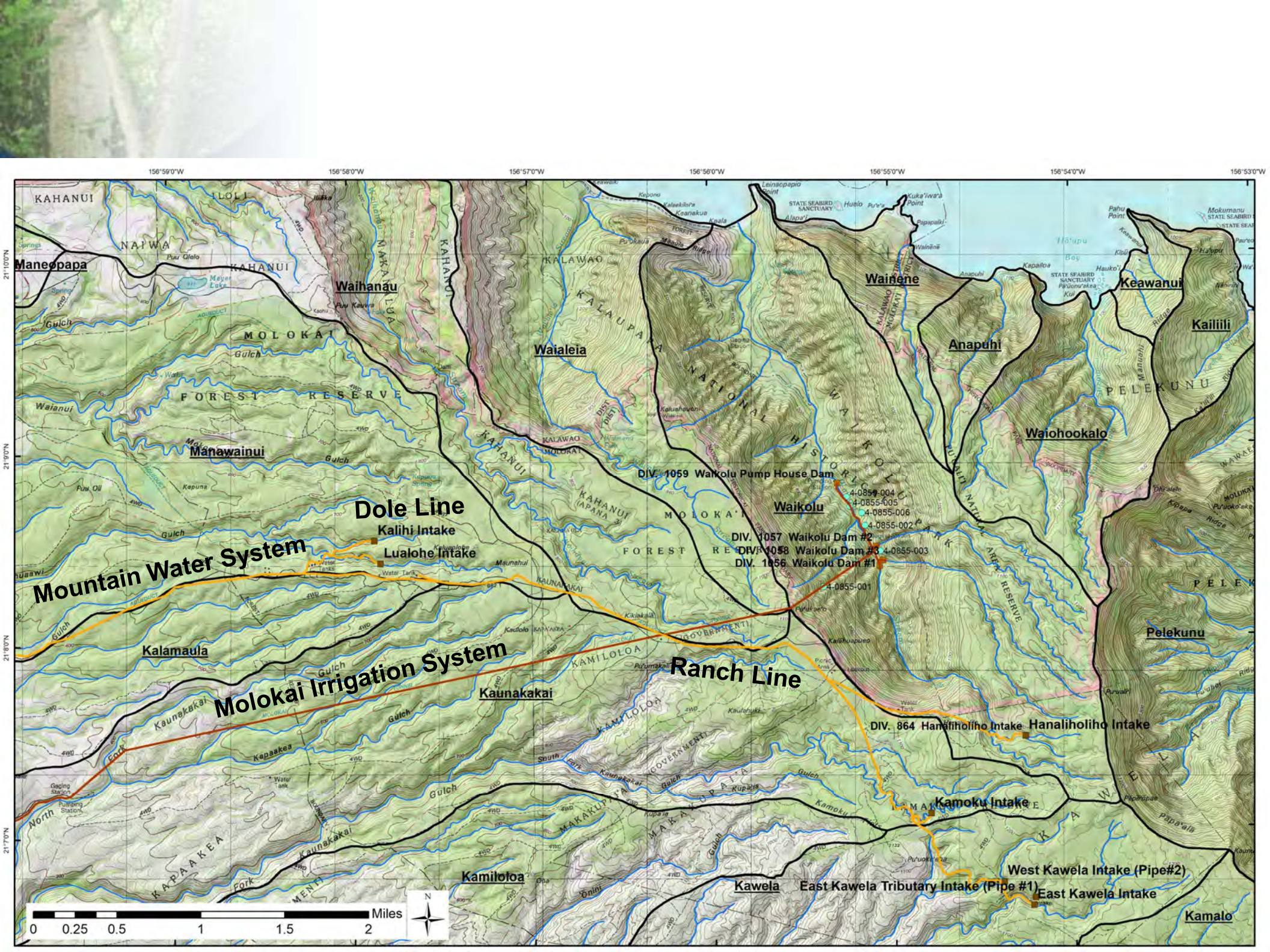
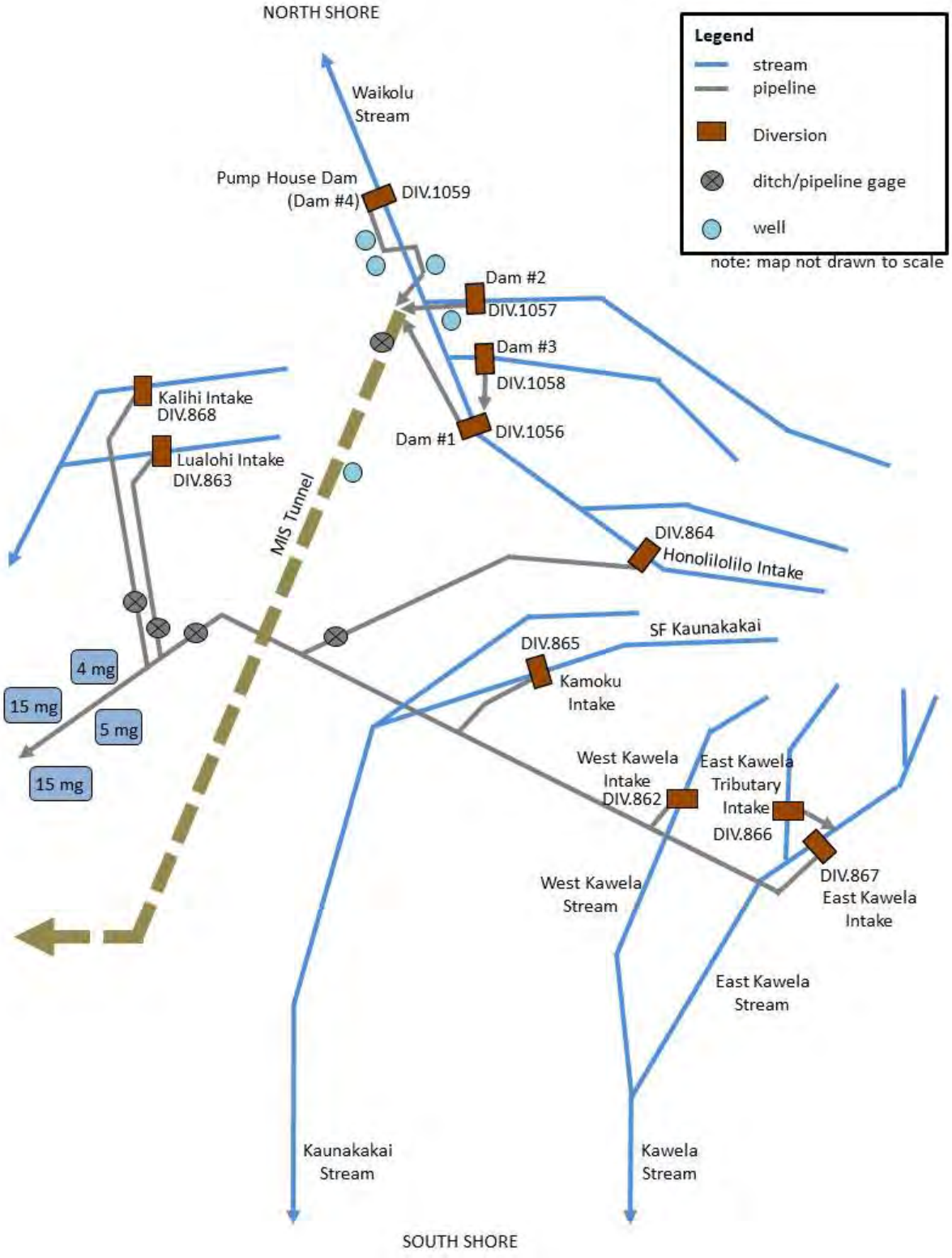
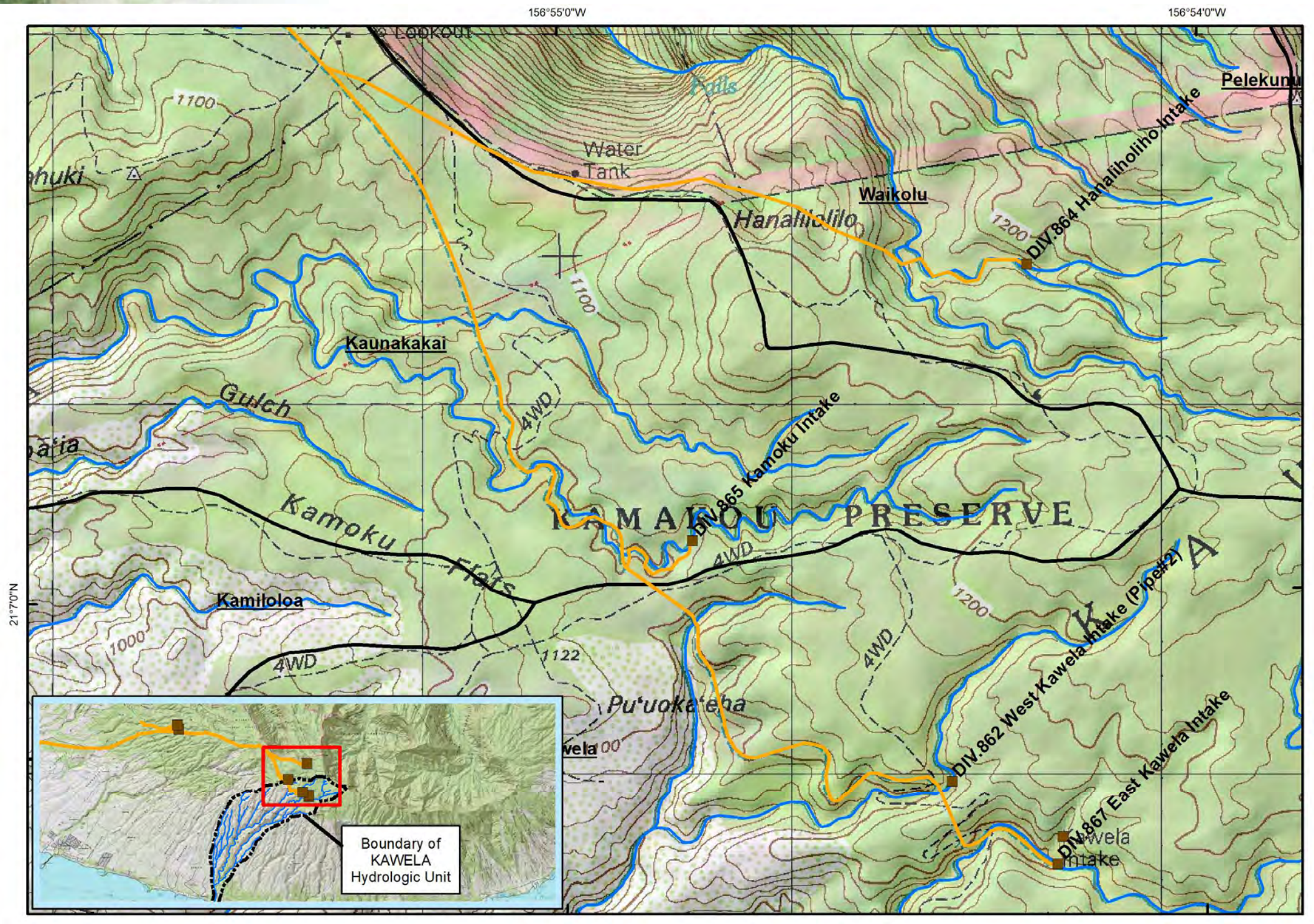
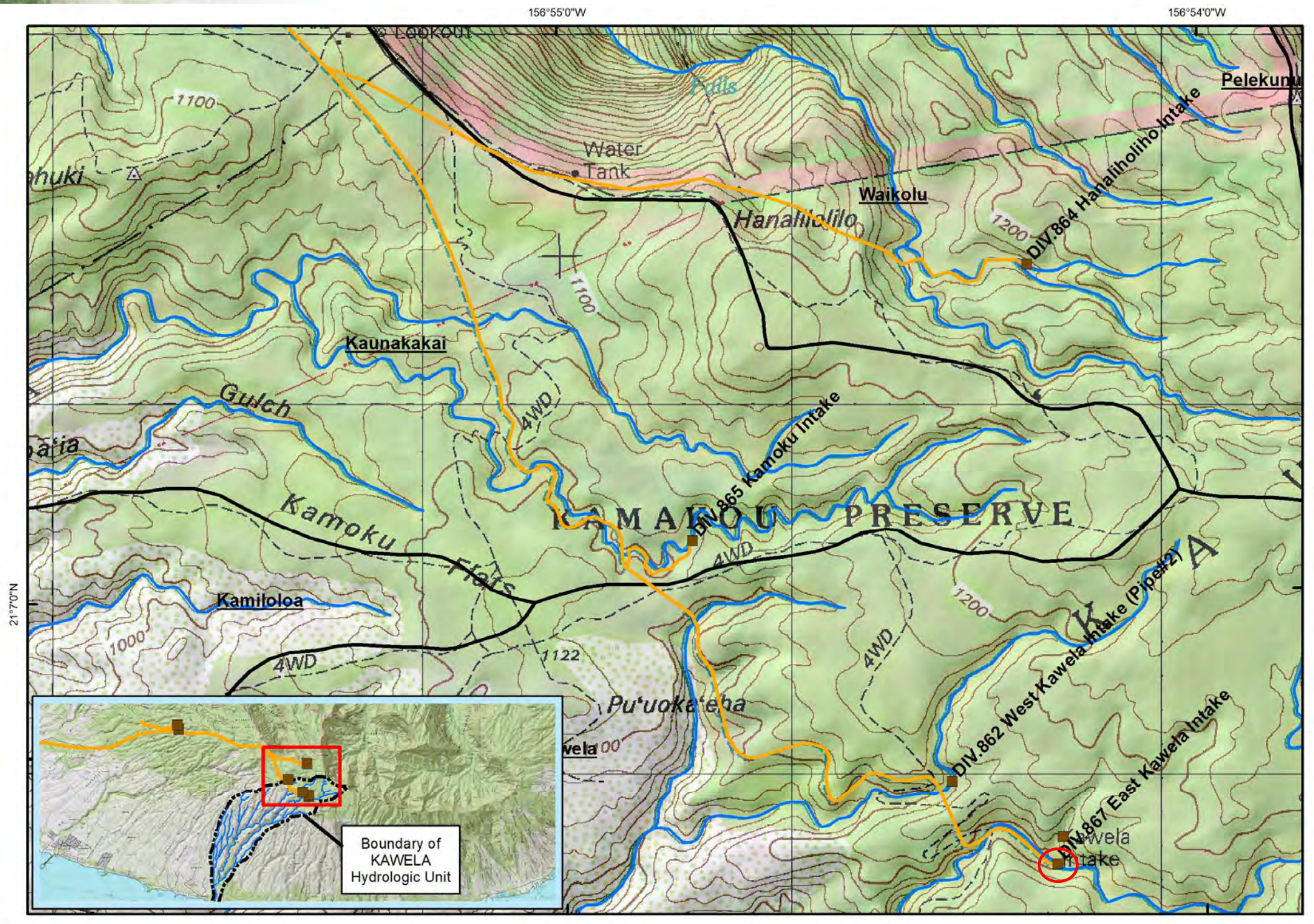

Maneopapa
Waihanau
Waialeia
Waiehene
Keawanui
Kailiili
Anapuhi
Waiohookalo
Pelekunu
Manawainui
Waikolu
Kalamaula
Kaunakakai
Kamiloloa
Kawela
Kamalo
Dole Line
Kalihi Intake
Lualohe Intake
Mountain Water System
Molokai Irrigation System
Ranch Line
DIV. 1059 Waikolu Pump House Dam
4-0859-004
4-0855-005
4-0855-006
4-0855-002
DIV. 1057 Waikolu Dam #2
DIV. 1058 Waikolu Dam #3
4-0855-003
DIV. 1056 Waikolu Dam #1
4-0855-001
DIV. 864 Hanaliholiho Intake
Hanaliholiho Intake
Kamoku Intake
West Kawela Intake (Pipe#2)
East Kawela Tributary Intake (Pipe #1)
East Kawela Intake
KAHANUI
MOLOKAI
FOREST RESERVE
KALAUPAPA NATIONAL HISTORICAL PARK
PELEKUNU
KAMILOLOA
MAKAKUPAIA
KAPAAKEA
Miles
0
0.25
0.5
1
1.5
2
N


NORTH SHORE
Legend
stream
pipeline
Diversion
ditch/pipeline gage
well
note: map not drawn to scale
Waikolu Stream
Pump House Dam (Dam #4)
DIV.1059
Dam #2
DIV.1057
Dam #3
DIV.1058
Dam #1
DIV.1056
Kalihi Intake DIV.868
Lualohi Intake DIV.863
MIS Tunnel
DIV.864 Honolilolilo Intake
SF Kaunakakai
DIV.865
Kamoku Intake
4 mg
15 mg
5 mg
15 mg
West Kawela Intake DIV.862
East Kawela Tributary Intake DIV.866
DIV.867 East Kawela Intake
West Kawela Stream
East Kawela Stream
Kaunakakai Stream
Kawela Stream
SOUTH SHORE

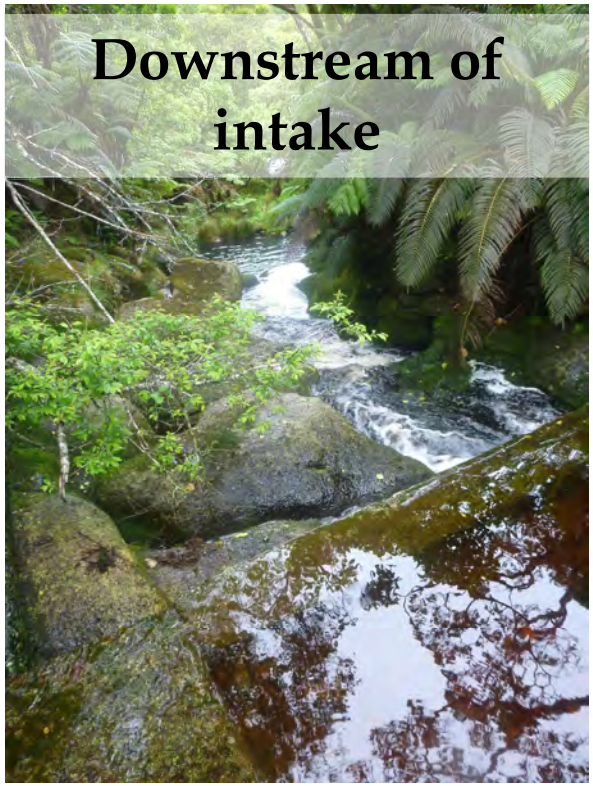
Mountain Water System: Ranch Line



Mountain Water System: Ranch Line



East Kawela Intake (Diversion 867)



Streamflow (mgd)
Q_{50} = 0.34
Q_{70} = 0.26
Q_{80} = 0.12
Q_{90} = 0.08

Diverted flow (mgd)
mdf = 0.224
Q_{50} = 0.223
Q_{70} = 0.113
Q_{90} = 0.021

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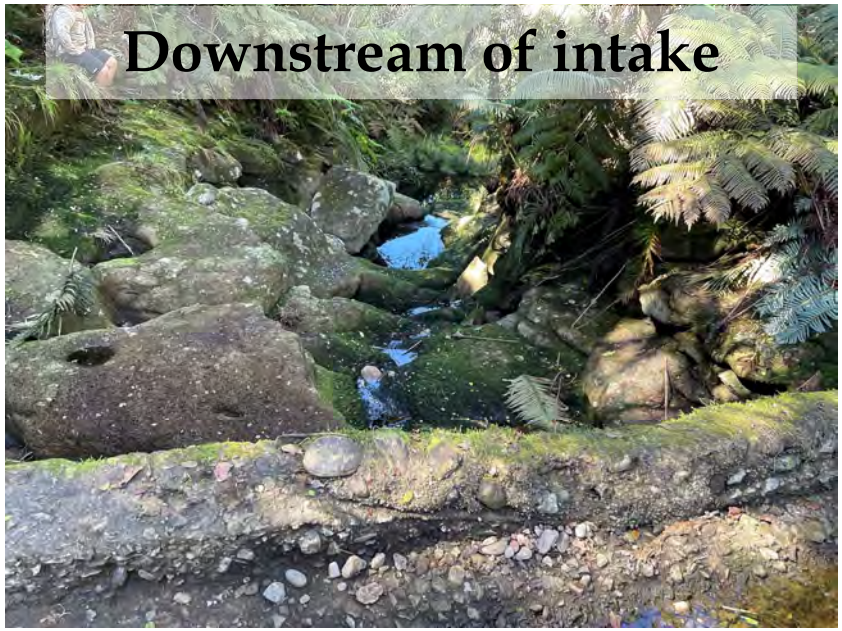
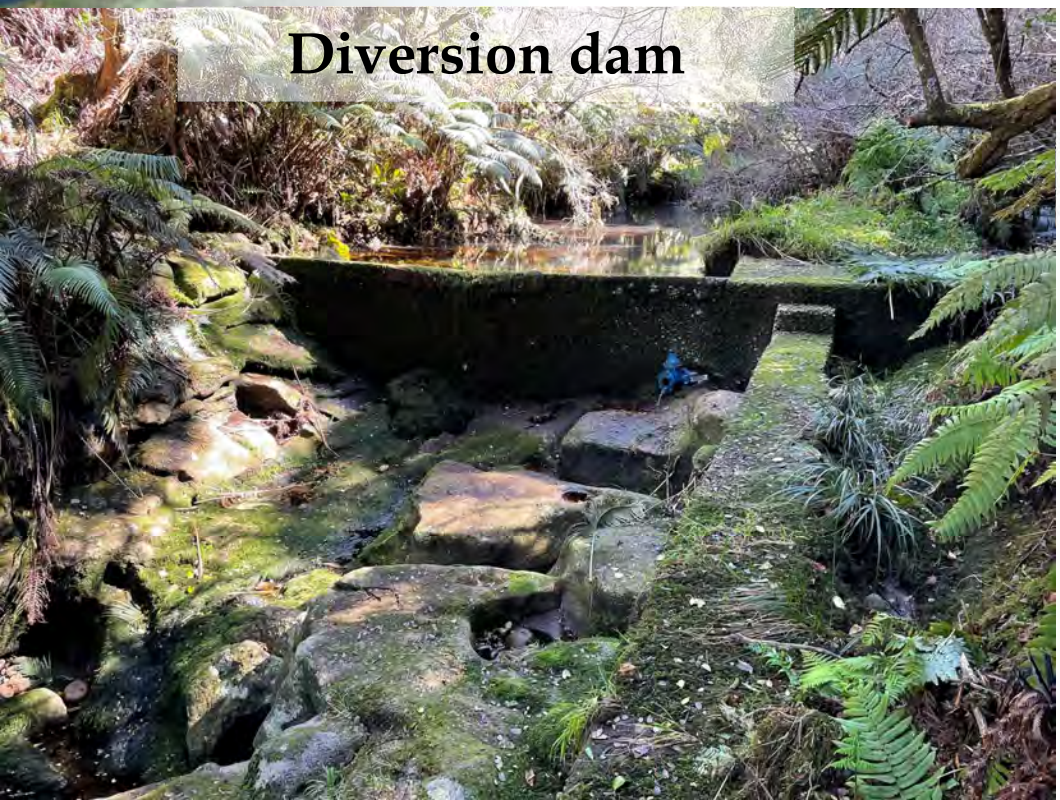
East Kawela Intake (Diversion 867)

Upstream of intake

Downstream of intake



Diversion dam

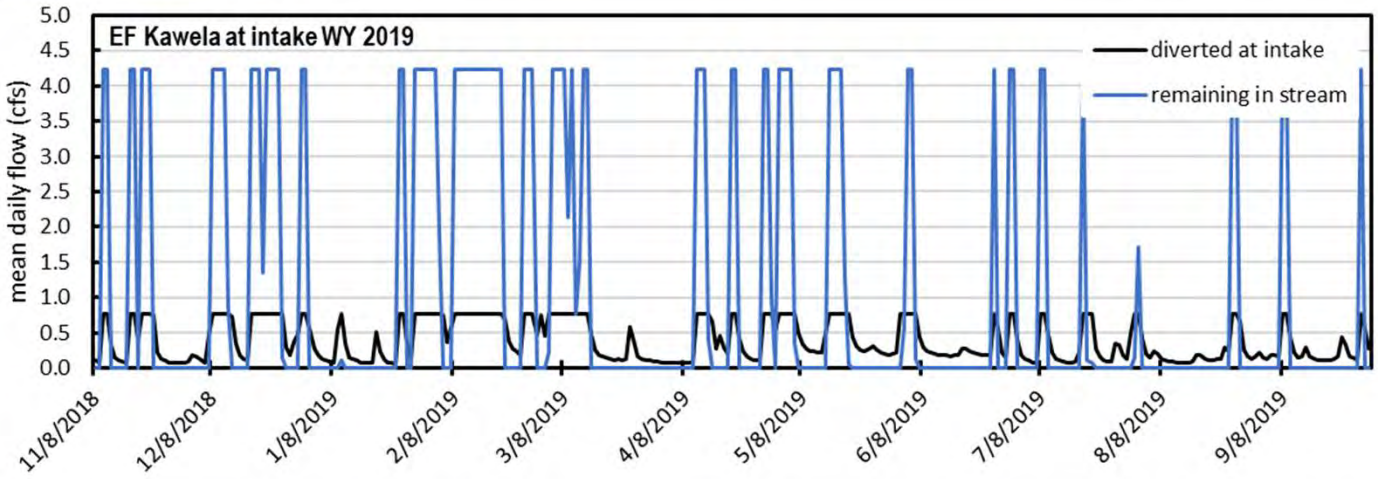


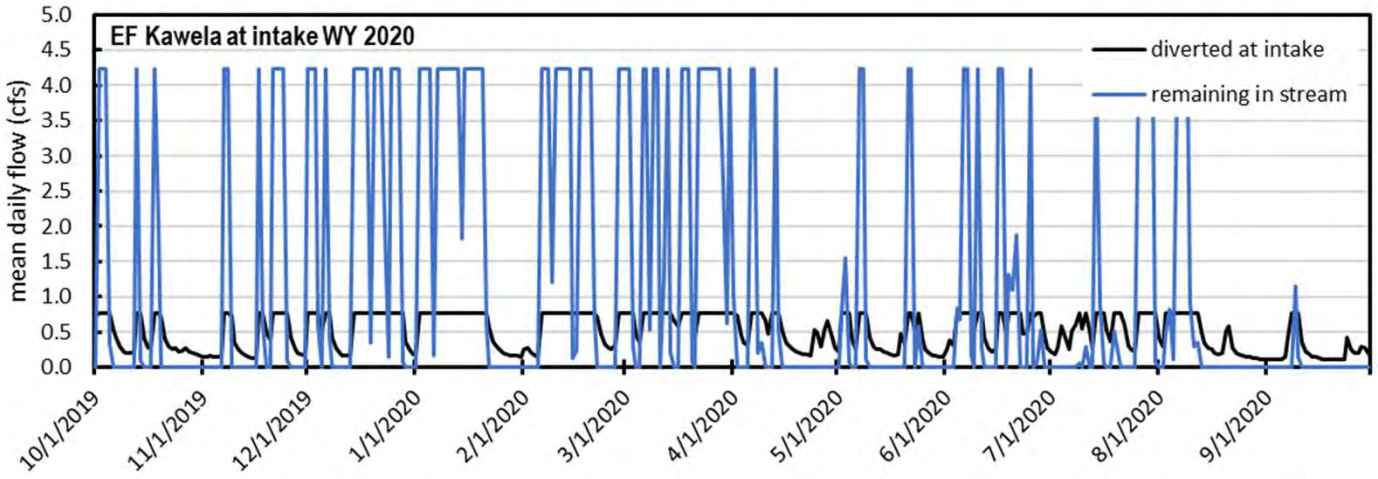
Flush out valve

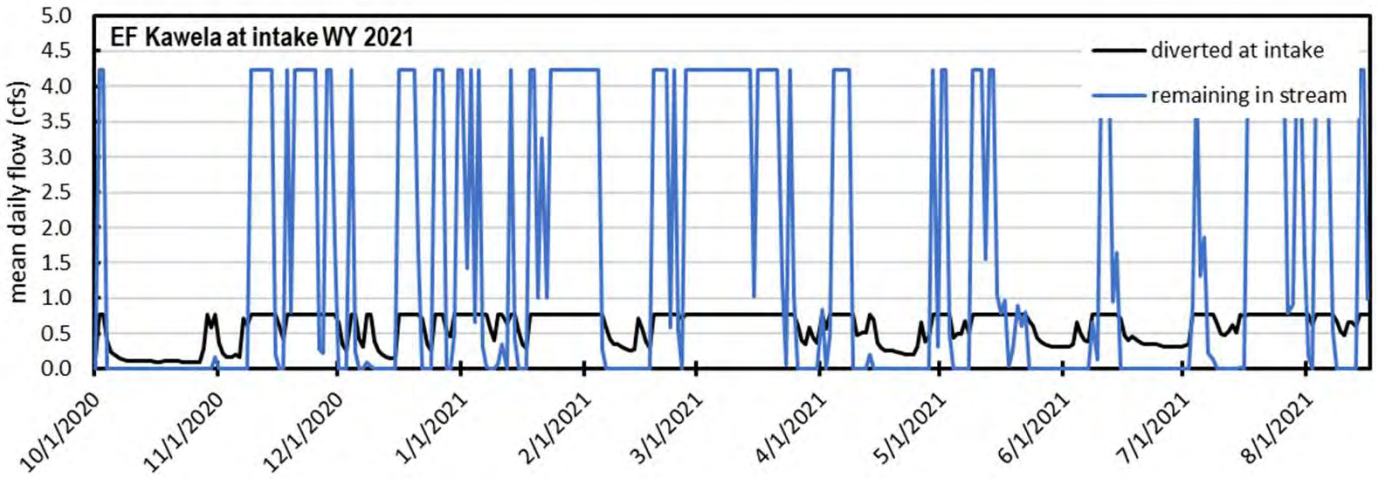
Streamflow (mgd)
Q_{50} = 0.34
Q_{70} = 0.26
Q_{80} = 0.12
Q_{90} = 0.08

Diverted flow (mgd)
mdf = 0.224
Q_{50} = 0.223
Q_{70} = 0.113
Q_{90} = 0.021

East Kawela mean daily flow diverted and remaining in the stream at intake







in cfs

MDF	stream	diverted	remaining
mean	1.79	0.49	1.29
Q_{50}	0.52	0.52	0.00

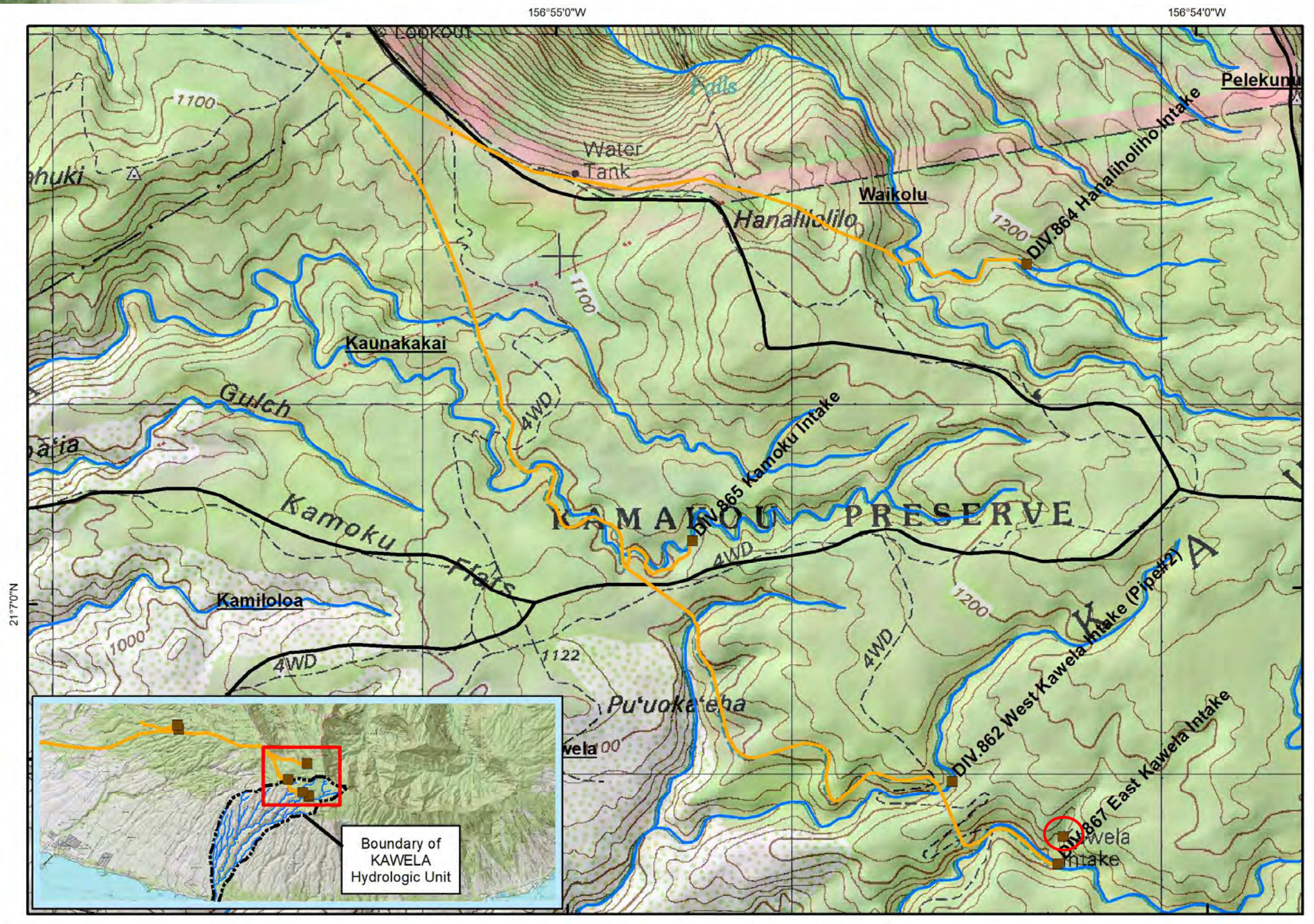
in mgd

MDF	stream	diverted	remaining
mean	1.16	0.32	0.83
Q_{50}	0.34	0.34	0.00

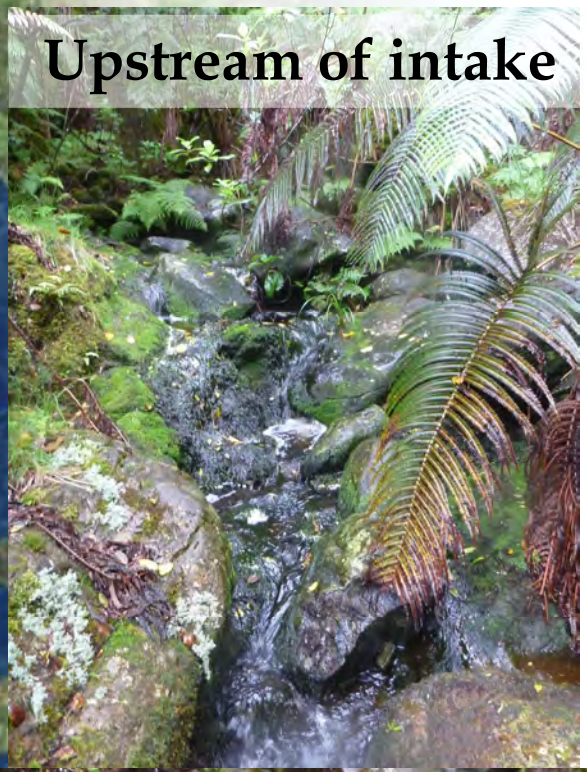
58% of days have zero flow remaining in stream

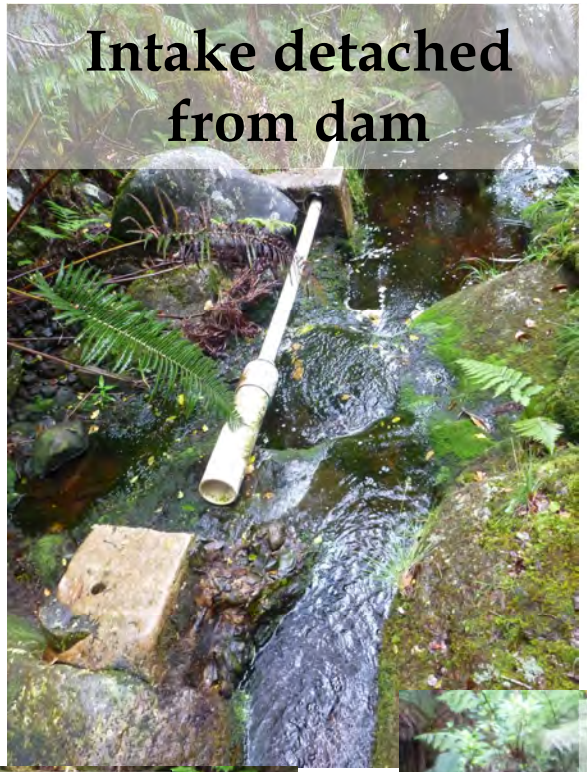
East Kawela Intake (Diversion 867)

Mountain Water System: Ranch Line



East Kawela Tributary Intake (Diversion 866) (not active)

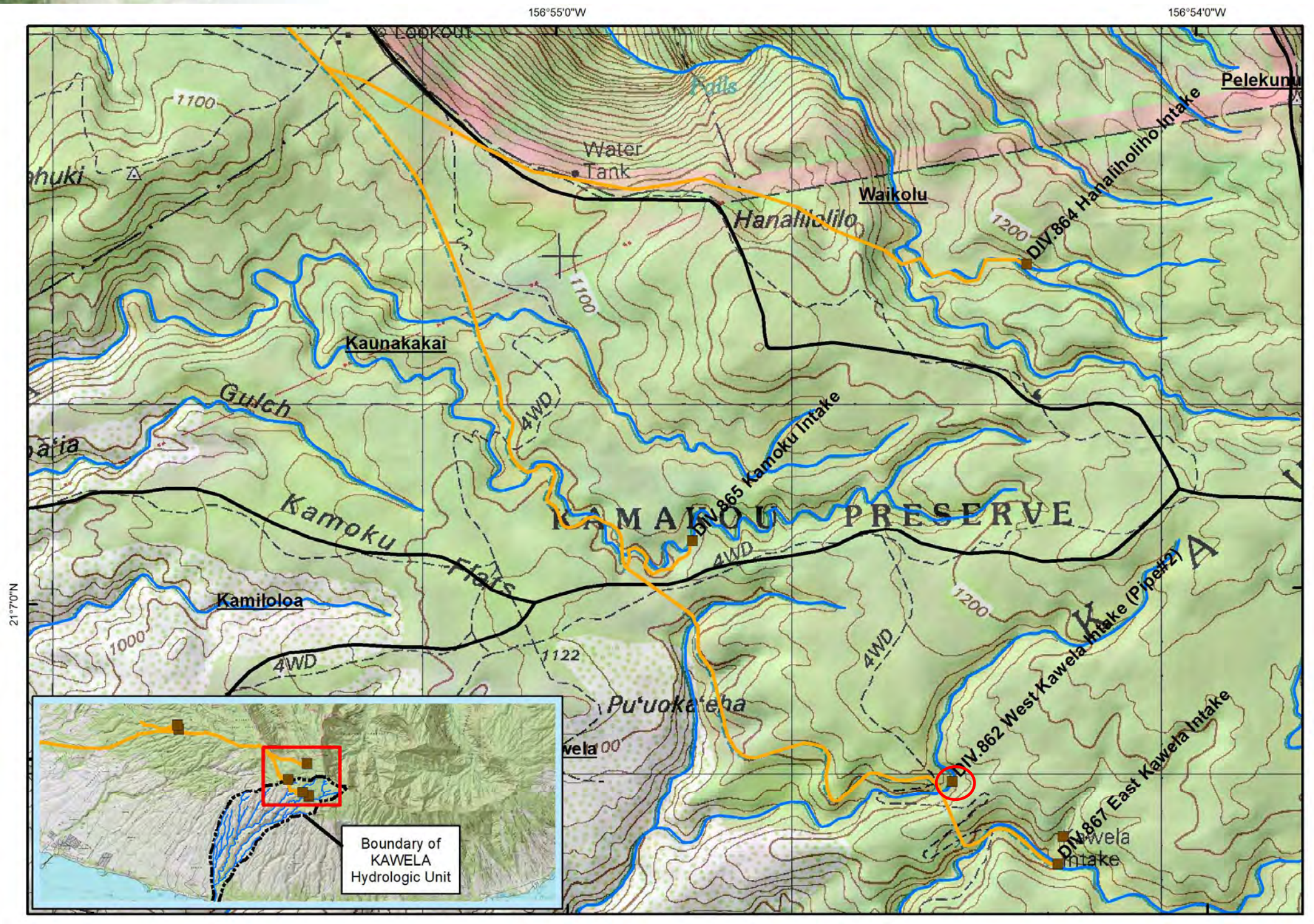




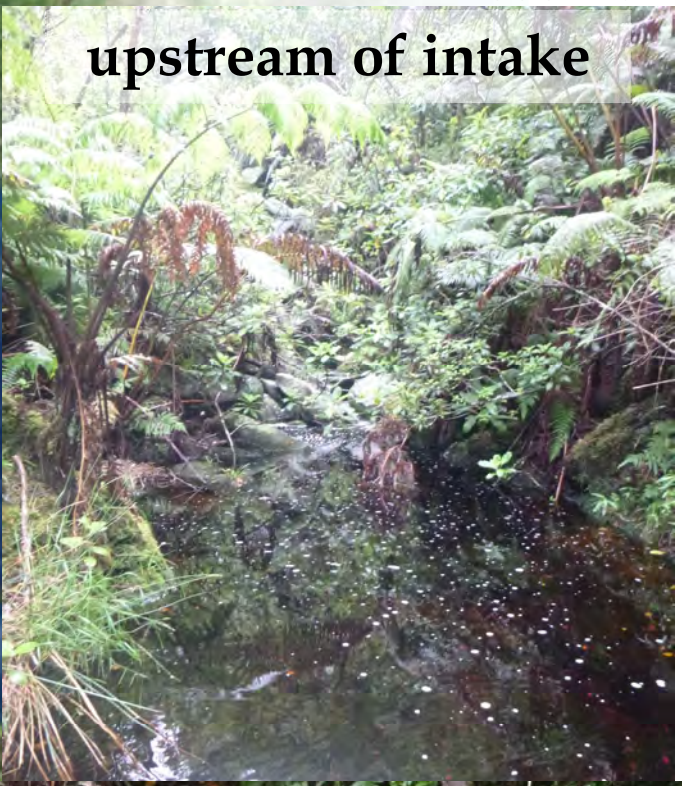
Streamflow (mgd)
Q_{50} = 0.001
Q_{70} = 0.0025
Q_{80} = 0.0015
Q_{90} = 0.0008

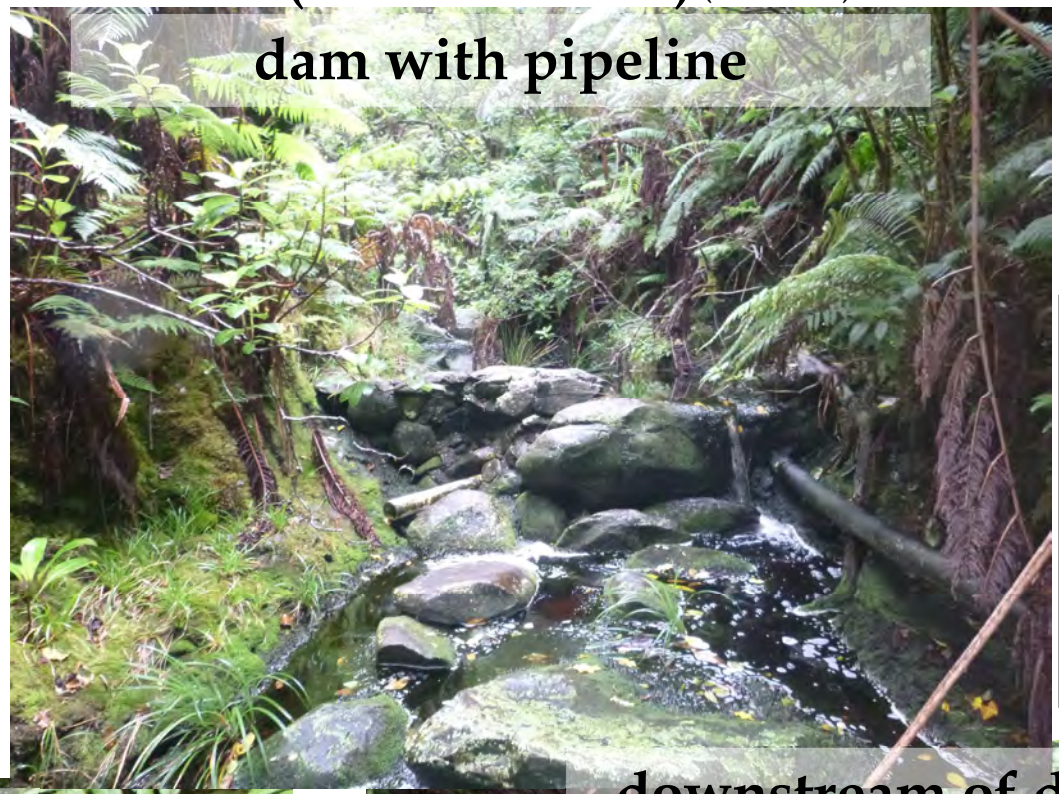
Diverted flow (mgd)
mdf = n/a
Q_{50} = n/a
Q_{70} = n/a
Q_{90} = n/a

Mountain Water System: Ranch Line



West Kawela Intake (Diversion 862) (not active)

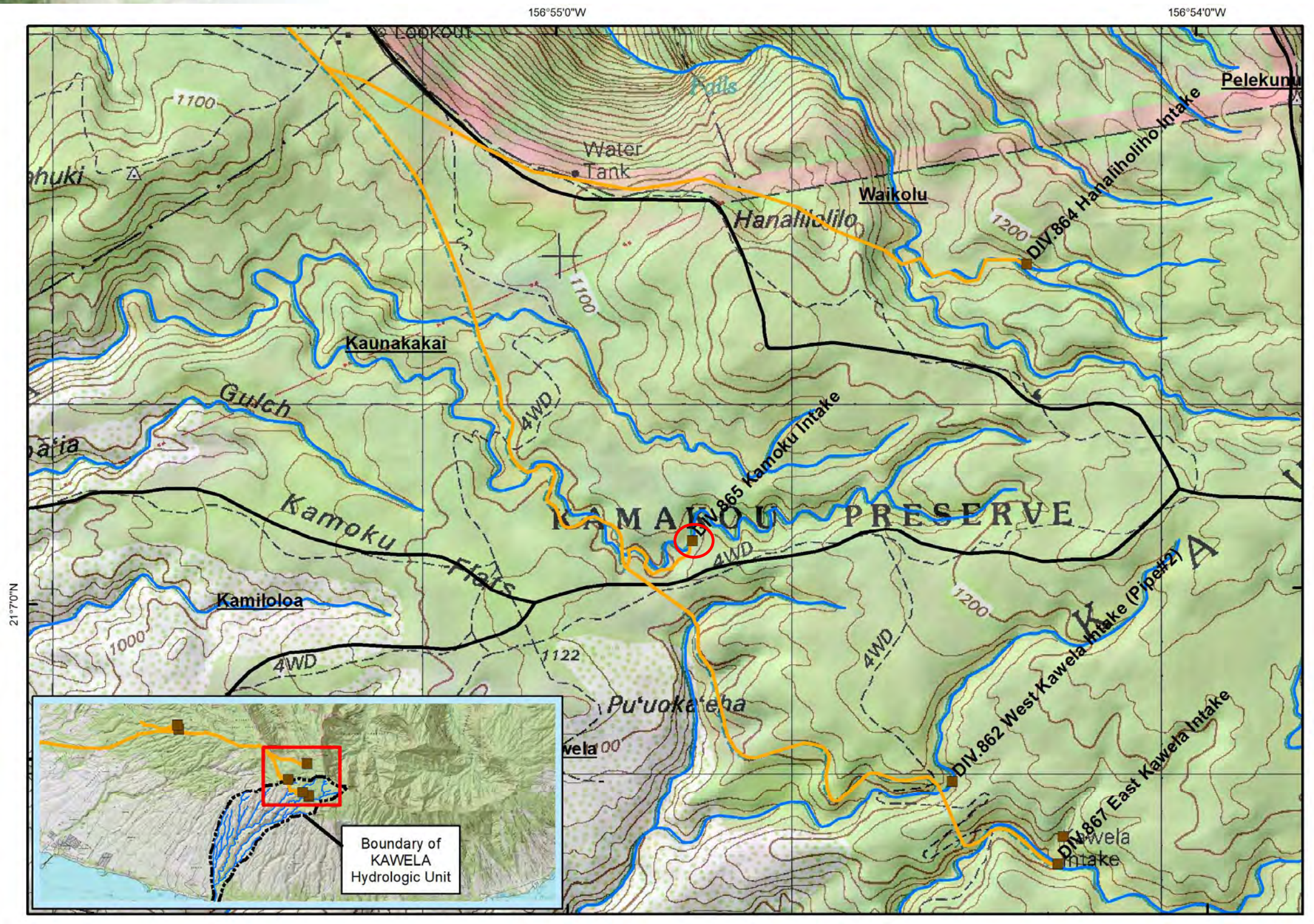




Streamflow (mgd)
Q_{50} = 0.029
Q_{70} = 0.010
Q_{80} = 0.004
Q_{90} = 0.002

Diverted flow (mgd)
mdf = n/a
Q_{50} = n/a
Q_{70} = n/a
Q_{90} = n/a

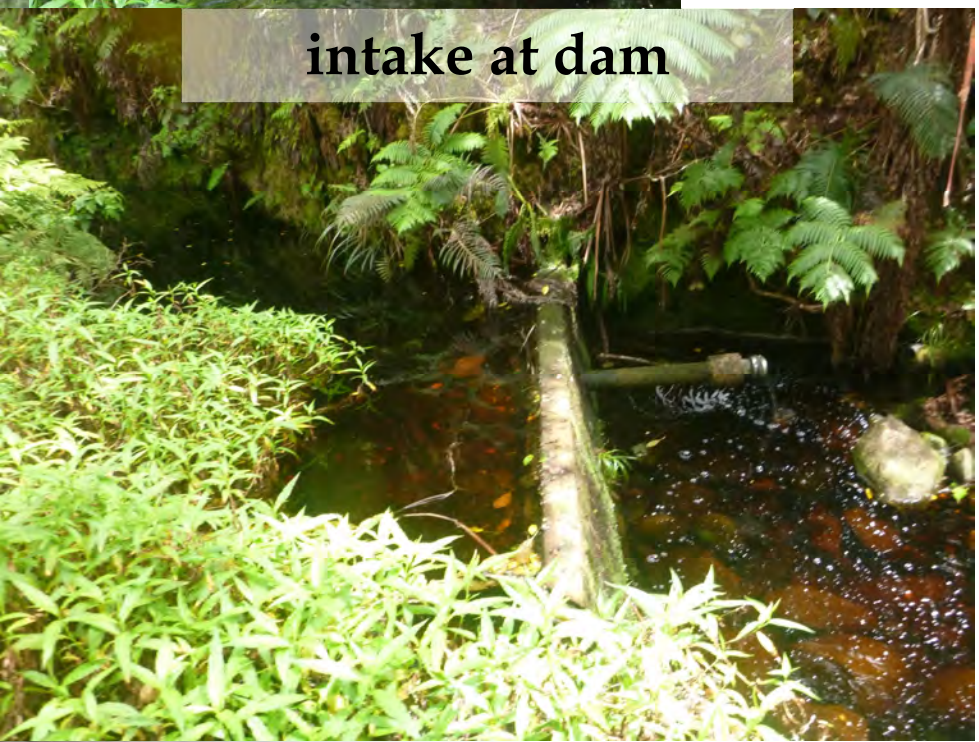
Mountain Water System: Ranch Line



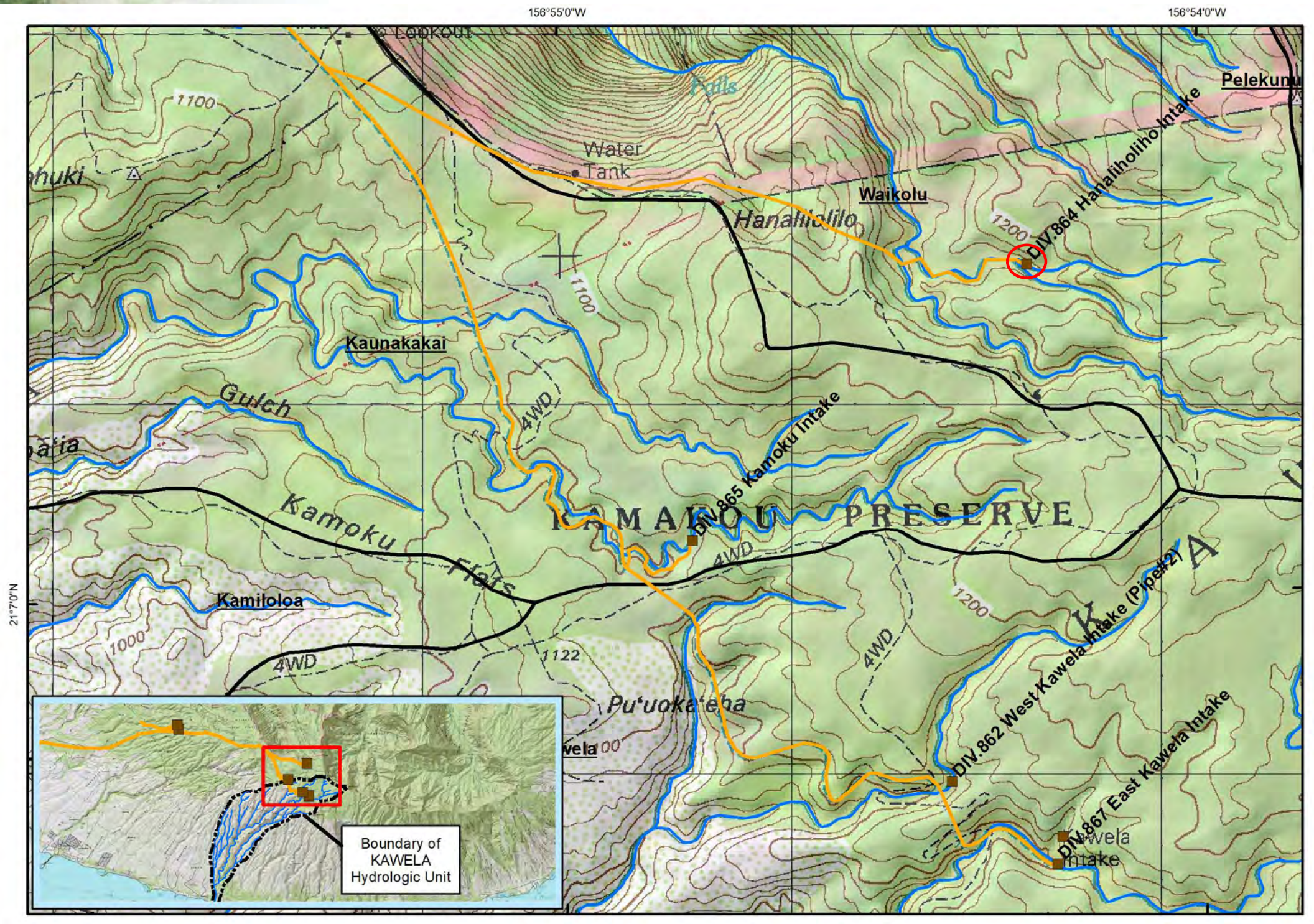
Kamoku Intake (Diversion 865) (not active)

Streamflow (mgd)
Q_{50} = 0.033
Q_{70} = 0.011
Q_{80} = 0.004
Q_{90} = 0.002

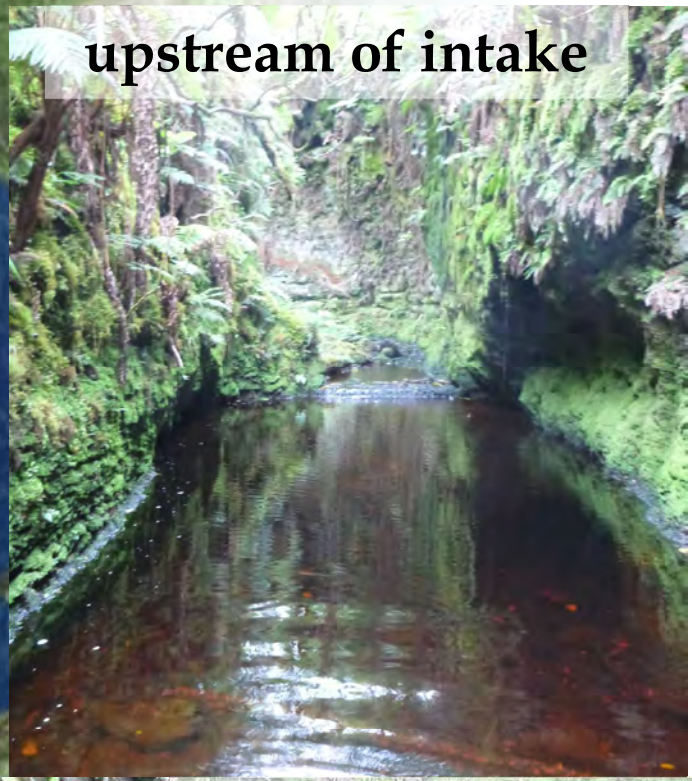
Diverted flow (mgd)
mdf = n/a
Q_{50} = n/a
Q_{70} = n/a
Q_{90} = n/a



Mountain Water System: Ranch Line



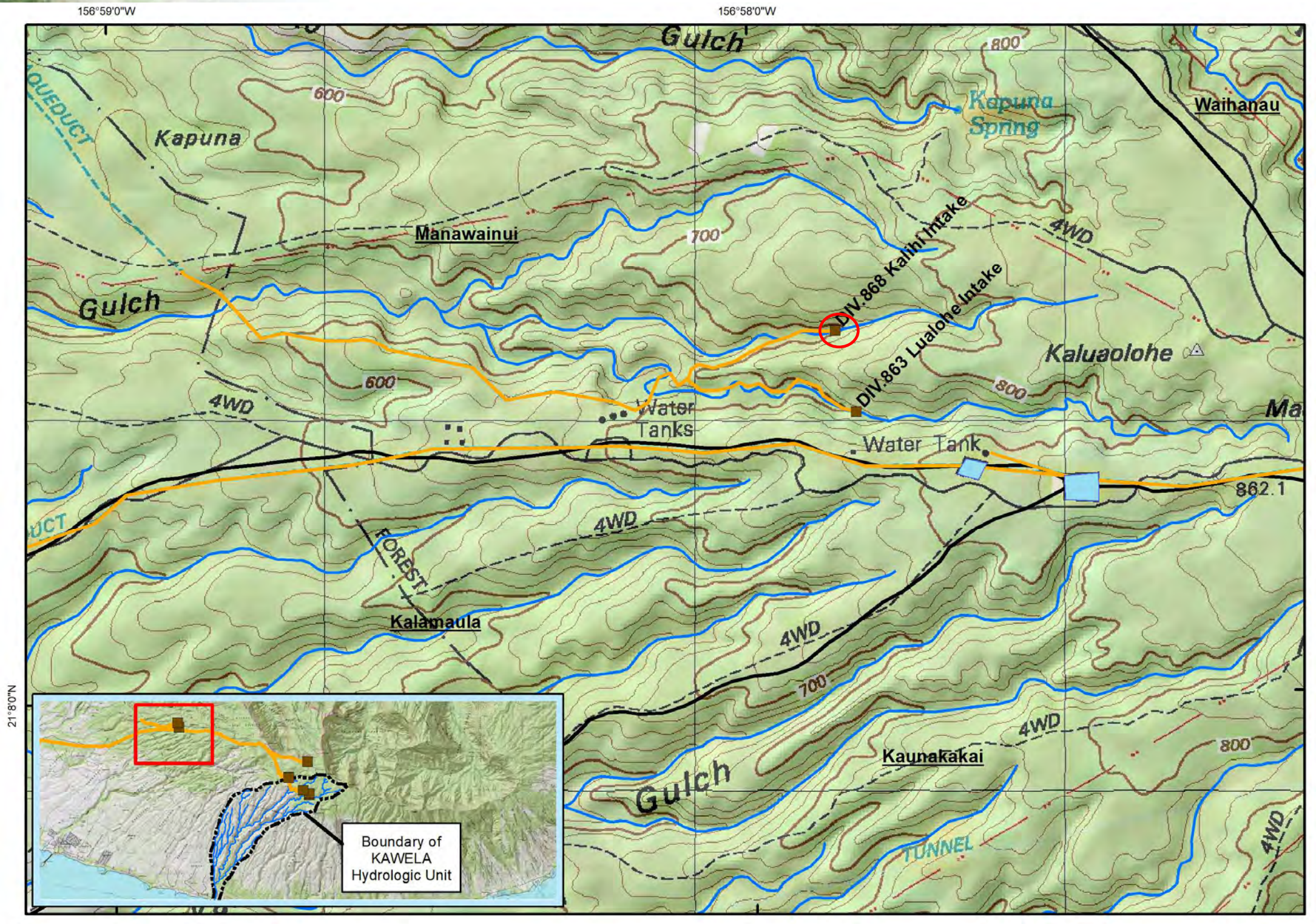
Hanalilolilo Intake (Diversion 864)



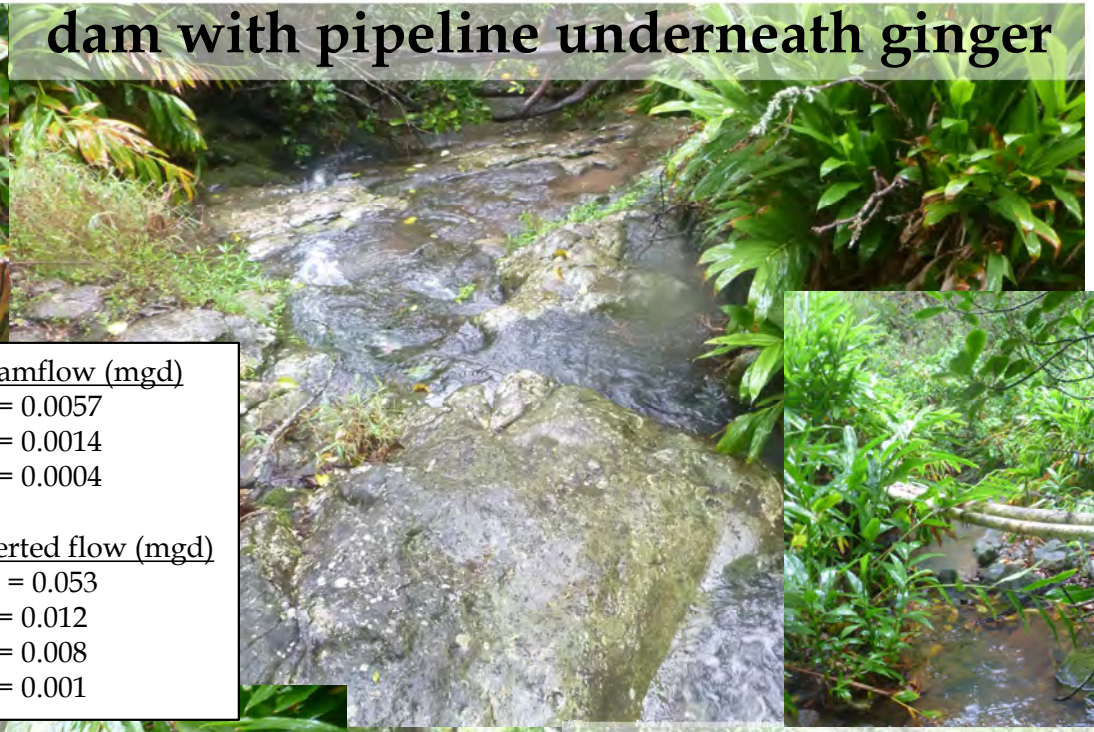
Streamflow (mgd)
Q_{50} = 0.274
Q_{70} = 0.109
Q_{80} = 0.053
Q_{90} = 0.017

Diverted flow (mgd)
mdf = 0.122
Q_{50} = 0.095
Q_{70} = 0.050
Q_{90} = 0.001

Mountain Water System: Dole Line

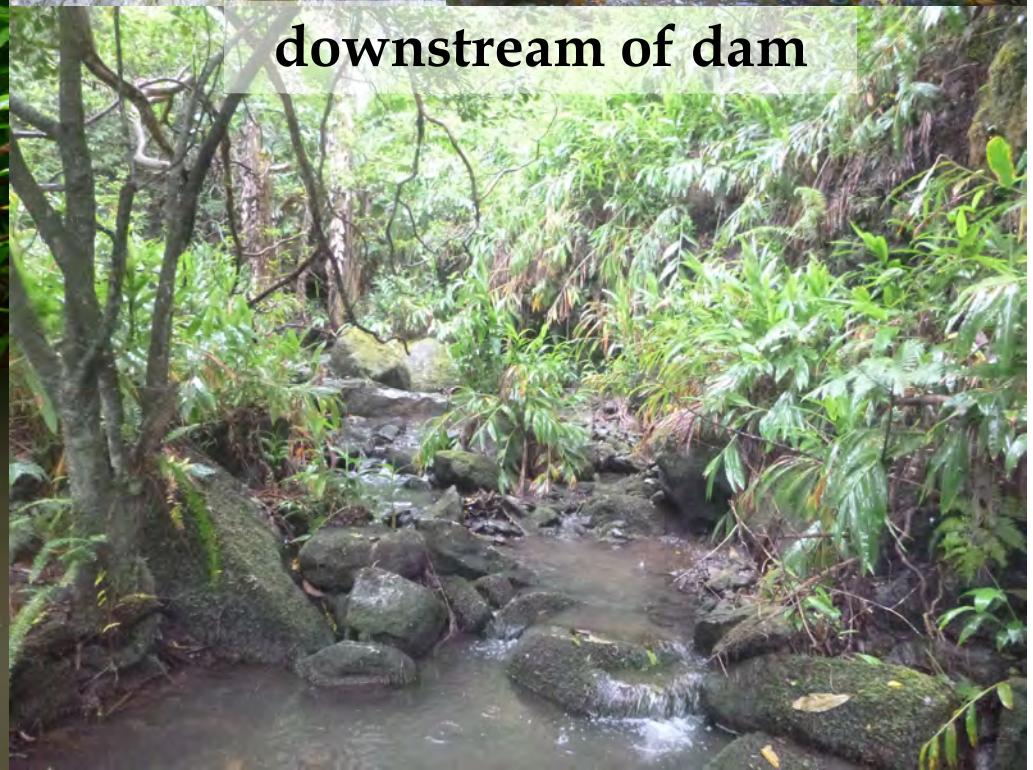


Kalihi Intake (Diversion 868) (not active)

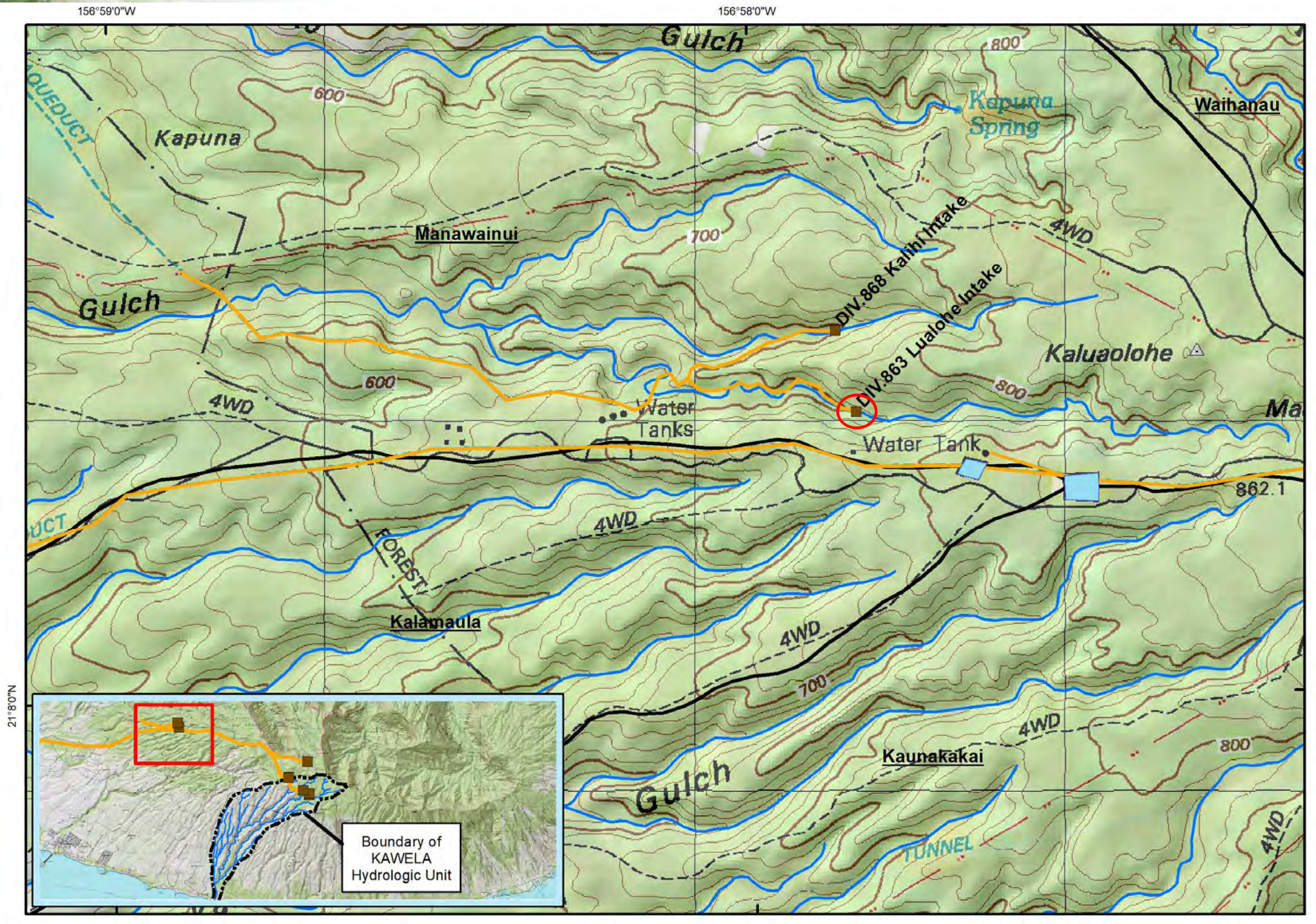


Streamflow (mgd)
Q_{50} = 0.0057
Q_{70} = 0.0014
Q_{90} = 0.0004

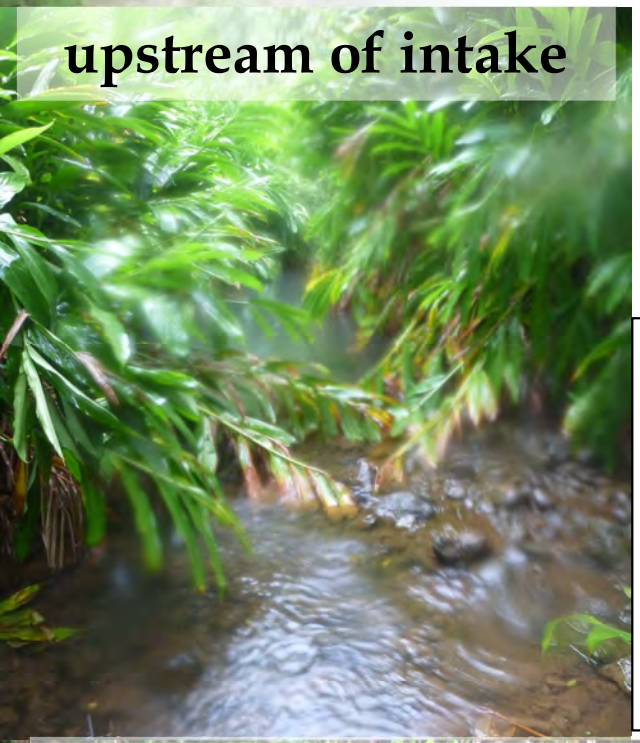
Diverted flow (mgd)
mdf = 0.053
Q_{50} = 0.012
Q_{70} = 0.008
Q_{90} = 0.001

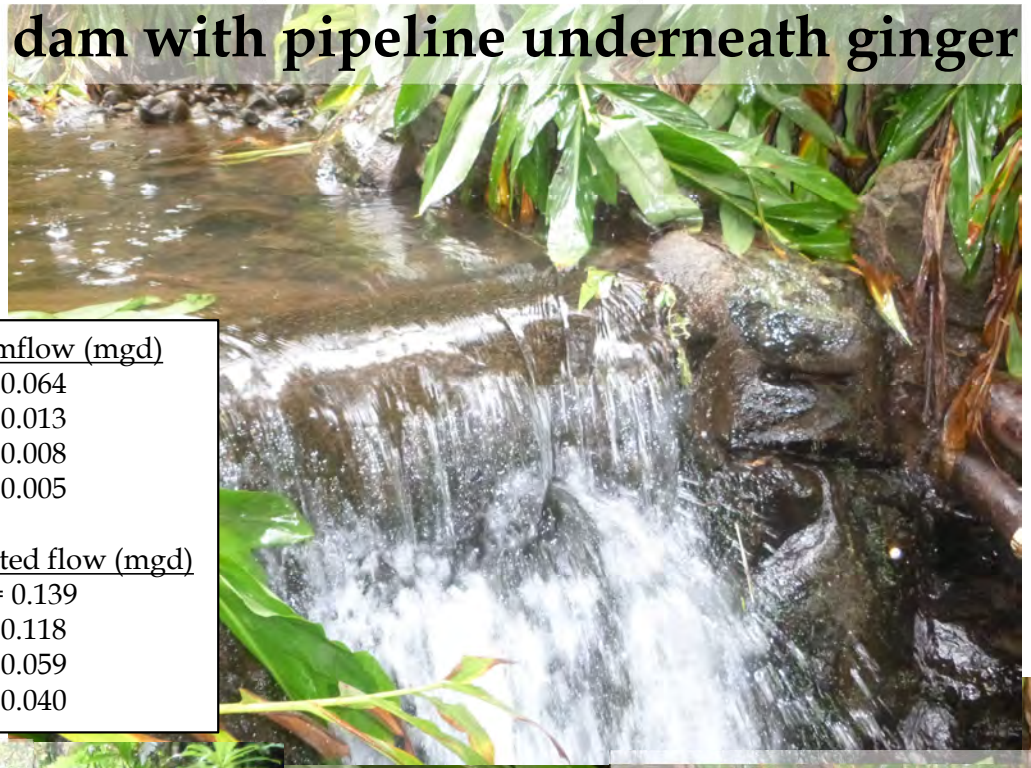


Mountain Water System: Dole Line



Luaholi Intake (Diversion 867) (not active)

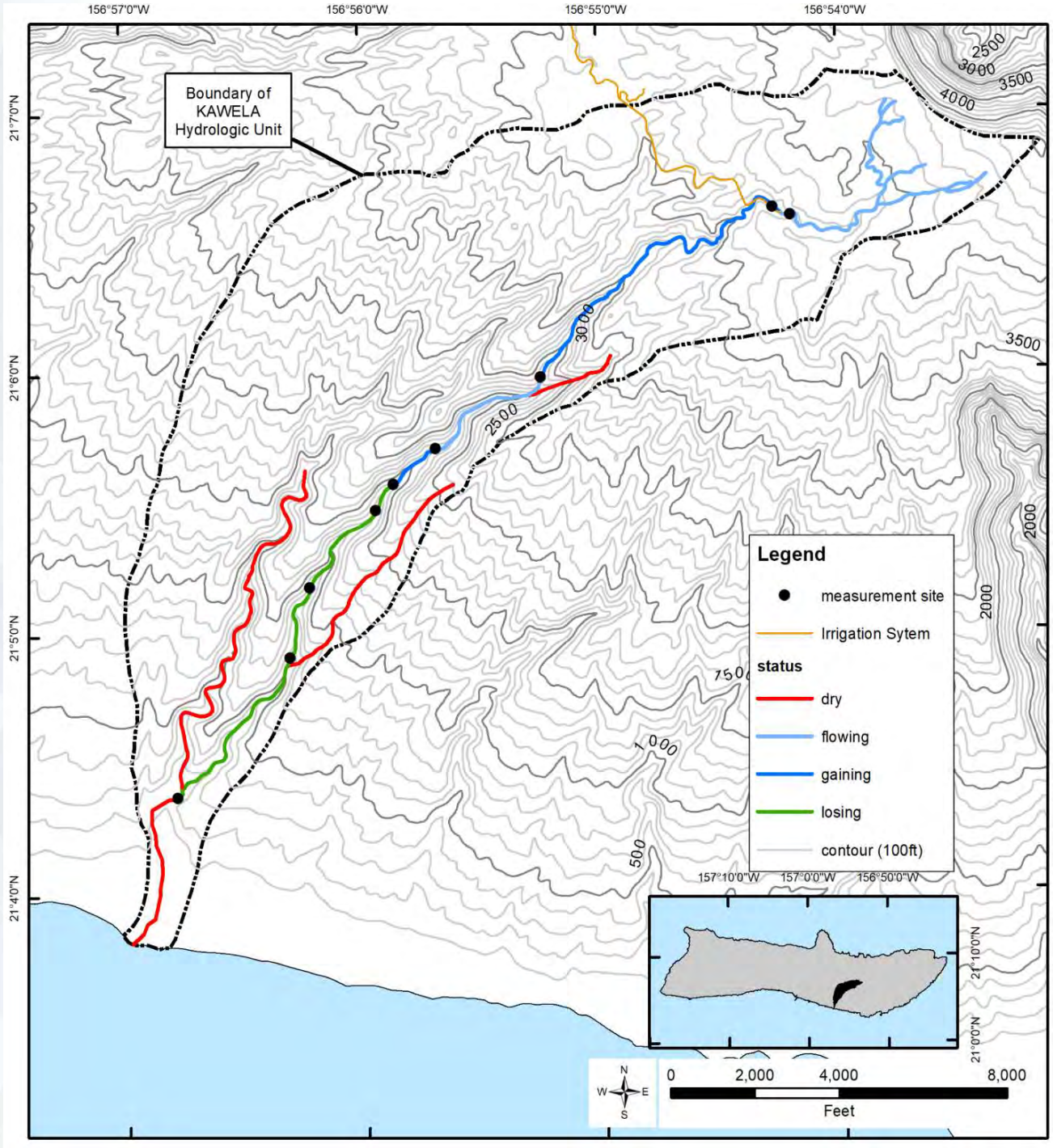




Streamflow (mgd)
Q_{50} = 0.064
Q_{70} = 0.013
Q_{80} = 0.008
Q_{90} = 0.005

Diverted flow (mgd)
mdf = 0.139
Q_{50} = 0.118
Q_{70} = 0.059
Q_{90} = 0.040

Kawela Seepage Run: Surface water-Groundwater Interactions



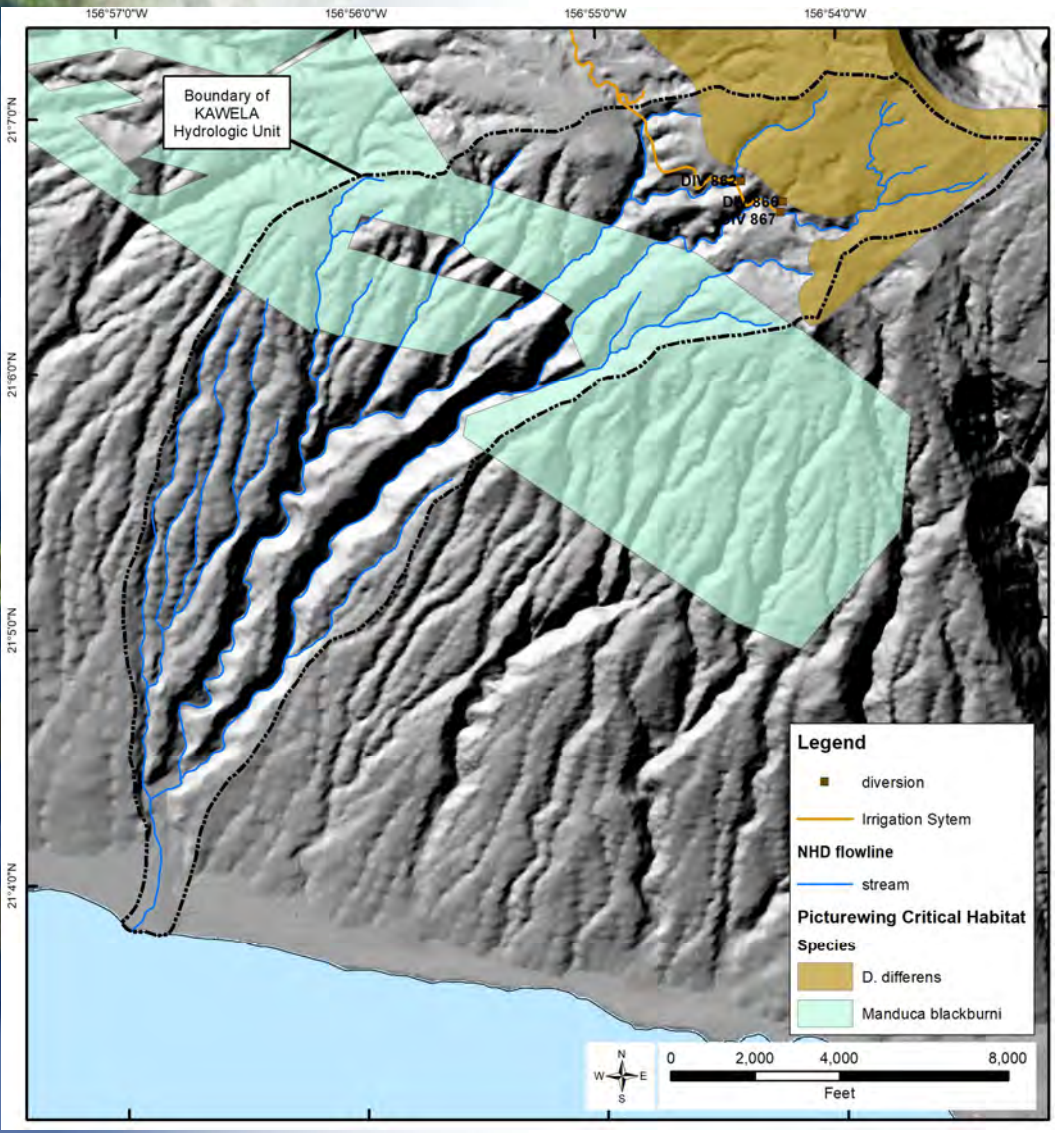
Mountain Water System Sources
(in mgd)

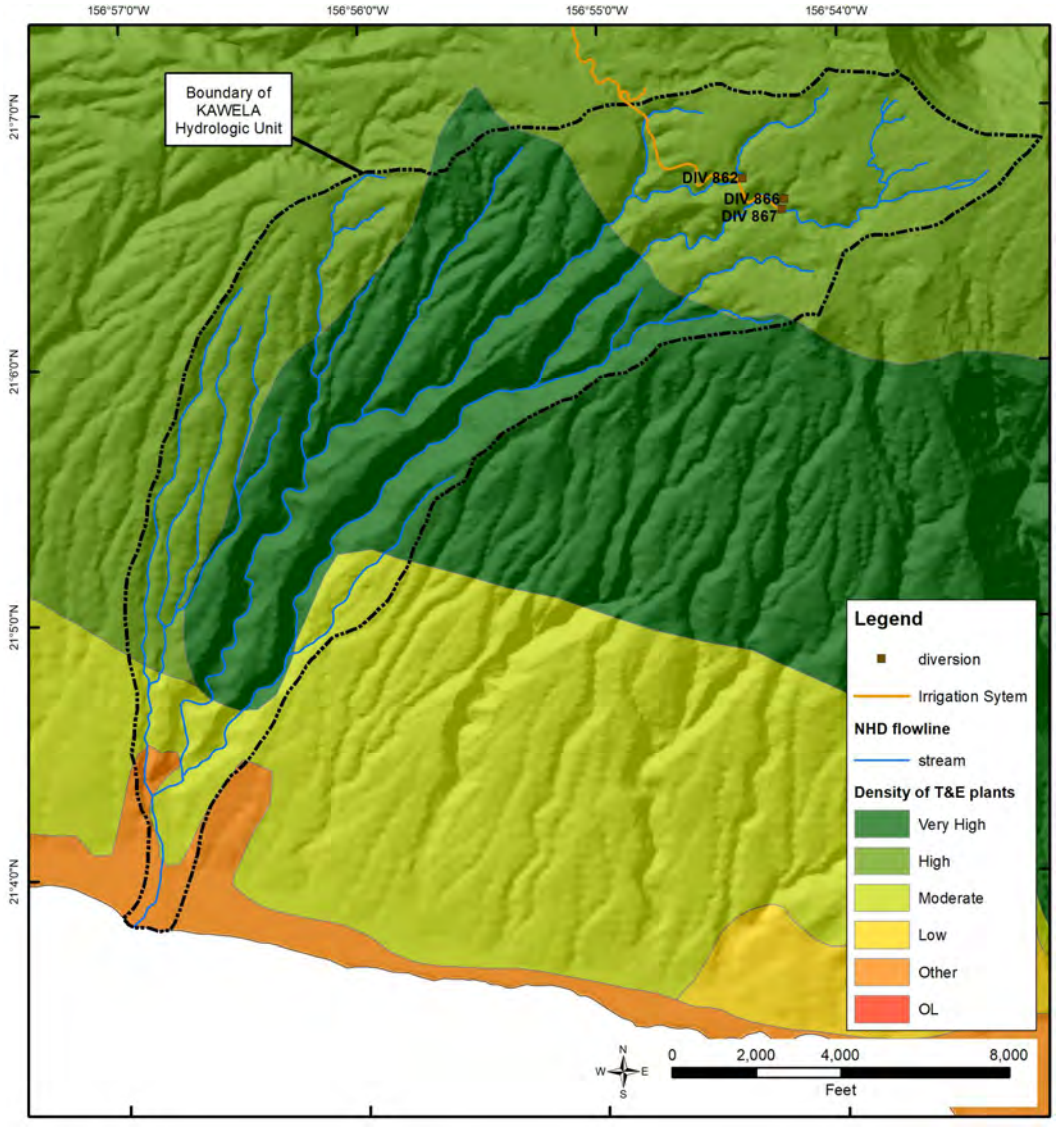
Stream	2015-2021 status	estimation method	Q_{50}	Q_{70}	Q_{90}	Q_{95}
East Kawela	active	Continuous	0.34	0.17	0.08	0.06
East Kawela Tributary	not-active	Model	0.01	0.0025	0.0008	0.0006
West Kawela	not-active	Partial-Record	0.029	0.010	0.004	0.002
Kamoku	not-active	Partial-Record	0.033	0.011	0.004	0.002
Hanalilolilo	active	Model	0.177	0.070	0.034	0.017
		Ranch line total	0.620	0.283	0.135	0.065
Kalihi	not-active	Model	0.0057	0.0014	0.0004	0.0003
Lualohi	not-active	Model	0.0420	0.0130	0.0050	0.0030
		Dole line total	0.0473	0.0146	0.0054	0.0036

Kawela: Instream Values

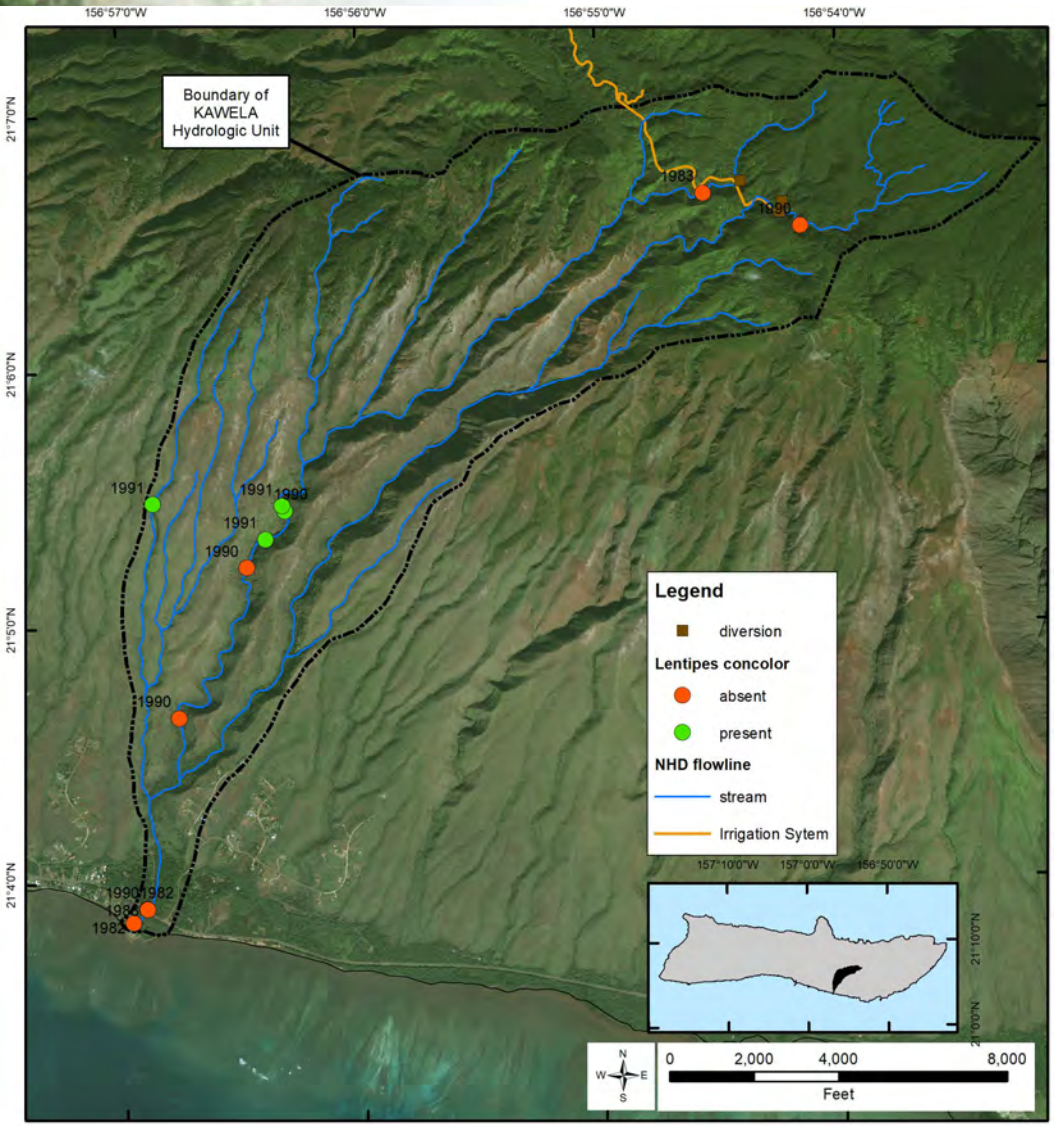
Biological Resources	Kawela
Final Rank	Limited (2 of 4)
Alamoo	--
Nakea	--
nopili	--
Hihiwai	--
# NG2	--
Cultural Resources	**Kawela**
Final Rank	Outstanding (4 of 4)
taro cultivation	no
# archaeological sites	15
density	High
valley significance	Pre-contact, excellent examples, important information, culturally noteworthy
Riparian Resources	**Kawela**
Final Rank	Substantial (3 of 4)
Detrimental species	mangrove, pigs, deer, goats
% native forest	--
Presence of recovery habitat	--
# T&E birds	--
# of rare plants	--
Wetlands	--
Recreational Resources	**Kawela**
Final Rank	Outstanding (4 of 4)
Opportunities	Camping, hiking, fishing, swimming, hunting, scenic views
Regional rank	1

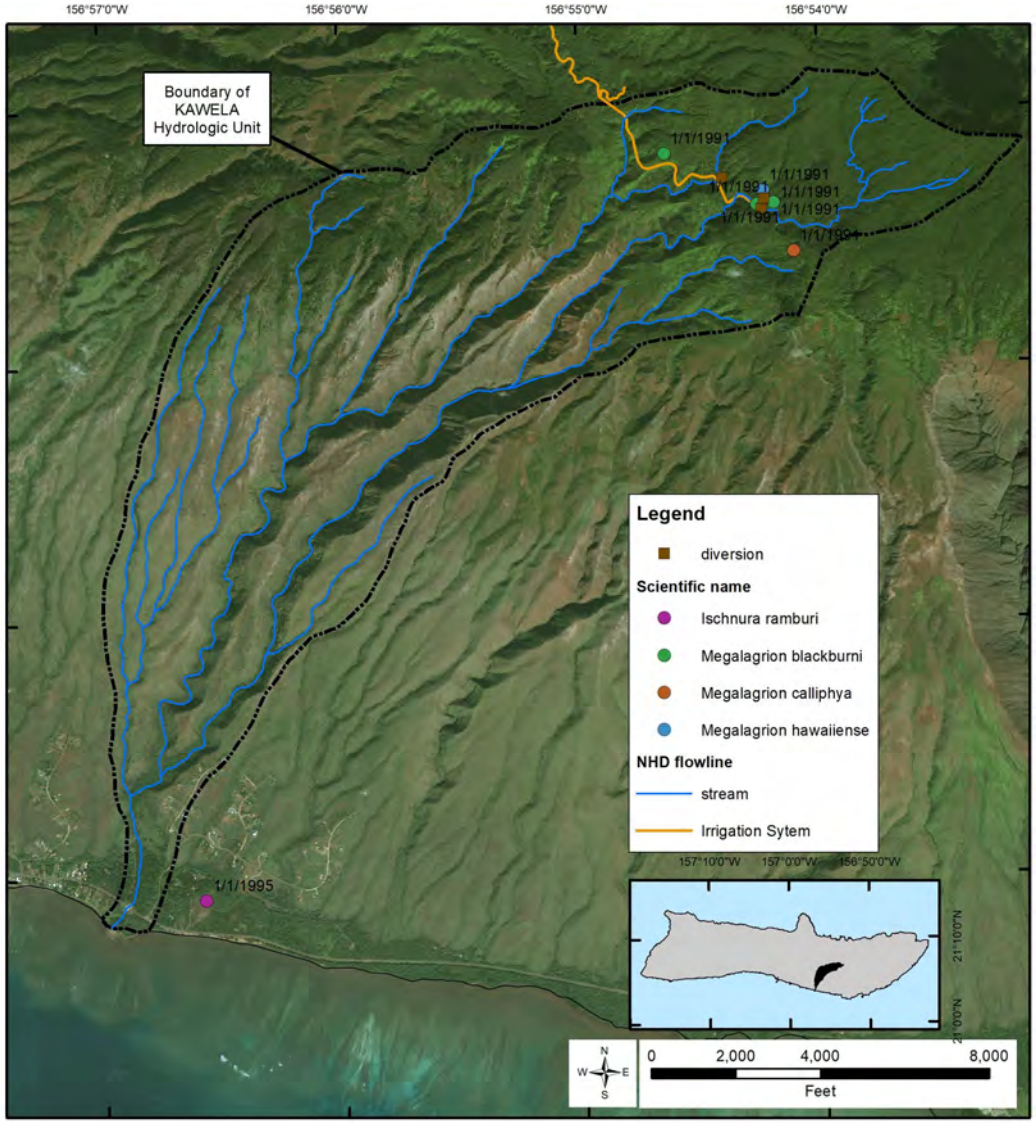
Kawela: Critical habitat for threatened or endangered plants and animals





Kawela: freshwater habitat





Lentipes concolor

damselfly identification

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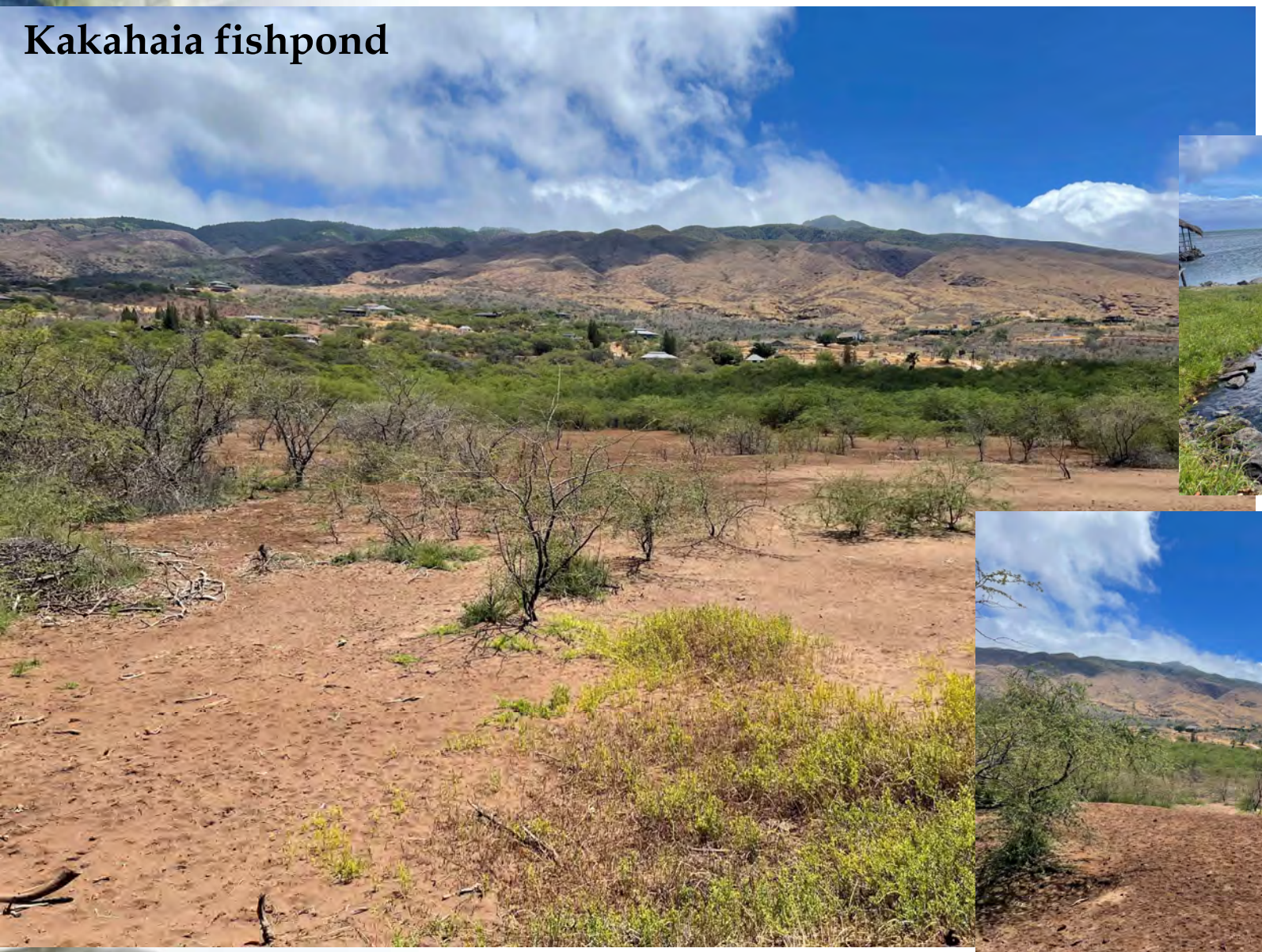
Kawela: cultural practices
improved spring flow supports limu productivity, near-shore ecosystems

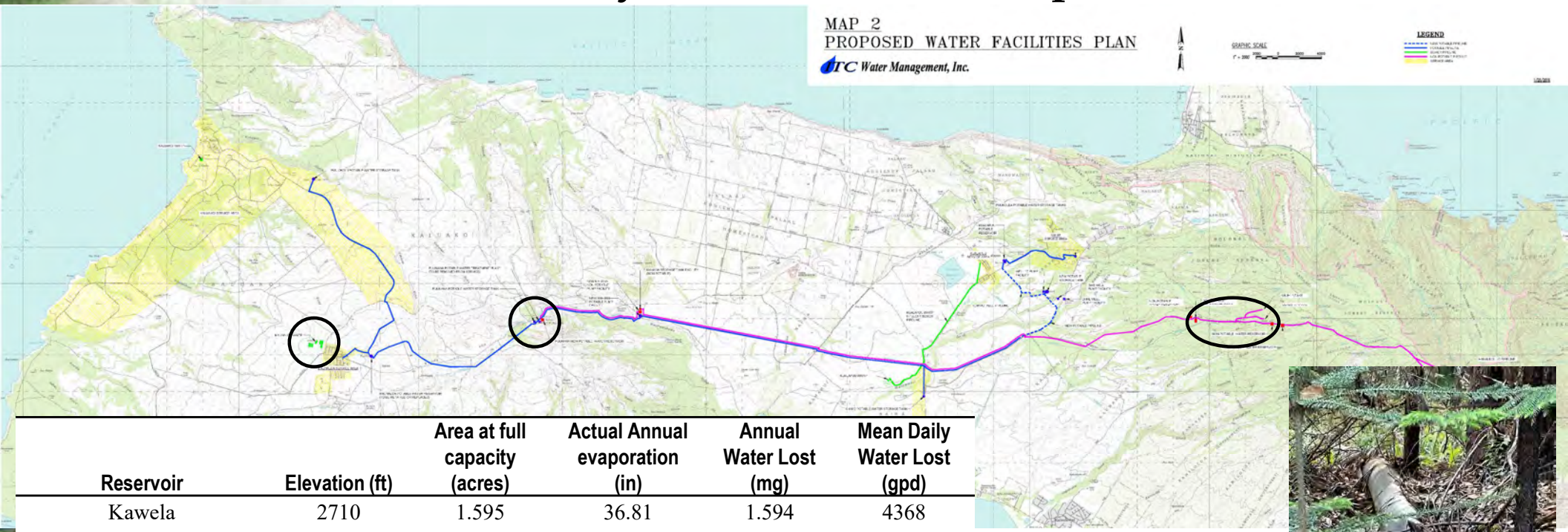
Commission on Water Resource Management
State of Hawaii

Kawela: cultural practices
improved spring flow supports fishponds

Kakahaia fishpond



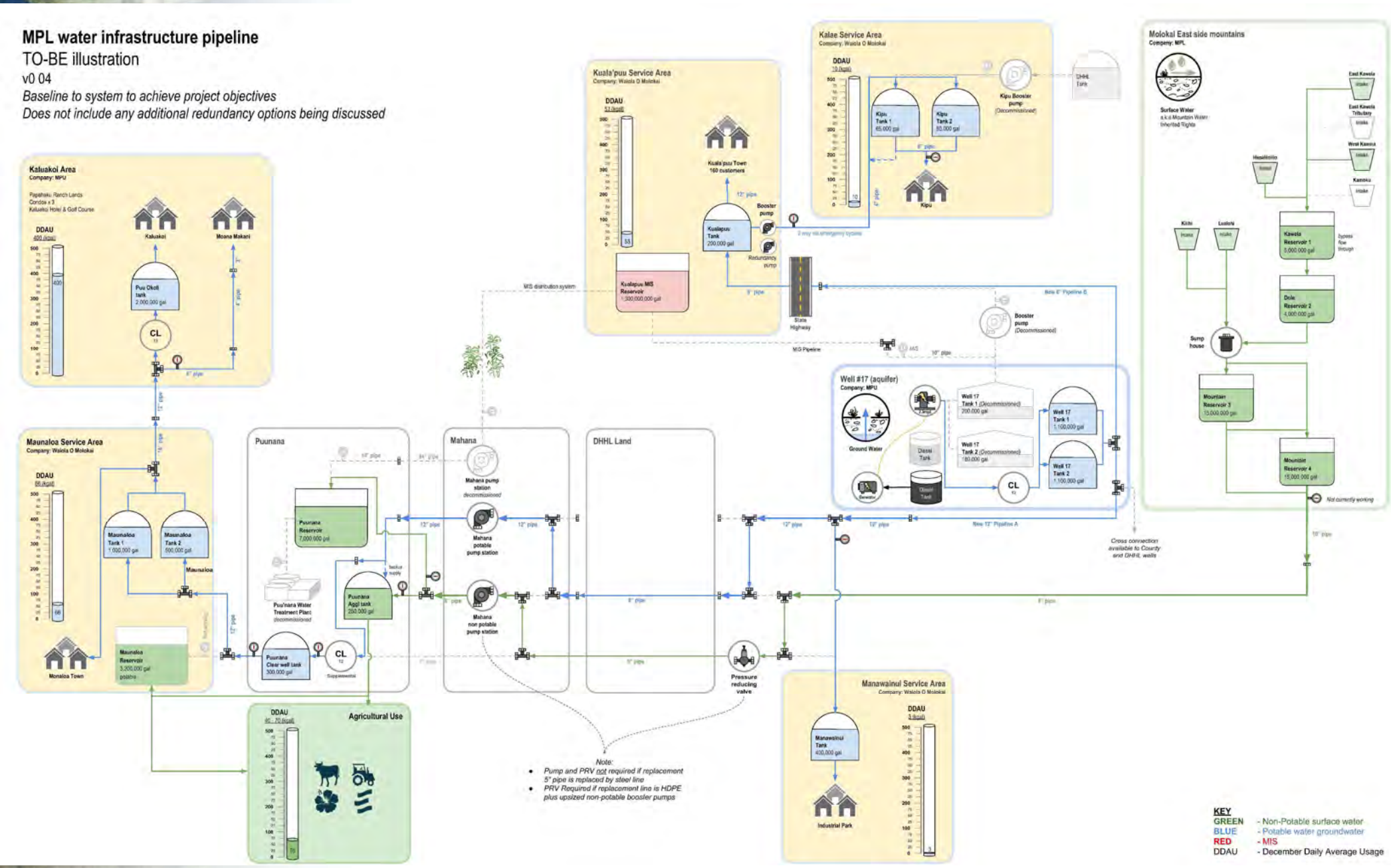
Mountain Water System Reservoirs: Evaporative Loss



Reservoir	Elevation (ft)	Area at full capacity (acres)	Actual Annual evaporation (in)	Annual Water Lost (mg)	Mean Daily Water Lost (gpd)
Kawela	2710	1.595	36.81	1.594	4368
Dole	2640	0.684	37.47	0.696	1908
Mountain Reservoir 1	1940	2.700	43.49	3.189	8737
Mountain Reservoir 2	1900	2.626	44.77	3.192	8745
Puunana	1305	1.836	23.80	1.187	3251
Maunaloa	1200	0.692	n/a	0	0
Livestock Reservoirs	900	3.922	21.48	2.288	6268
total					33,277

Non-Potable Water Uses

Non-Potable Water Uses



Service Area (Utility)	Use	units		Water Use Rate[1]		Existing Total Water Use[1]		Planned Total Water Use	
		Existing	Planned	Potable	Non-Potable	Potable	Non-Potable	Potable	Non-Potable
Kala'e (WOM)									
	Kipu Residences	18	7	439		7,906		10,975	
	Kipu Golf Course Office Area	1	0	629		629		629	
Kualapu'u (WOM)									
	Residences	122	42	196		23,877		32,144	
	Reed House	1			6,069		6,069		6,069
	Shafer House	1			6,069		6,069		6,069
	County Park	1	0	1,047		1,047		2,332	
	Aka'ula School	1		236		236		529	
	Commercial businesses	5	1	1,010		5,052		6,060	
	Kualapuu Ranch[2]						20,000		
Manawainui (WOM)									
	Manawainui Industrial Park	3	16	933		2,798	775	17,727	775
	Swenson (business)	1	0			480	768		768
	Space Options (business)	1	0			1,519	1,117		1,117
	Tri-L (concrete)	1	0			13,338	7,359		7,359
	The Gas Co.						3		3
	Maui Electric Co.						827		827
	Goodfellow Inc (office)						567		567
	Goodfellow Inc (crusher)						0		0
	Oliwai Pastures/Kamakana Farms[2]						137		137
	Molokai Sea Farms[2]						4,033		4,033
	County of Maui baseyard*					6,666	500	6,666	500
Maunaloa (WOM)									
	Molokai Ranch Livestock water						13,181		13,181
	Neighborhood Residences	143	323	251		37,192		81,073	
	Molokai Land Trust						122		122
	Sakugawa & Sons (livestock; ac)						185		185
	ARInc (lessee)						78		78
	Kaupoa Camp	80	0	112		8,950		8,950	
	Kolo Camp	20	0	38		761		761	
	Paniolo Camp	80	0	40		3,225		3,225	
	Lodge	22	0	359		7,903		7,903	
Kaluako'i (MPU)									
	Papohaku Beach Park	1	0	12,176		12,176		12,176	
	Papohaku Beach Access	5	1	377		1,883		2,262	
	Kaluakoi Resort Condos	124	350	350[4]		43,400		122,500	
	Kaluakoi Resort Landscaping (ac)	35.448	0		1,753		62,140[3]		62,140
	Kaluakoi Hotel units	148	0	350[4]		51,800		51,800	
	Kaluakoi Hotel Landscaping (ac)	15.12	18.12		1,877		28,378[3]		34,012
	Kaluakoi GC Facilities	5	0	600[4]		3,000		3,000	
	Kaluakoi Resort Residences	106	325	1,228		130,188		399,100	
	Kaluakoi Condos	0	284	350[4]		0	0	113,750	
	Kaluakoi Hotel & Apartments	0	481	350[4]		0	0	168,350	
	total					454,544	61,790	1,051,912	137,942

Service Area (Utility) / Use	Existing Total Water Use[1]	
	Potable	Non-Potable
Kala'e (WOM)		
Kipu Residences	7,906	
Kipu Golf Course Office Area	629	
Kualapu'u (WOM)		
Residences	23,877	
Reed House		6,069
Shafer House		6,069
County Park	1,047	
Aka'ula School	236	
Commercial businesses	5,052	
Kualapuu Ranch[2]		20,000
Manawainui (WOM)		
Manawainui Industrial Park	2,798	775
Swenson (business)	480	768
Space Options (business)	1,519	1,117
Tri-L (concrete)	13,338	7,359
The Gas Co.		3
Maui Electric Co.		827
Goodfellow Inc (office)		567
Goodfellow Inc (crusher)		0
Oliwai Pastures/Kamakana Farms[2]		137
Molokai Sea Farms[2]		4,033
County of Maui baseyard*	6,666	500
Maunaloa (WOM)		
Molokai Ranch Livestock water		13,181
Neighborhood Residences	37,192	
Molokai Land Trust		122
Sakugawa & Sons (livestock; ac)		185
ARInc (lessee)		78
Kaupoa Camp	8,950	
Kolo Camp	761	
Paniolo Camp	3,225	
Lodge	7,903	
Kaluako'i (MPU)		
Papohaku Beach Park	12,176	
Papohaku Beach Access	1,883	
Kaluakoi Resort Condos	43,400	
Kaluakoi Resort Landscaping (ac)		62,140[3]
Kaluakoi Hotel units	51,800	
Kaluakoi Hotel Landscaping (ac)		28,378[3]
Kaluakoi GC Facilities	3,000	
Kaluakoi Resort Residences	130,188	
Kaluakoi Condos	0	0
Kaluakoi Hotel & Apartments	0	0
total	454,544	61,790

Service Area (Utility)	Use	Existing Total Water Use[1] Potable	Existing Total Water Use[1] Non-Potable
Kala'e (WOM)			
	Kipu Residences	7,906	
	Kipu Golf Course Office Area	629	
Kualapu'u (WOM)			
	Residences	23,877	
	Reed House		6,069
	Shafer House		6,069
	County Park	1,047	
	Aka'ula School	236	
	Commercial businesses	5,052	
	Kualapuu Ranch[2]		20,000
Manawainui (WOM)			
	Manawainui Industrial Park	2,798	775
	Swenson (business)	480	768
	Space Options (business)	1,519	1,117
	Tri-L (concrete)	13,338	7,359
	The Gas Co.		3
	Maui Electric Co.		827
	Goodfellow Inc (office)		567
	Goodfellow Inc (crusher)		0
	Oliwai Pastures/Kamakana Farms[2]		137
	Molokai Sea Farms[2]		4,033
	County of Maui baseyard*	6,666	500
Maunaloa (WOM)			
	Molokai Ranch Livestock water		13,181
	Neighborhood Residences	37,192	
	Molokai Land Trust		122
	Sakugawa & Sons (livestock; ac)		185
	ARInc (lessee)		78
	Kaupoa Camp	8,950	
	Kolo Camp	761	
	Paniolo Camp	3,225	
	Lodge	7,903	
Kaluako'i (MPU)			
	Papohaku Beach Park	12,176	
	Papohaku Beach Access	1,883	
	Kaluakoi Resort Condos	43,400	
	Kaluakoi Resort Landscaping (ac)		62,140[3]
	Kaluakoi Hotel units	51,800	
	Kaluakoi Hotel Landscaping (ac)		28,378[3]
	Kaluakoi GC Facilities	3,000	
	Kaluakoi Resort Residences	130,188	
	Kaluakoi Condos	0	0
	Kaluakoi Hotel & Apartments	0	0
	total	454,544	61,790

Service Area (Utility) / Use	Existing Total Water Use[1] Potable	Existing Total Water Use[1] Non-Potable
Kala'e (WOM)		
Kipu Residences	7,906	
Kipu Golf Course Office Area	629	
Kualapu'u (WOM)		
Residences	23,877	
Reed House		6,069
Shafer House		6,069
County Park	1,047	
Aka'ula School	236	
Commercial businesses	5,052	
Kualapuu Ranch[2]		20,000
Manawainui (WOM)		
Manawainui Industrial Park	2,798	775
Swenson (business)	480	768
Space Options (business)	1,519	1,117
Tri-L (concrete)	13,338	7,359
The Gas Co.		3
Maui Electric Co.		827
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Goodfellow Inc (crusher)		0
Oliwai Pastures/Kamakana Farms[2]		137
Molokai Sea Farms[2]		4,033
County of Maui baseyard*	6,666	500
Maunaloa (WOM)		
Molokai Ranch Livestock water		13,181
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Sakugawa & Sons (livestock; ac)		185
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Kaupoa Camp	8,950	
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Paniolo Camp	3,225	
Lodge	7,903	
Kaluako'i (MPU)		
Papohaku Beach Park	12,176	
Papohaku Beach Access	1,883	
Kaluakoi Resort Condos	43,400	
Kaluakoi Resort Landscaping (ac)		62,140[3]
Kaluakoi Hotel units	51,800	
Kaluakoi Hotel Landscaping (ac)		28,378[3]
Kaluakoi GC Facilities	3,000	
Kaluakoi Resort Residences	130,188	
Kaluakoi Condos	0	0
Kaluakoi Hotel & Apartments	0	0
total	454,544	61,790

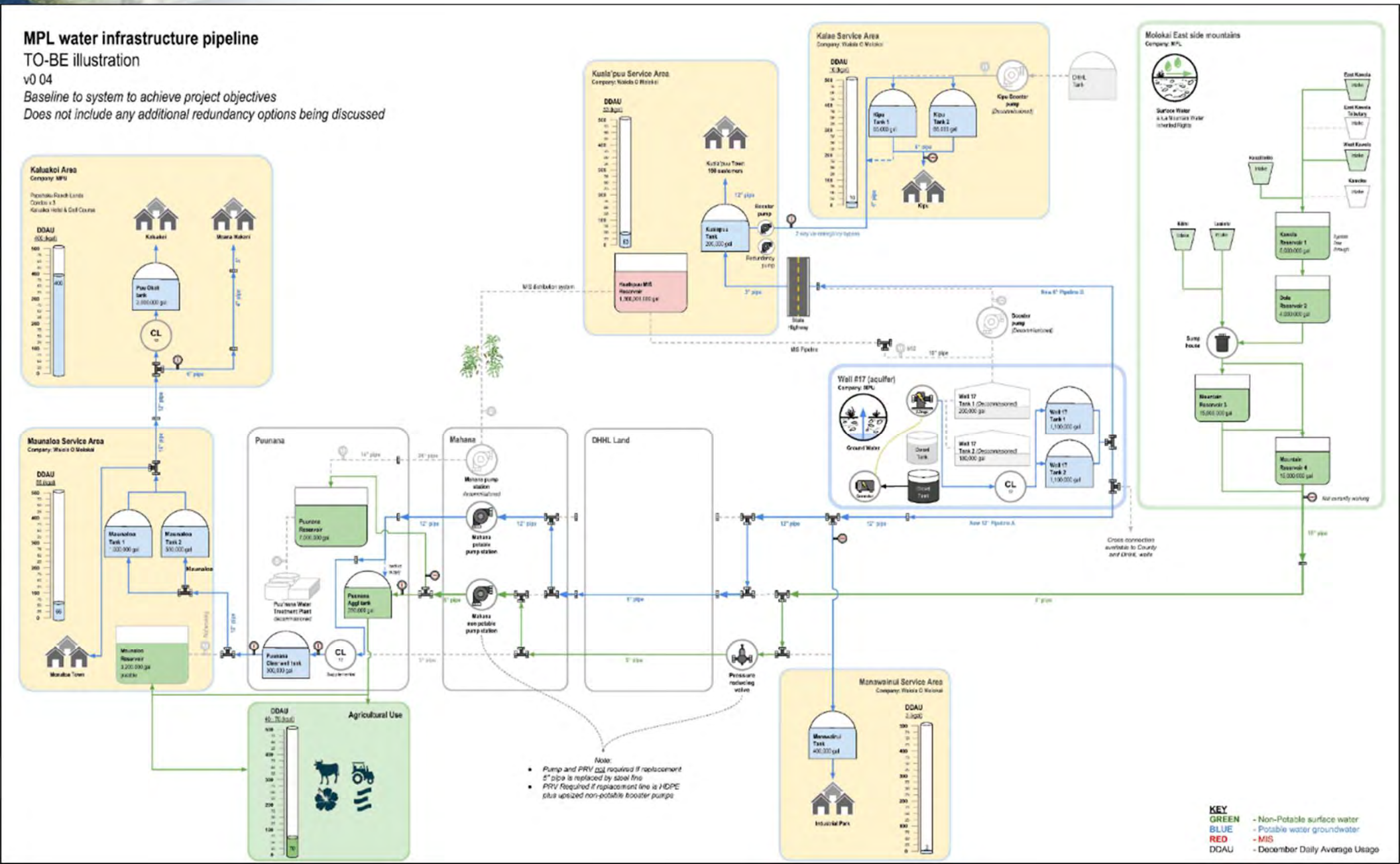
~62,000 gpd current non-potable use
+
~33,000 gpd evaporative loss

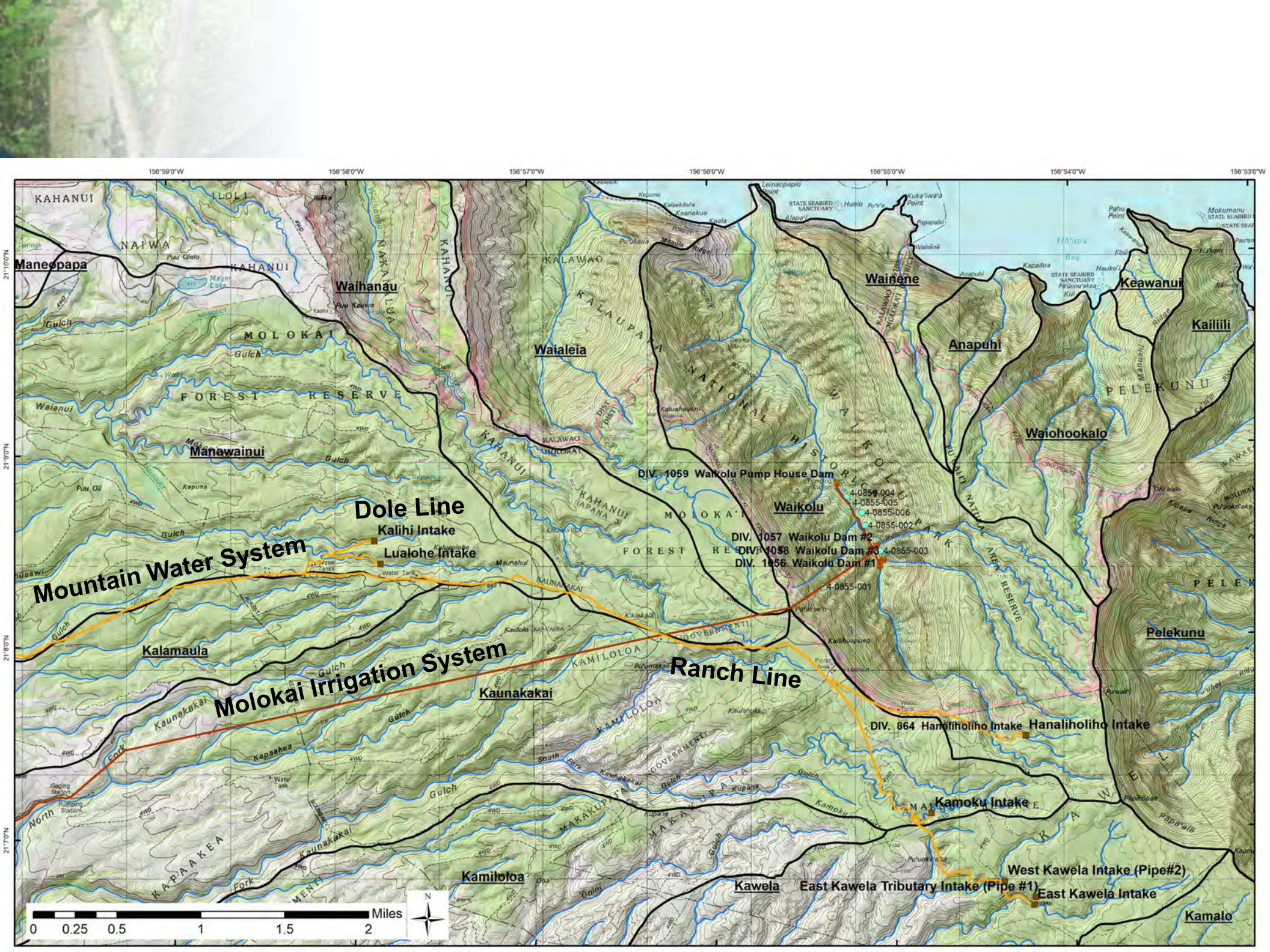
=

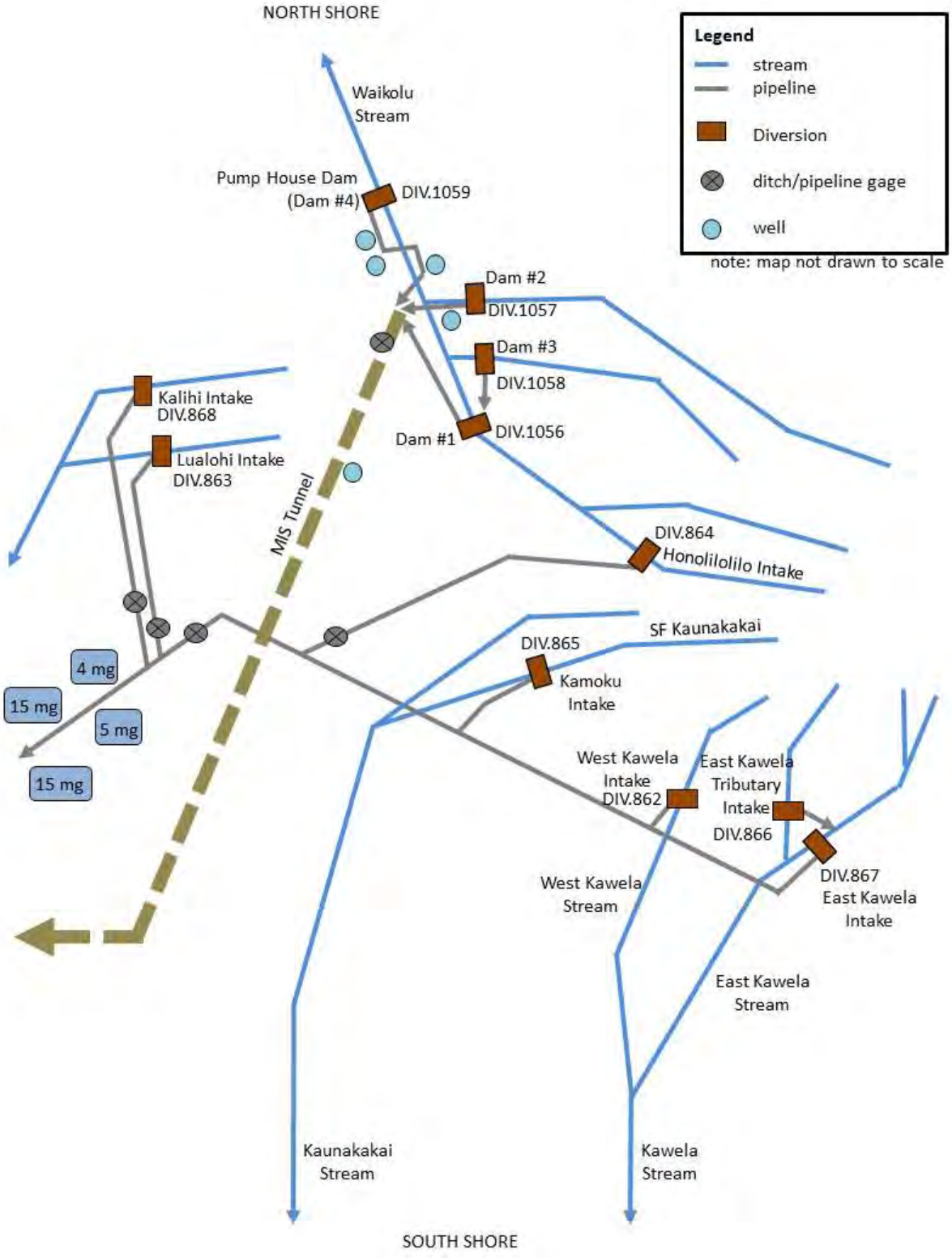
~95,000 gpd of source demand
(0.095 mgd)

~90,000 gpd of potential demand

Mountain Water System Uses

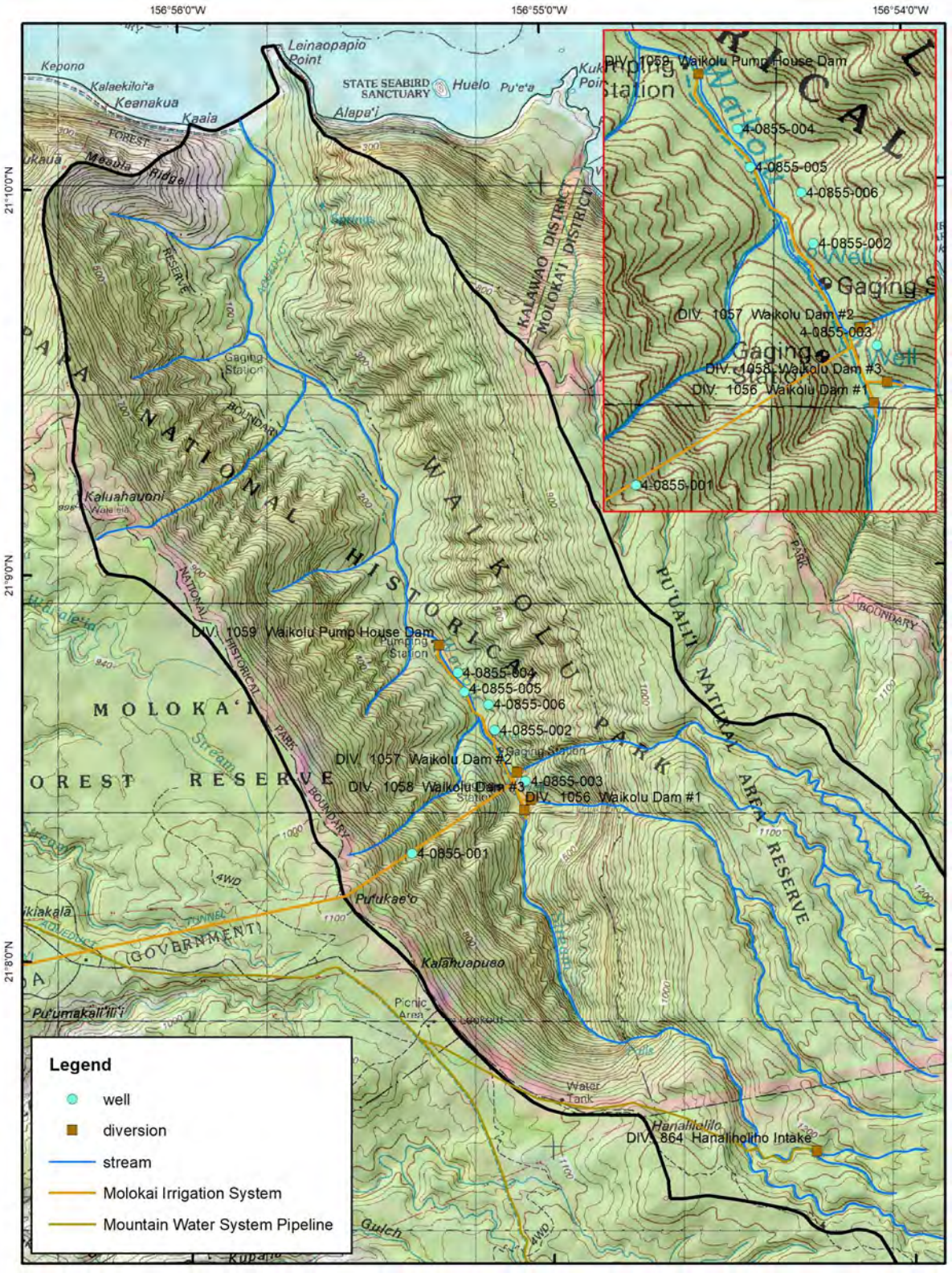



Maneopapa
Waihanau
Waialeia
Waiehene
Keawanui
Kailiili
Anapuhi
Waiohookalo
Pelekunu
Manawainui
Waikolu
Kalamaula
Kaunakakai
Kamiloloa
Kawela
Kamalo
Dole Line
Kalihi Intake
Lualohe Intake
Mountain Water System
Molokai Irrigation System
Ranch Line
DIV. 1059 Waikolu Pump House Dam
4-0859-004
4-0855-005
4-0855-006
4-0855-002
DIV. 1057 Waikolu Dam #2
DIV. 1058 Waikolu Dam #3
4-0855-003
DIV. 1056 Waikolu Dam #1
4-0855-001
DIV. 864 Hanaliholiho Intake
Hanaliholiho Intake
Kamoku Intake
West Kawela Intake (Pipe#2)
East Kawela Tributary Intake (Pipe #1)
East Kawela Intake
KAHANUI
MOLOKAI
FOREST RESERVE
KALAUPAPA NATIONAL HISTORICAL PARK
PELEKUNU
KAMILOLOA
MAKAKUPAIA
KAPAAKEA
Miles
0
0.25
0.5
1
1.5
2
N


NORTH SHORE
Legend
stream
pipeline
Diversion
ditch/pipeline gage
well
note: map not drawn to scale
Waikolu Stream
Pump House Dam (Dam #4)
DIV.1059
Dam #2
DIV.1057
Dam #3
DIV.1058
Dam #1
DIV.1056
Kalihi Intake DIV.868
Lualohi Intake DIV.863
MIS Tunnel
DIV.864 Honolilolilo Intake
SF Kaunakakai
DIV.865
Kamoku Intake
4 mg
15 mg
5 mg
15 mg
West Kawela Intake DIV.862
East Kawela Tributary Intake DIV.866
DIV.867 East Kawela Intake
West Kawela Stream
East Kawela Stream
Kaunakakai Stream
Kawela Stream
SOUTH SHORE

Molokai Irrigation System

- 4 stream diversions
  - 3 gravity feed at 1000 ft
  - 1 pump house at 730 ft
- 6 wells
- Kualapu‘u Reservoir



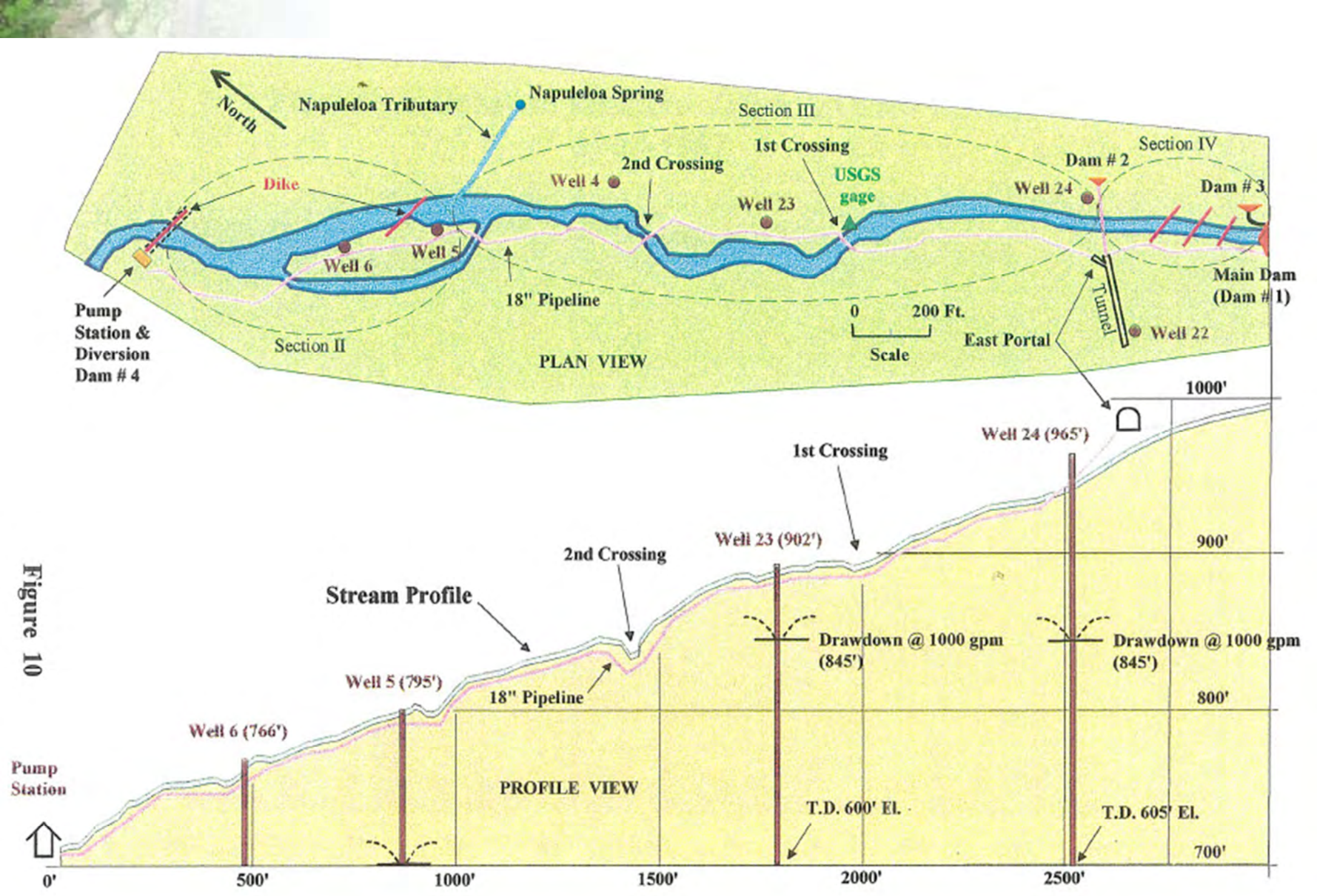
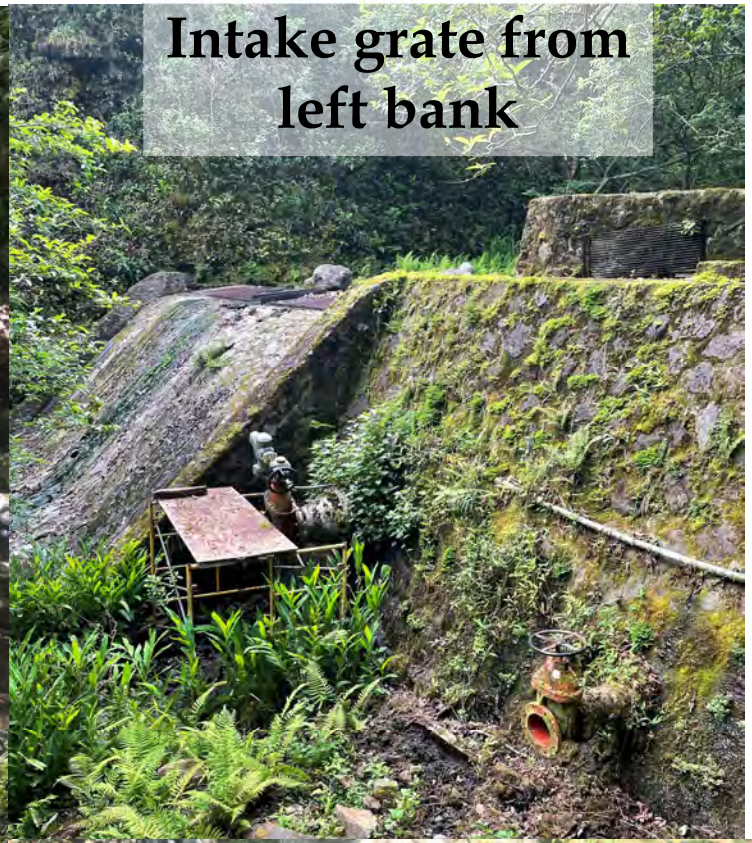
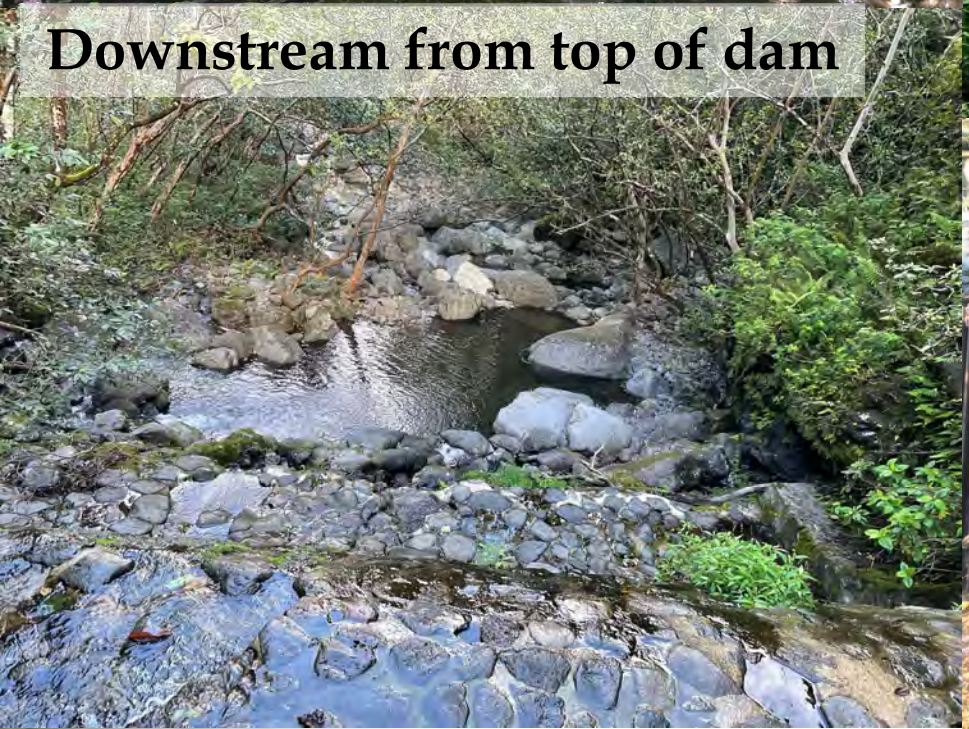


Figure 10

Plan and Profile of Waikolu Stream Between Dams #1 and #4

Waikolu Dam #1 (Diversion 1056)

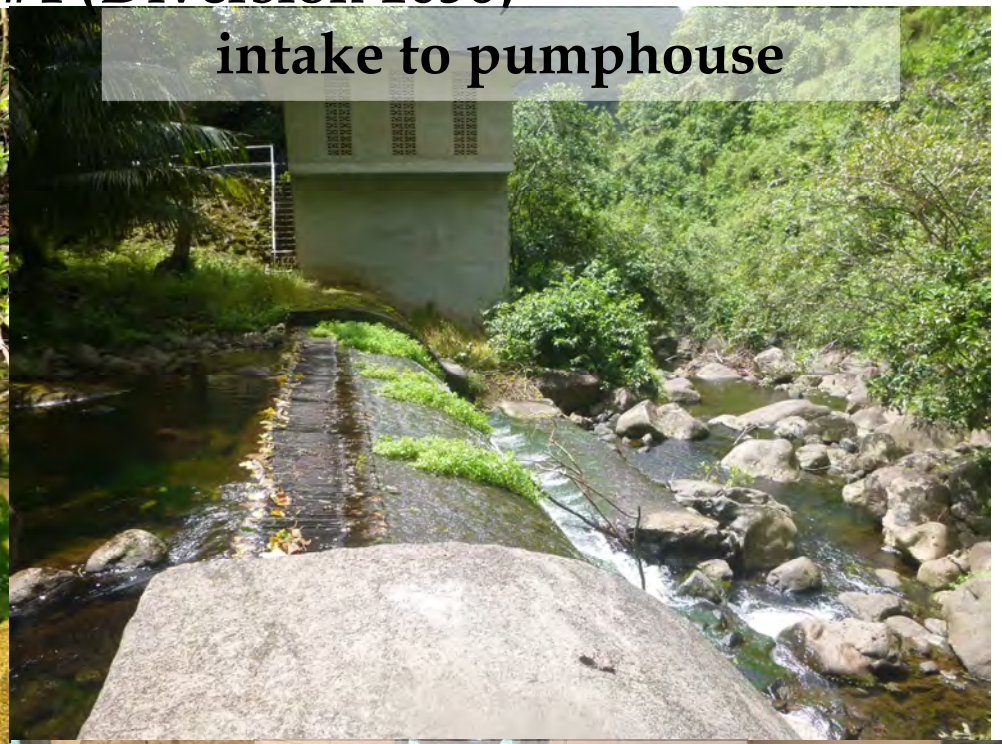


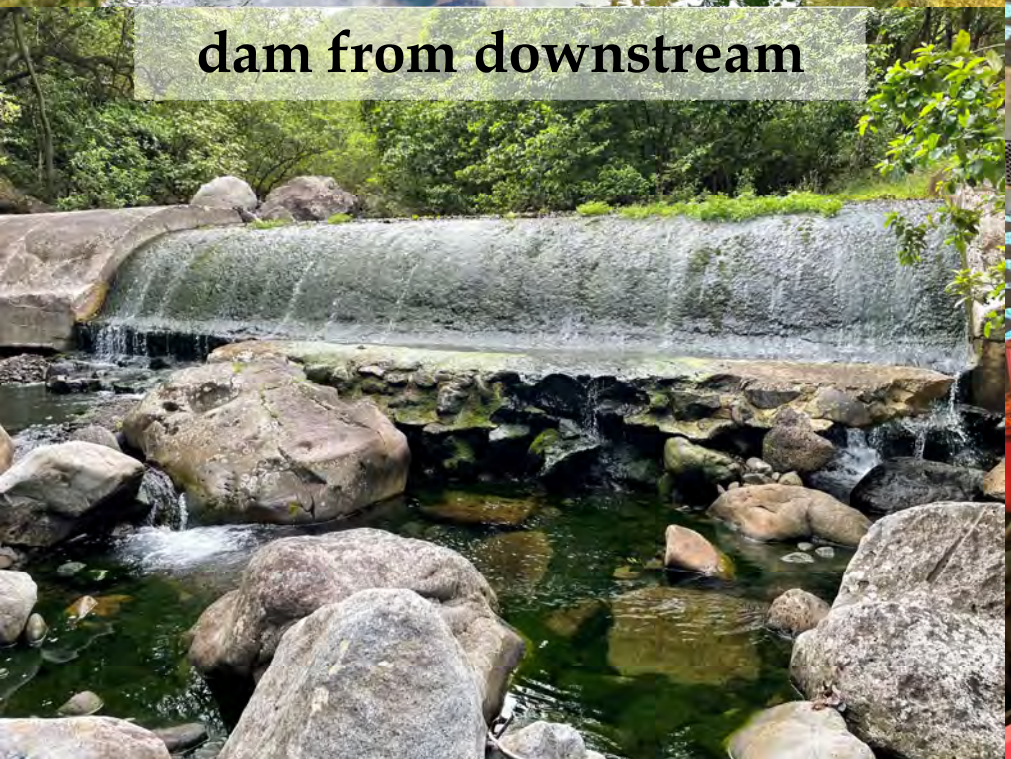


Commission on Water Resource Management
State of Hawaii

Waikolu Dam #1 (Diversion 1056)

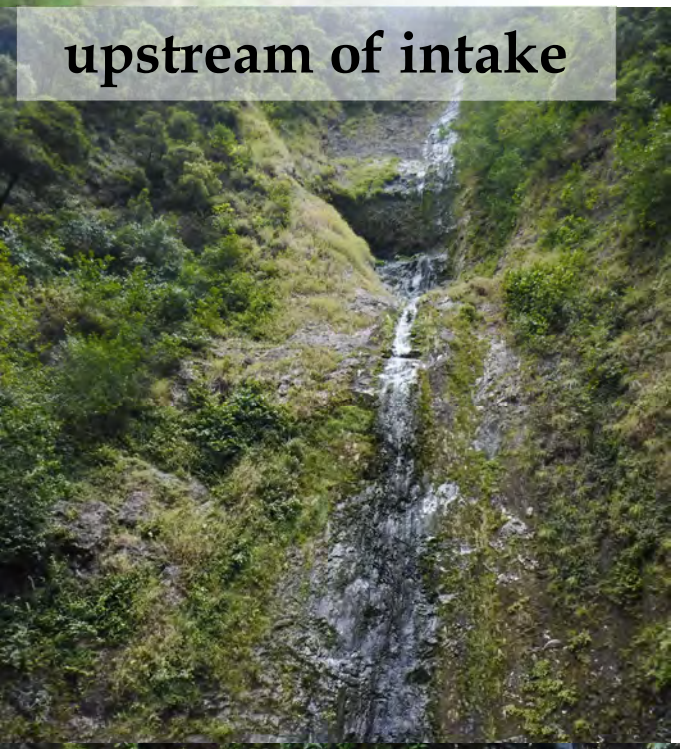
Waikolu Dam #4 (Diversion 1056)





Waikolu Dam #2 (Diversion 1057)

upstream of intake

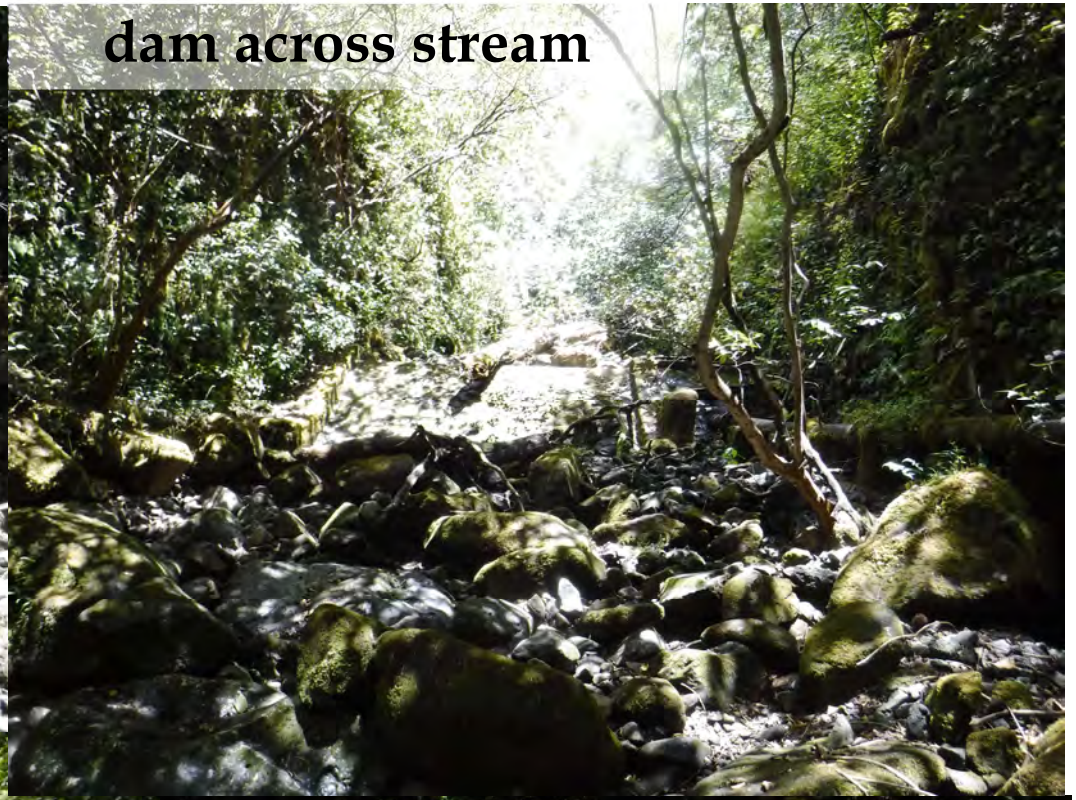


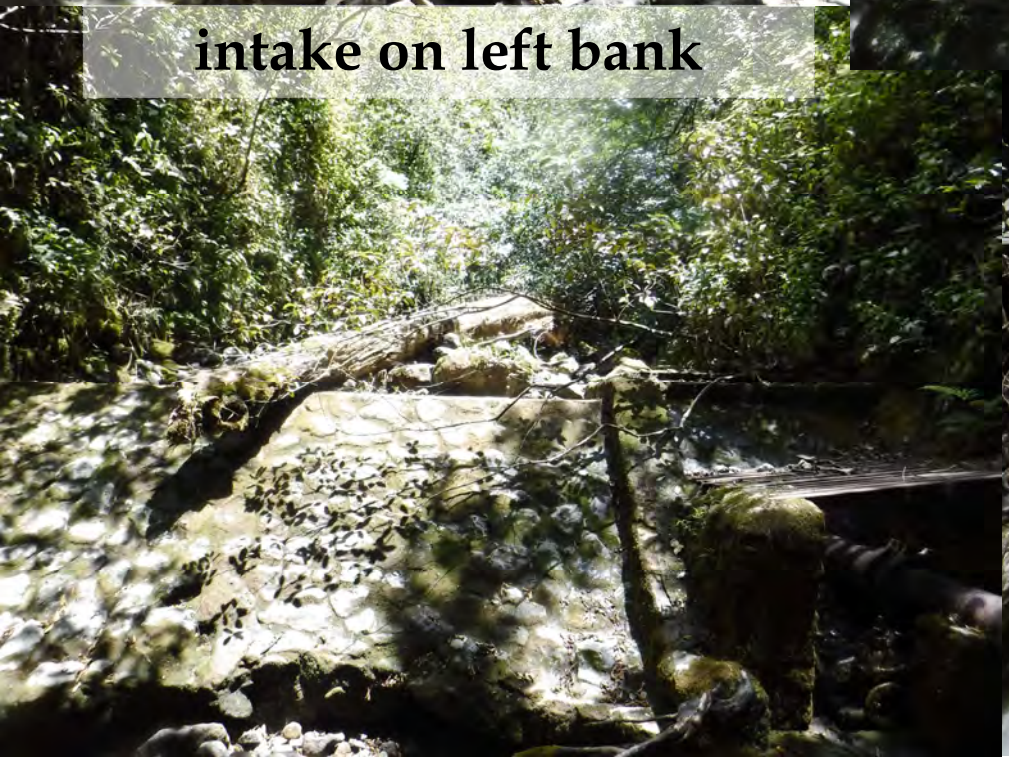
dam across stream

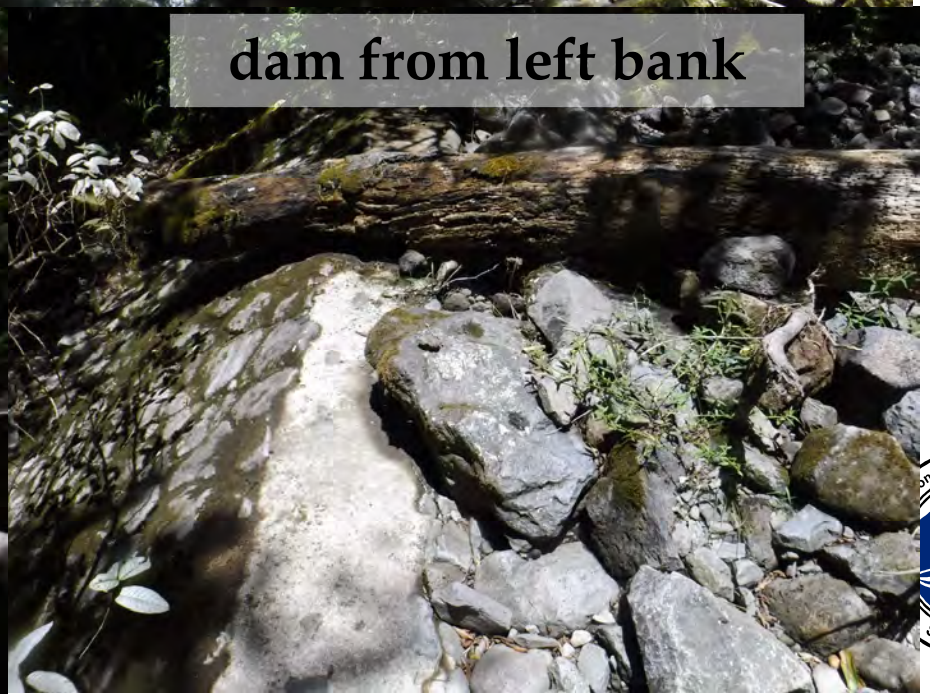
intake on left bank

dam from left bank

Waikolu Dam #3 (Diversion 1058)



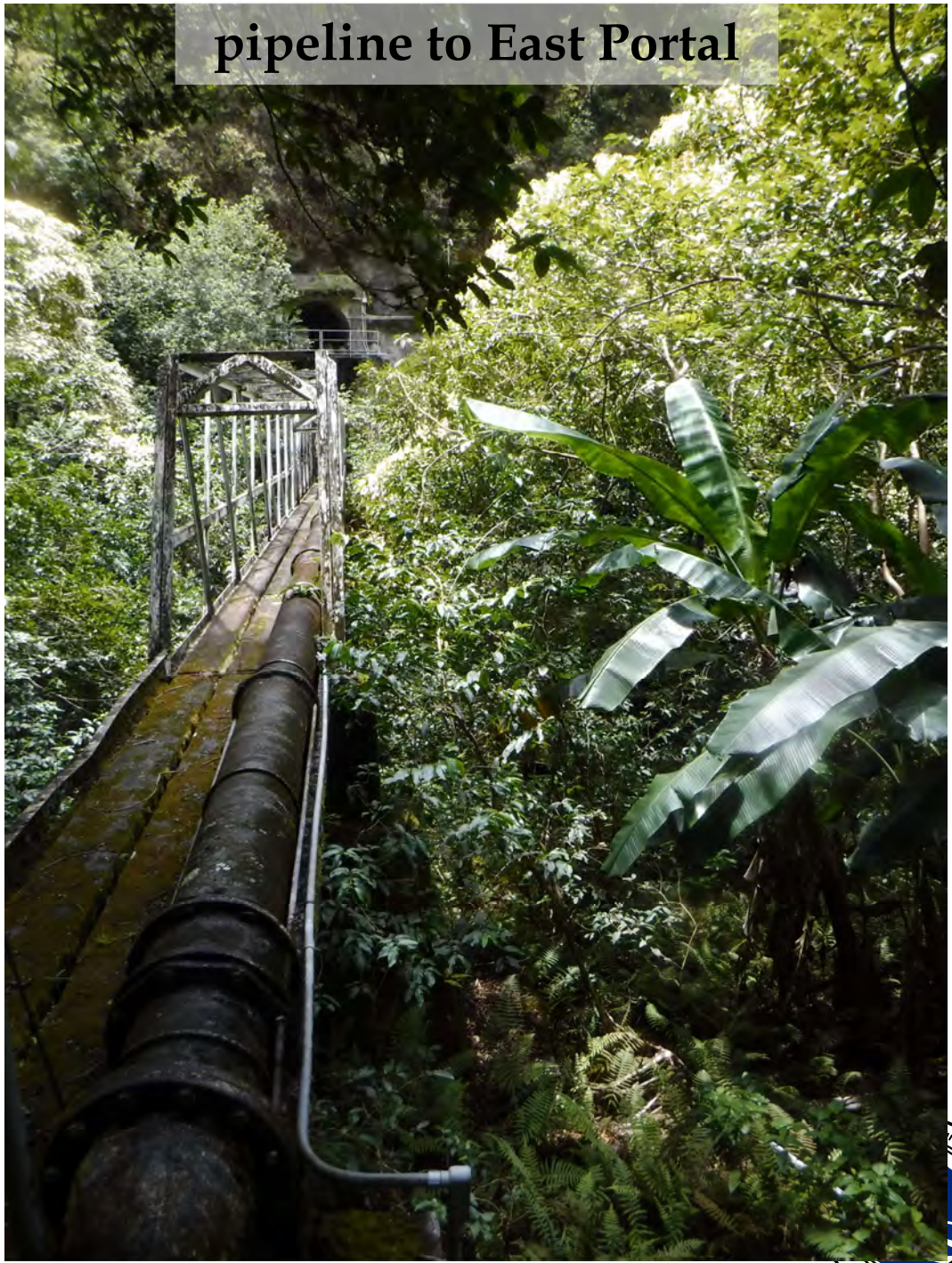




Waikolu Well 24 (4-0855-003)

Well connected to transmission

pipeline to East Portal

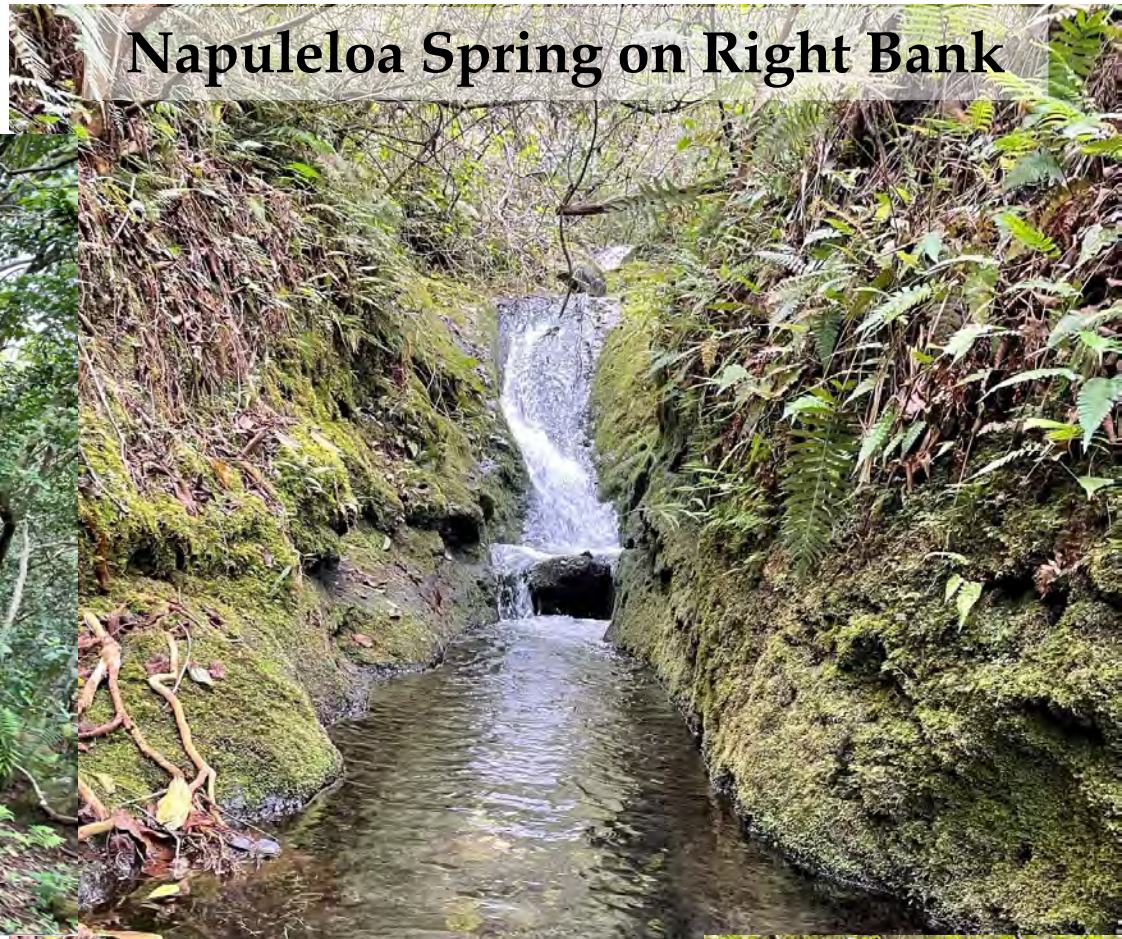


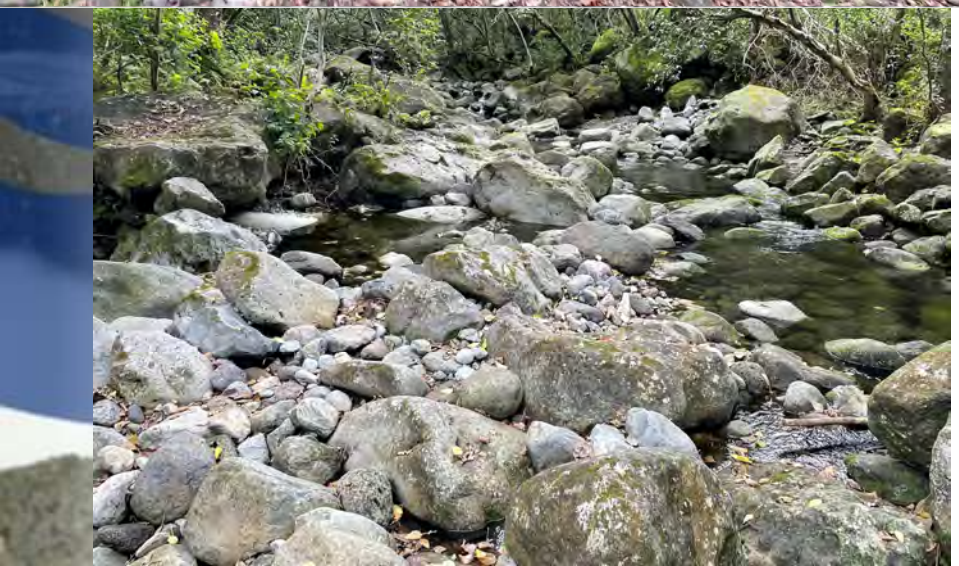
Waikolu Well 23 (4-0855-002)

Waikolu Well 5 (4-0855-005)

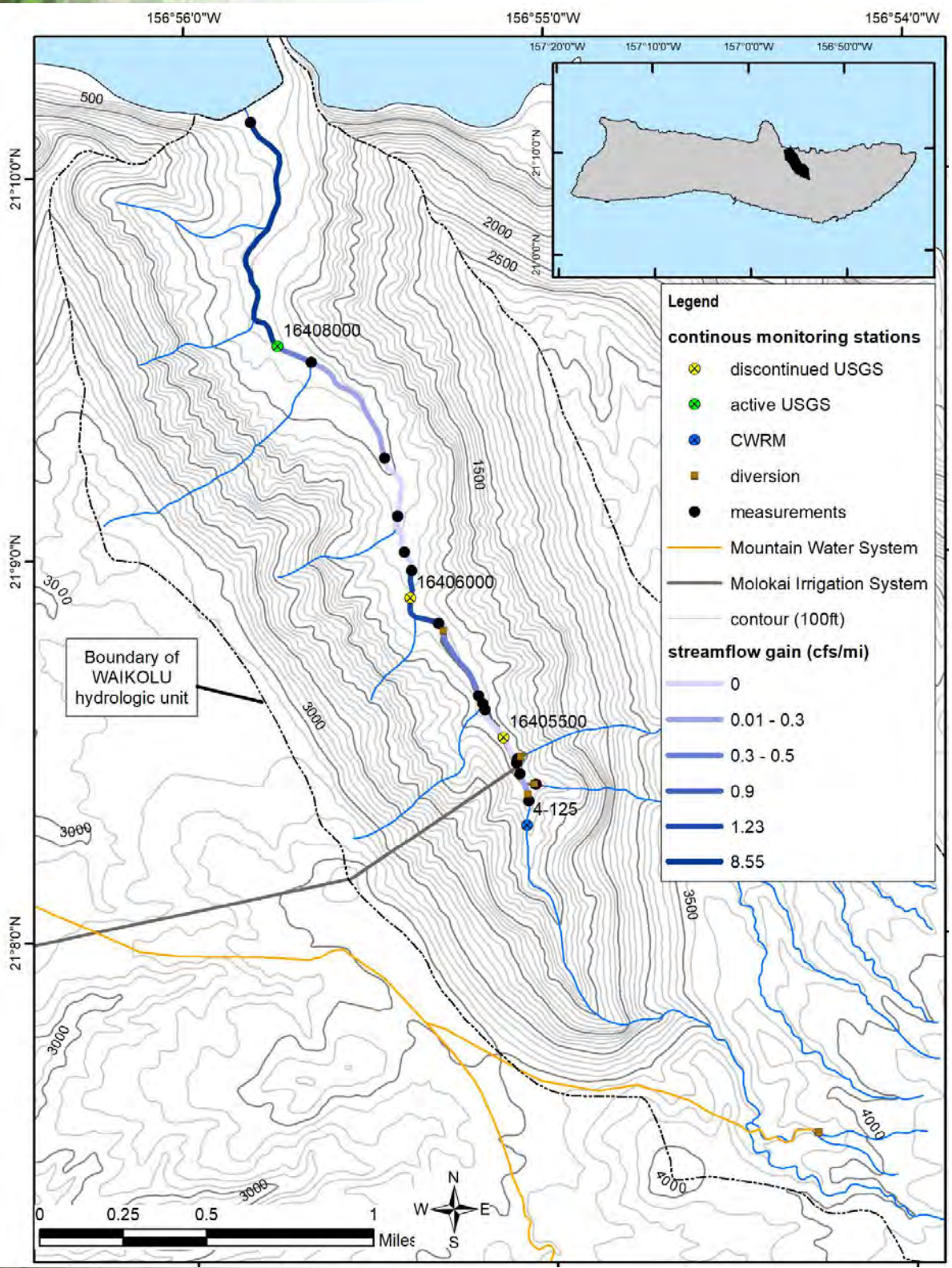
Waikolu Well 6 (4-0855-006)

Tributary inflow and Napuleloa Spring at Well 6

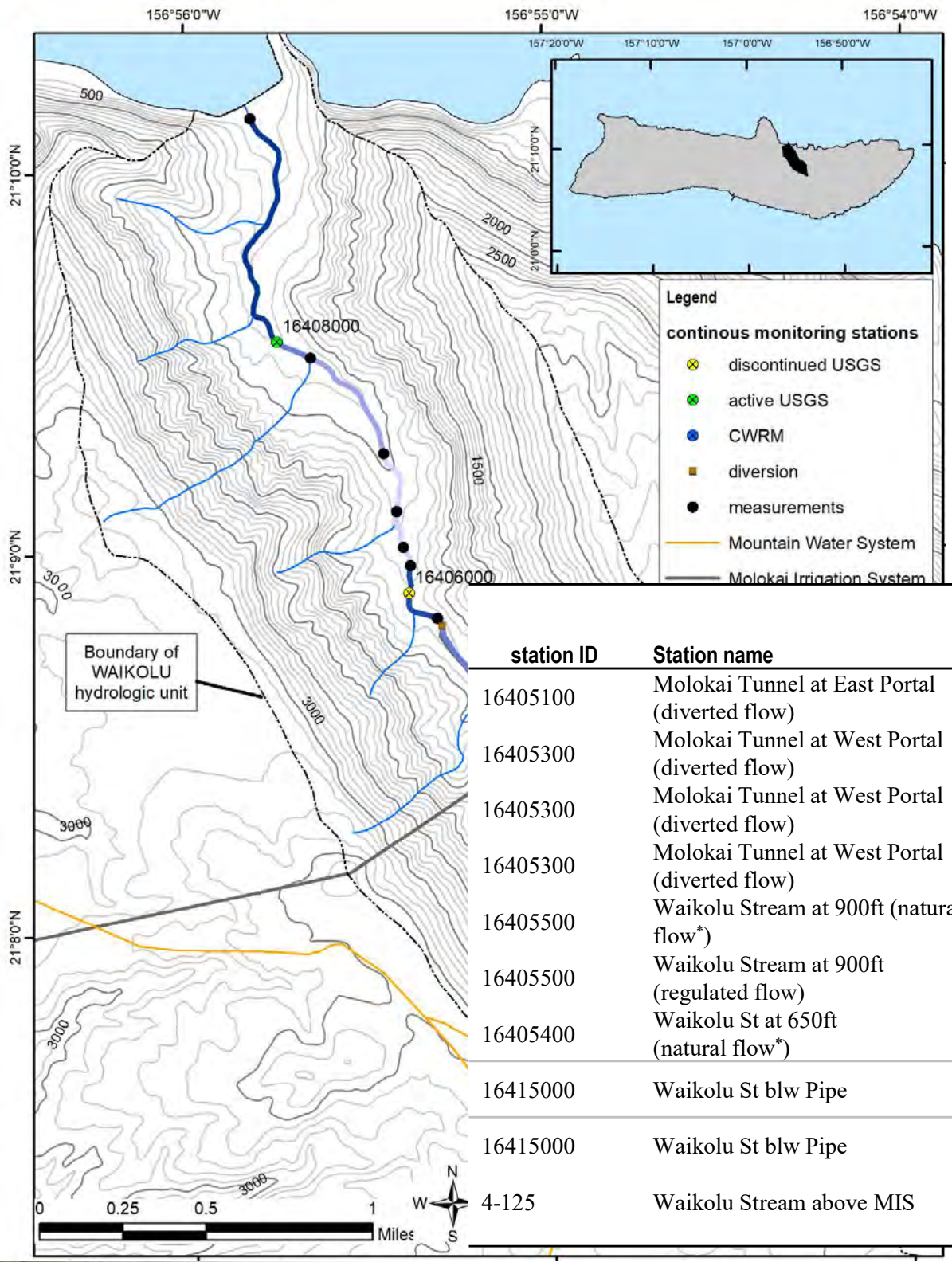




Waikolu Stream: Surface water-groundwater interactions



Waikolu Stream: streamflow statistics



station ID	Station name	Period of Record	Mean Daily Flow	Q_{50}	Q_{70}	Q_{90}
16405100	Molokai Tunnel at East Portal (diverted flow)	7/1966 – 9/02	4.83 (3.12)	3.70 (2.39)	2.30 (1.49)	1.10 (0.71)
16405300	Molokai Tunnel at West Portal (diverted flow)	7/1965 – 2/05	7.32 (4.73)	6.10 (3.94)	4.80 (3.10)	3.10 (2.00)
16405300	Molokai Tunnel at West Portal (diverted flow)	WY1970-WY1980	5.55 (3.58)	4.60 (2.97)	3.5 (2.26)	2.8 (1.81)
16405300	Molokai Tunnel at West Portal (diverted flow)	WY1995-WY2005	8.17 (5.28)	6.90 (4.46)	5.80 (3.75)	4.56 (2.95)
16405500	Waikolu Stream at 900ft (natural flow*)	6/1956 – 12/64	9.07 (6.27)	4.80 (3.10)	3.30 (2.13)	1.90 (1.23)
16405500	Waikolu Stream at 900ft (regulated flow)	1/1965 – 9/03	5.37 (3.47)	1.10 (0.71)	0.70 (0.45)	0.00 (0.00)
16405400	Waikolu St at 650ft (natural flow*)	7/1920 – 9/23	15.38 (9.94)	8.50 (5.49)	6.20 (4.01)	4.68 (3.02)
16415000	Waikolu St blw Pipe	7/1919 – 12/64	19.16 (12.38)	12.00 (7.76)	9.30 (6.01)	7.30 (4.72
16415000	Waikolu St blw Pipe	1/1965 – 11/96	16.24 (10.49)	8.90 (5.75)	7.00 (4.52)	5.00 (3.23)
4-125	Waikolu Stream above MIS	9/2017 – 11/21	2.43 (1.57)	1.86 (1.20)	1.43 (0.92)	1.16 (0.75)

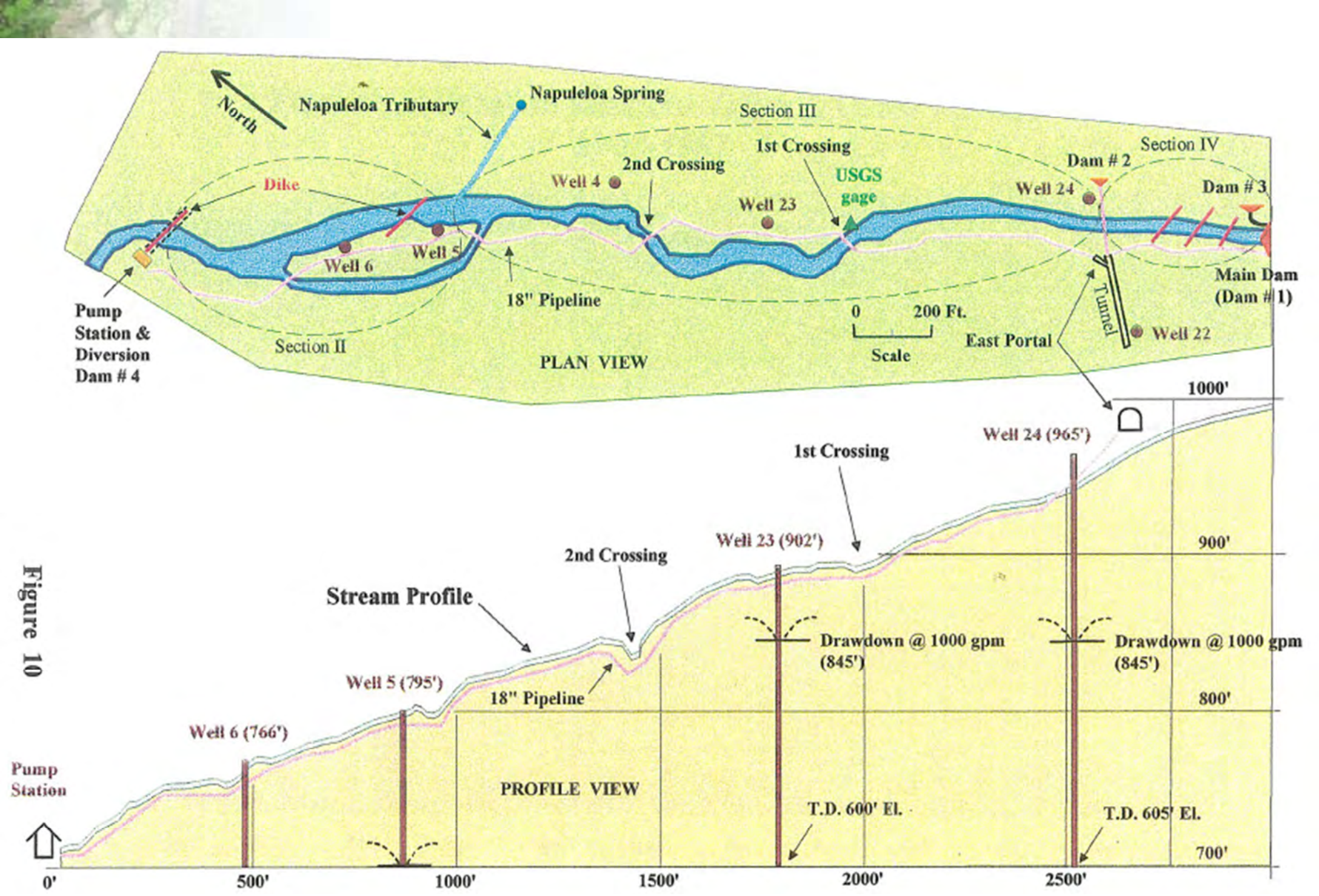


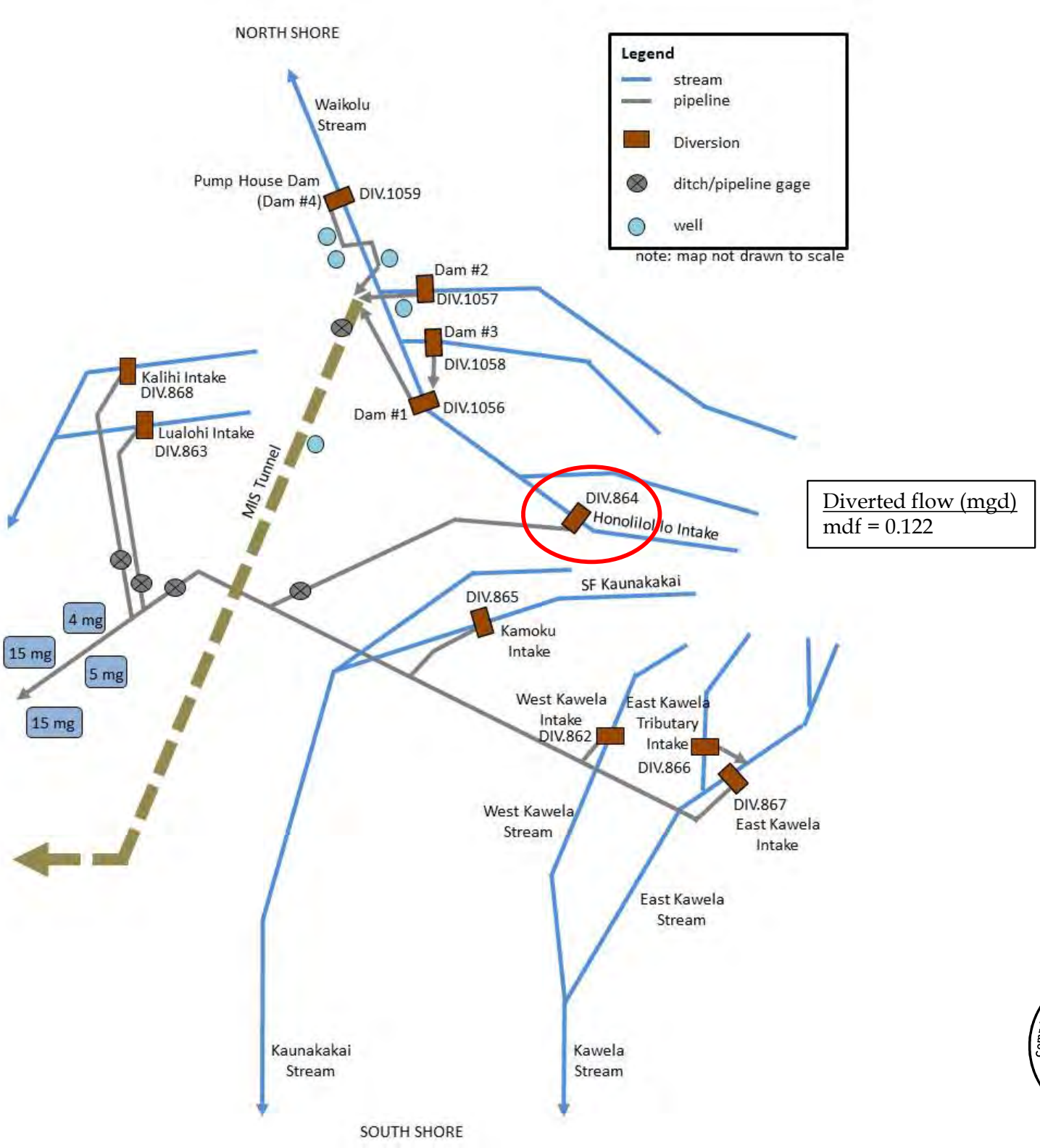
Figure 10

Plan and Profile of Waikolu Stream Between Dams #1 and #4

Waikolu Stream: Instream Values

Waikolu: Instream Values

Biological Resources	Waikolu
Final Rank	Outstanding (4 of 4)
Alamoo	Yes
Nakea	Yes
nopili	Yes
Hihiwai	Yes
# NG2	3
Cultural Resources	**Waikolu**
Final Rank	Substantial (3 of 4)
taro cultivation	historic
# archaeological sites	1
density	Moderate
valley significance	Pre-contact, important information, culturally noteworthy
Riparian Resources	**Waikolu**
Final Rank	Substantial (3 of 4)
Detrimental species	hau, pigs, deer, goats
% native forest	30%
Presence of recovery habitat	--
# T&E birds	0
# of rare plants	2
Wetlands	--
Recreational Resources	**Waikolu**
Final Rank	Outstanding (4 of 4)
Opportunities	Camping, hiking, hunting, parks, scenic views
Regional rank	



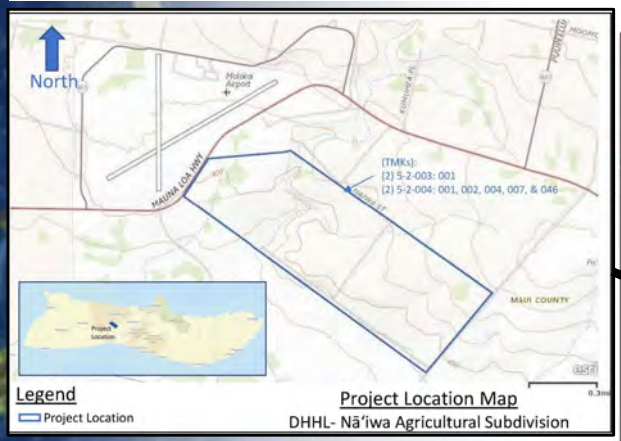
Diverted flow (mgd)
mdf = 0.122

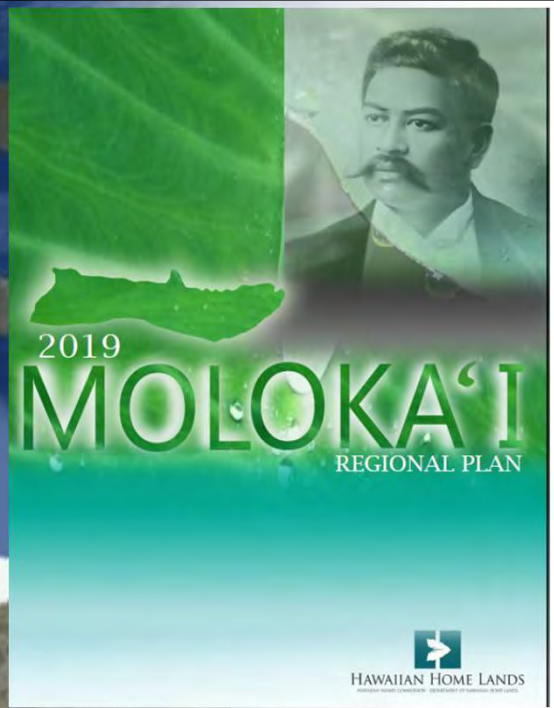
Recommendations: DHHL Reservations

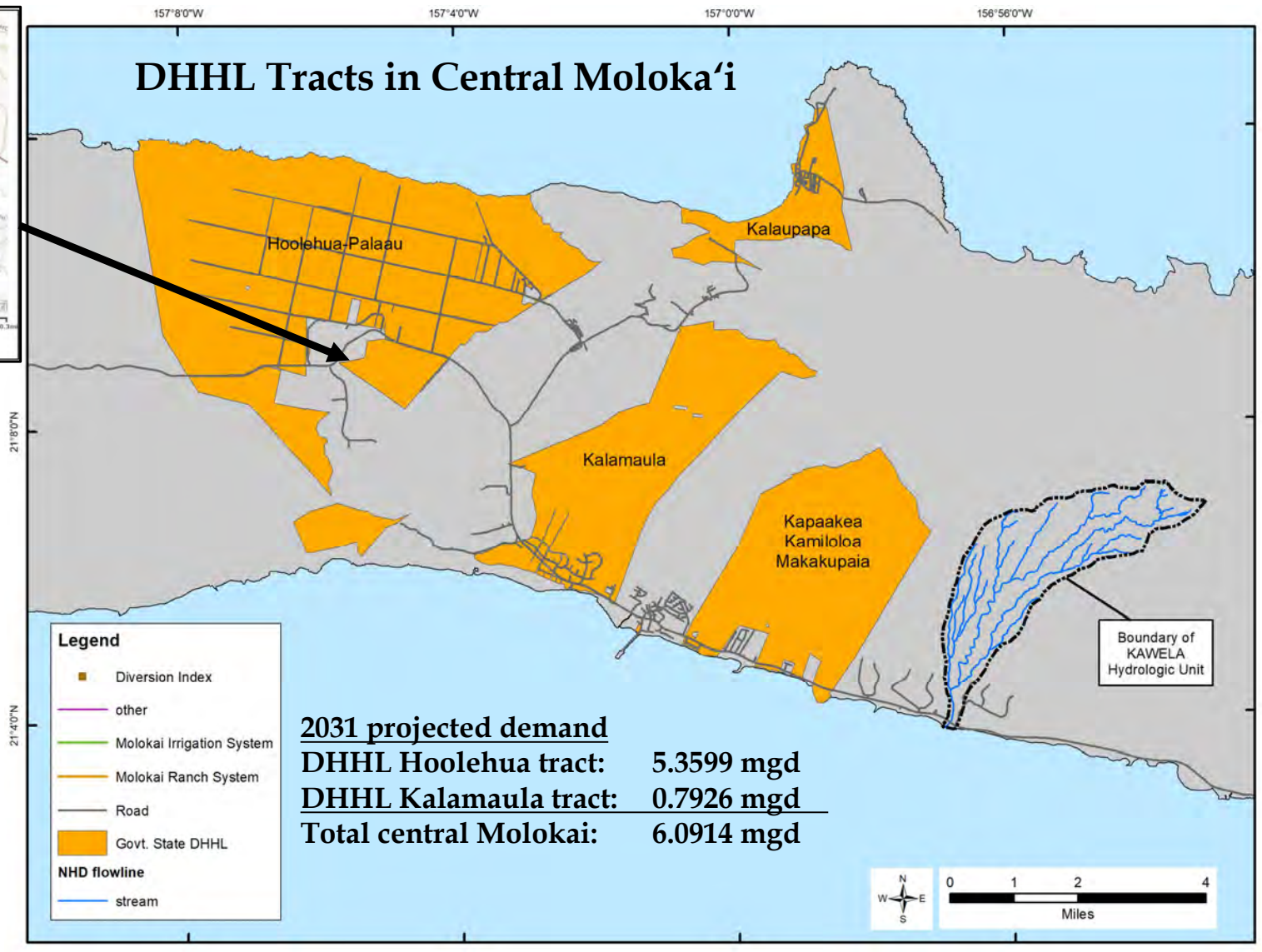
PROPOSED ACTION: NON-POTABLE WATER RESERVATION FROM MOLOKAI IRRIGATION SYSTEM OF 6.0914 MGD
→ Subject to two-thirds of the availability of water

PROPOSED ACTION: NON-POTABLE WATER RESERVATION FROM MOUNTAIN WATER SYSTEM OF 0.15 MGD
→ 50% of the available low-flow

DHHL Naiwa Ag Subdivision



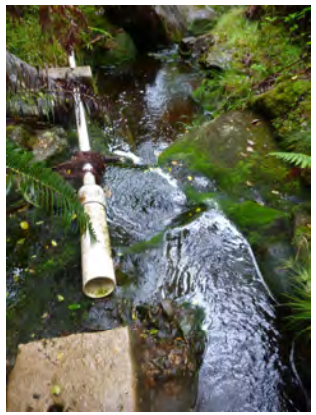




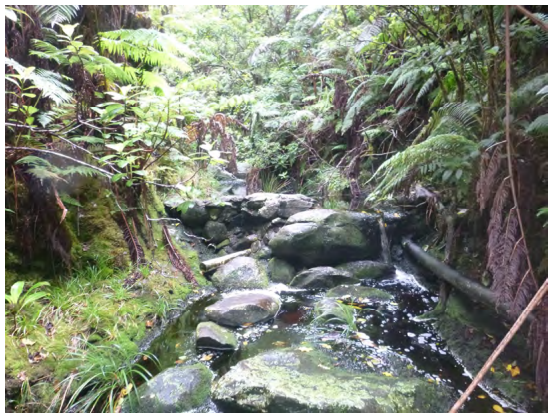
Mountain Water System Recommendations: Diversion Abandonments

PROPOSED ACTION: ABANDONMENT OF STREAM DIVERION 866 EAST KAWELA TRIBUTARY



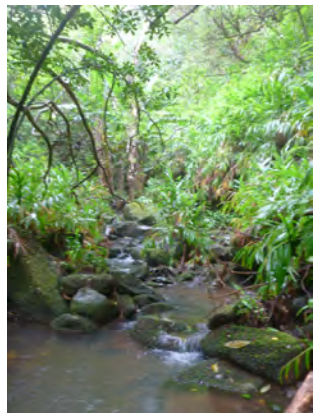
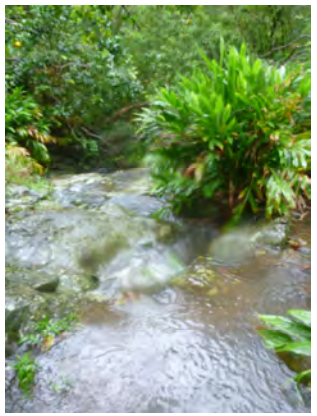



PROPOSED ACTION: ABANDONMENT OF STREAM DIVERION 862 WEST KAWELA STREAM




PROPOSED ACTION: ABANDONMENT OF STREAM DIVERION 868 KALIHI STREAM (tributary of Manawainui)



Mountain Water System Recommendations: Interim IFS

PROPOSED ACTION: INTERIM IFS ON EAST KAWELA STREAM

interim IFS of a mean daily flow of 0.19 cfs (0.12 mgd) below the intake on East Kawela Stream at diversion 867



PROPOSED ACTION: INTERIM IFS ON KAMOKU STREAM (LB SF Kaunakakai Stream)

interim IFS of a mean daily flow of 0.011 cfs (0.007 mgd) below the Kamakou Intake at diversion 865



PROPOSED ACTION: INTERIM IFS ON LUALOHI STREAM (tributary of Manawainui)

interim IFS of a mean daily flow of 0.012 cfs (0.008 mgd) below the intake at diversion 863 on Lualohi Stream

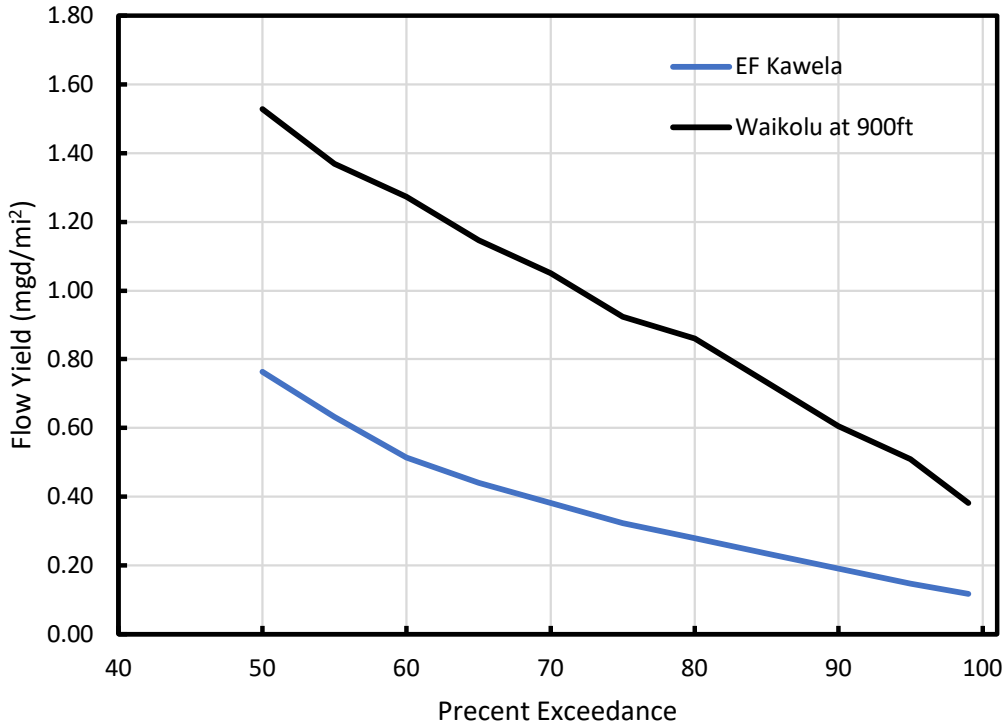


Why target Q_{80}?

- **EF Kawela streamflow is dominated by rainfall-driven runoff from Pepe'opae bog**
- **Baseflow is driven by discharge from thin layers of high elevation perched water and not spring flow from dikes → resulting in less baseflow**
- **Groundwater discharge only supports the flows less than Q_{90}**

For example:

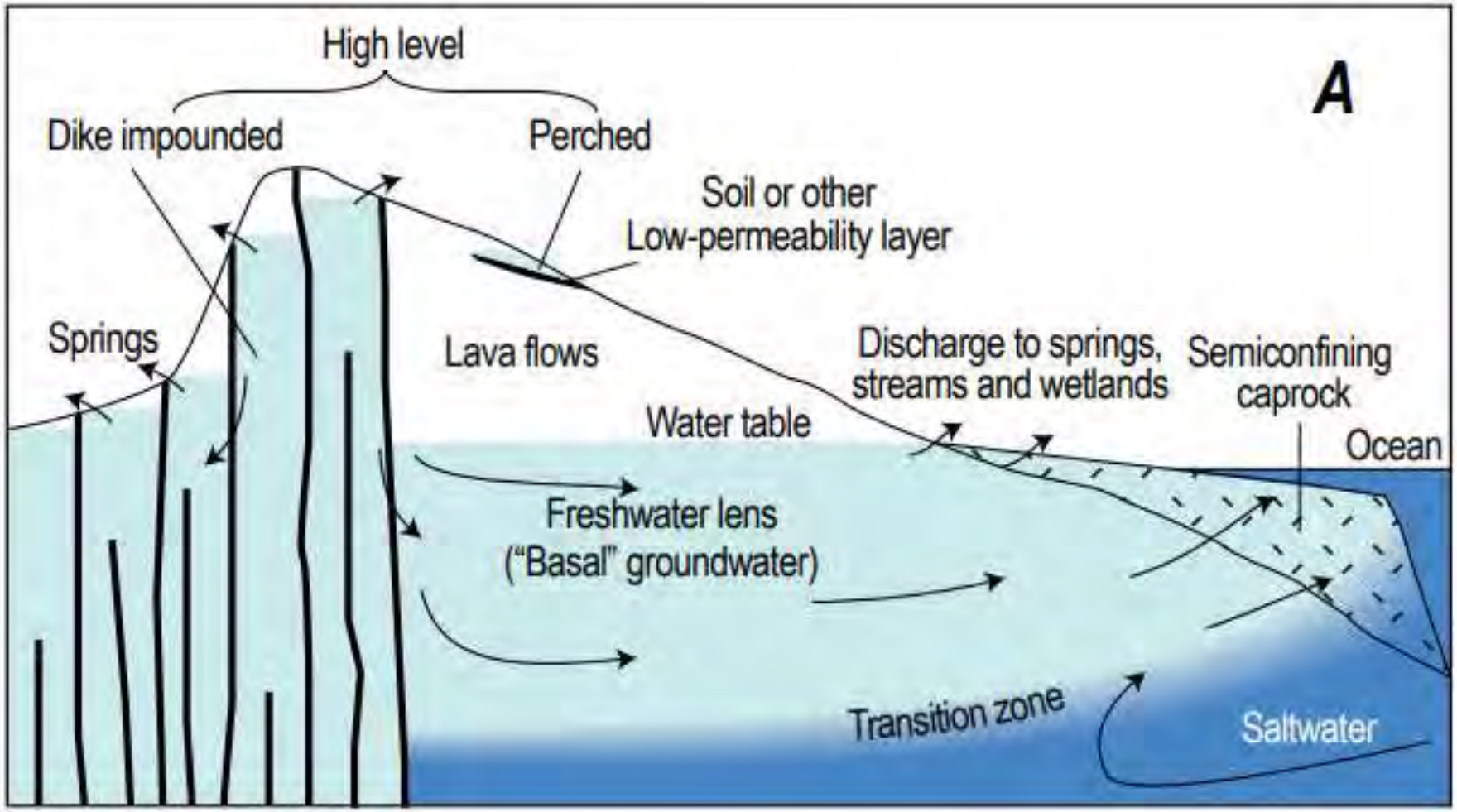
TFQ_{50} = 0.34 mgd BFQ_{50} = 0.27 mgd
TFQ_{70} = 0.17 mgd BFQ_{70} = 0.14 mgd
TFQ_{90} = 0.08 mgd BFQ_{90} = 0.07 mgd



2022 Q = 0.093 mgd (93,000 gpd)

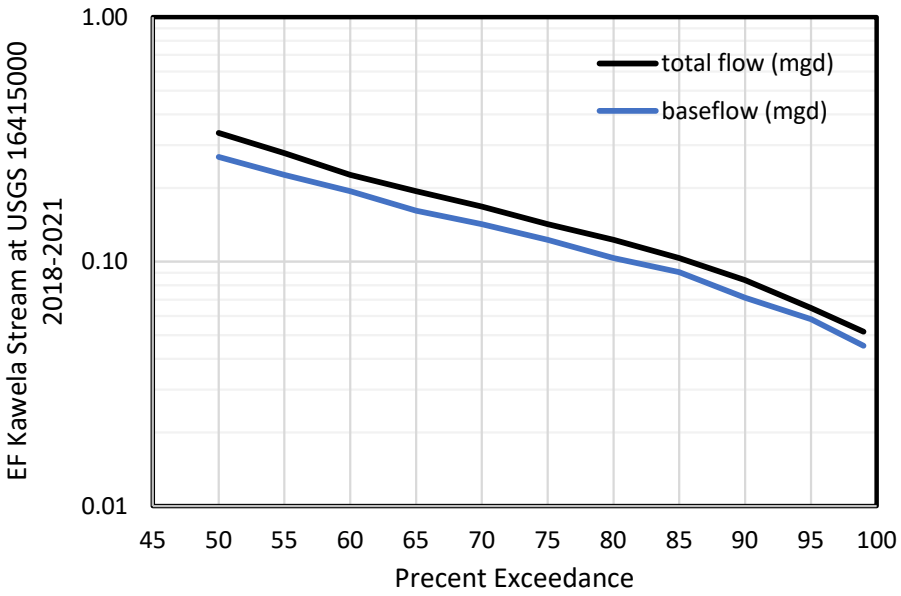

2018 Q = 0.280 mgd (280,000 gpd)

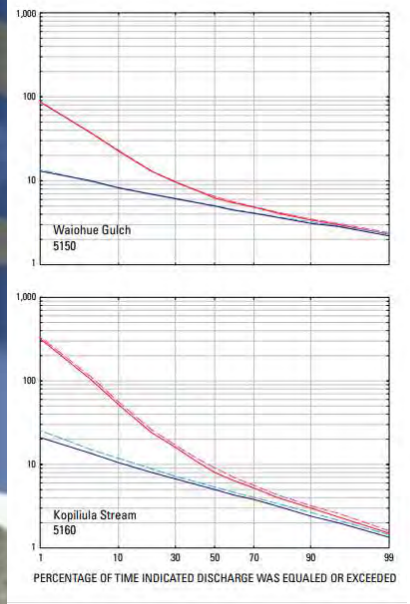

Perched water



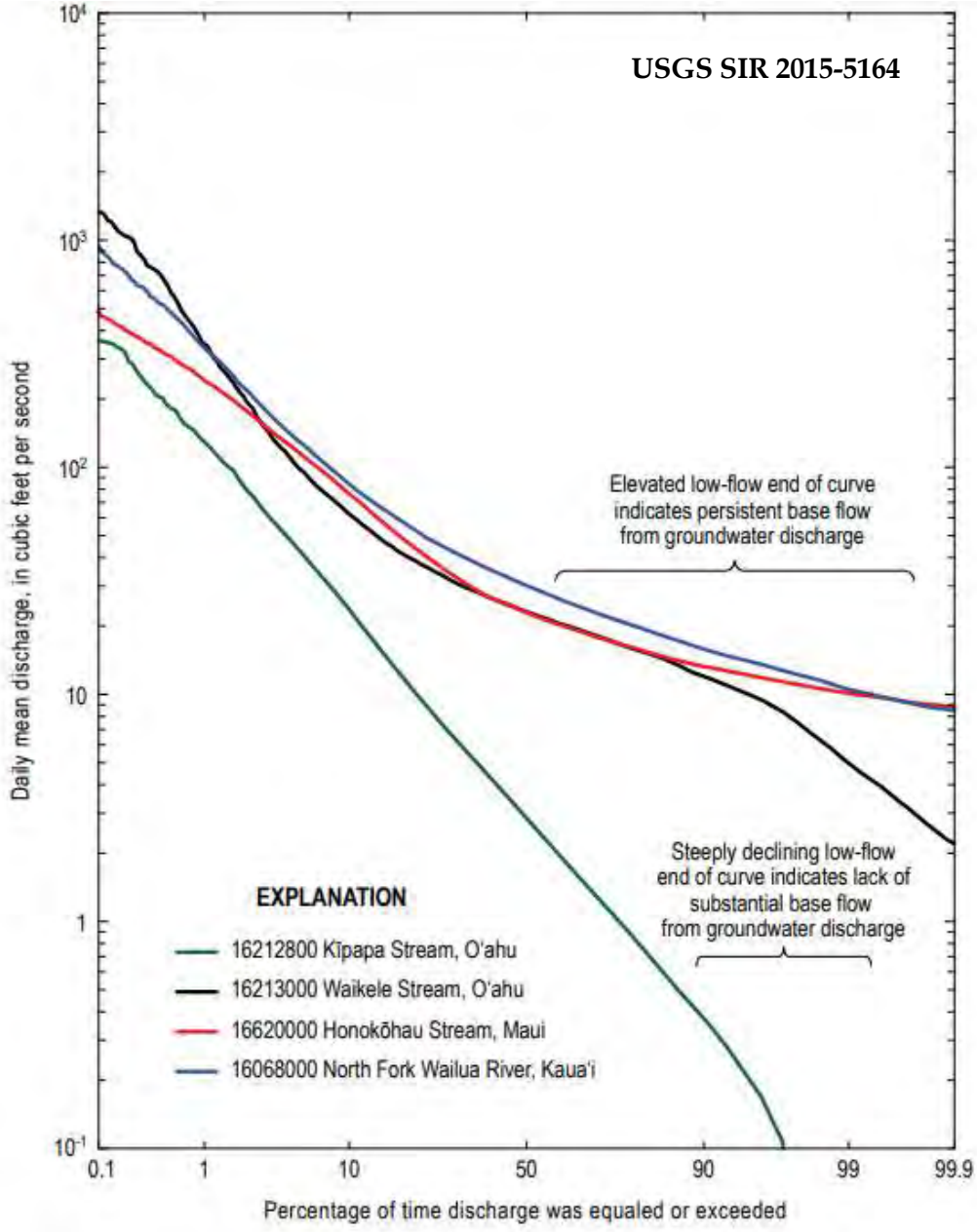
Why target Q_{80}?

- **In contrast to streamflow with baseflow supported by high-elevation dike-impounded water, small perched water bodies contribute smaller amounts to streamflow**





USGS SIR 2004-5262



Mountain Water System: Consequences of Recommendations

2000-02, 2004-05 reported water use					
Diverted flows (with Dole line but without Kamoku, West Kawela, or East Kawela Trib)	**Current conditions (gpd)**	**Abandonment of Kalihi Intake**	**With 0.15 mgd DHHL Reservation**	**With 0.12 mgd East Kawela Interim IFS**	**With 0.008 mgd Lualohi Interim IFS**
Mean	690,000	637,000	487,000	367,000	359,000
Q_{50}	601,000	589,000	439,000	319,000	311,000
Q_{70}	460,000	452,000	302,000	182,000	174,000
Q_{90}	350,000	349,000	199,000	79,000	71,000
Non-potable uses	**% of time uses met with no restrictions (without including available system storage)**				
Current demand (95,000 gpd)	100%	100%	100%	~85%	~80%
Future demand (185,000 gpd)	100%	100%	100%	~70%	~65%

~49 million gallons of storage can support all non-instream uses during extended drought (100s of days)

*Of the 95,000 gpd current demand, 33,000 is evaporative loss
→reducing evaporative loss will increase water available

Recommendations for the Molokai Irrigation System

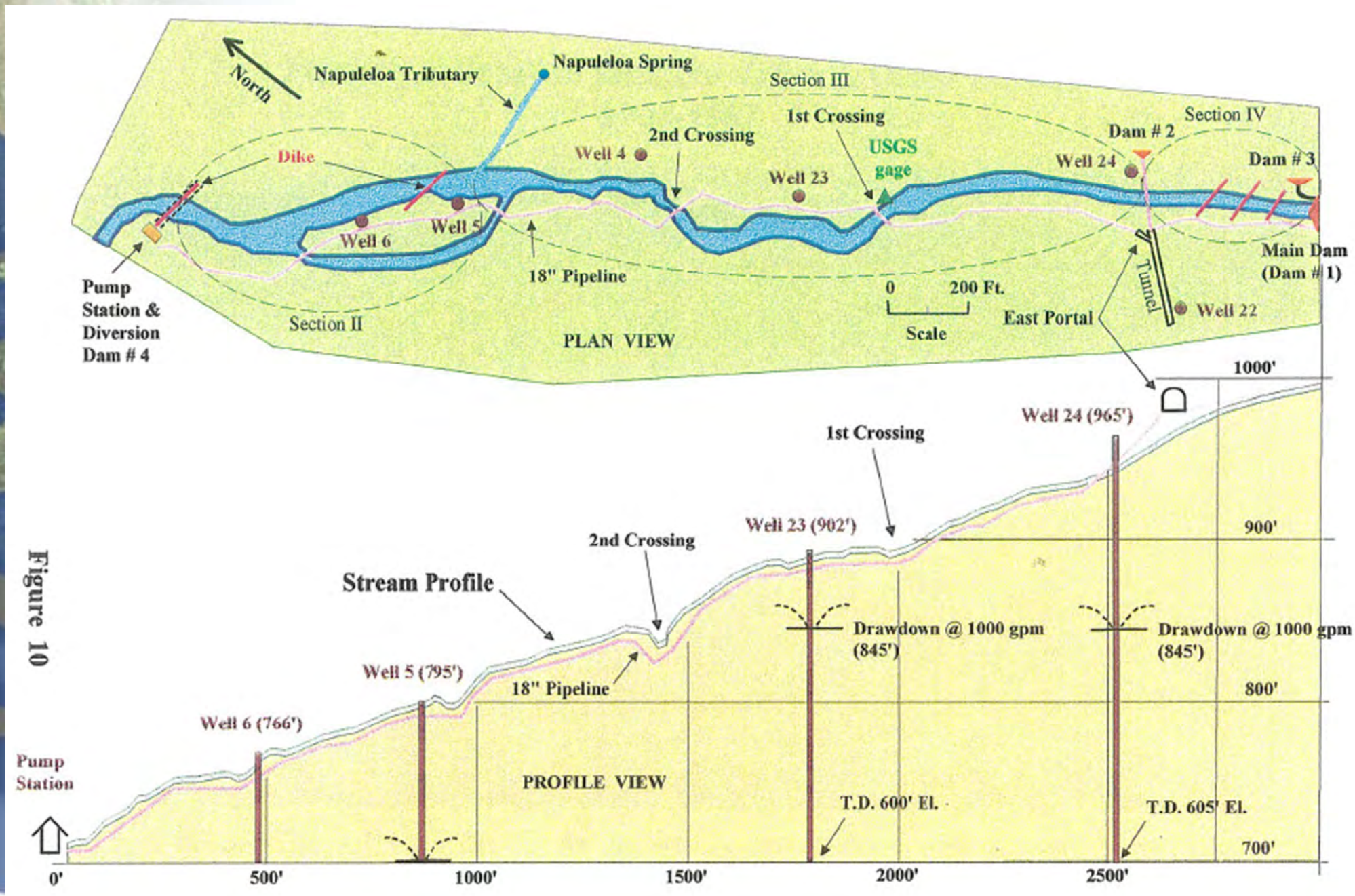


Figure 10

Plan and Profile of Waikolu Stream Between Dams #1 and #4

Molokai Irrigation System Proposed Action
Waikolu Dam #1 & Well 24 and Well 23

1. Maintain the continuous wetted path over Dam #1

Molokai Irrigation System Proposed Action
Waikolu Dam #1 & Well 24 and Well 23

2. Modify maximum permitted pumpage from Well 23 and Well 24 to limit impact to stream (WUP 0020)

-change approved use of Well 23 from 0.853 mgd to 0.145 mgd

-change approved use of Well 24 from 0.853 mgd to 0.360 mgd

-not modifying total WUP of 3.360 mgd

Commission on Water Resource Management
State of Hawaii

Molokai Irrigation System Proposed Action
Waikolu Dam #1 & Well 24 and Well 23

3. Interim IFS of 0.95 cfs (0.61 mgd) at USGS station 16405500

Molokai Irrigation System Proposed Action
Waikolu Dam #4

1. Continuous wetted-path over intake (18 in steel plate similar to Dam #1)
2. Interim IFS of 5.9 cfs at 250 feet elevation at USGS 16408000

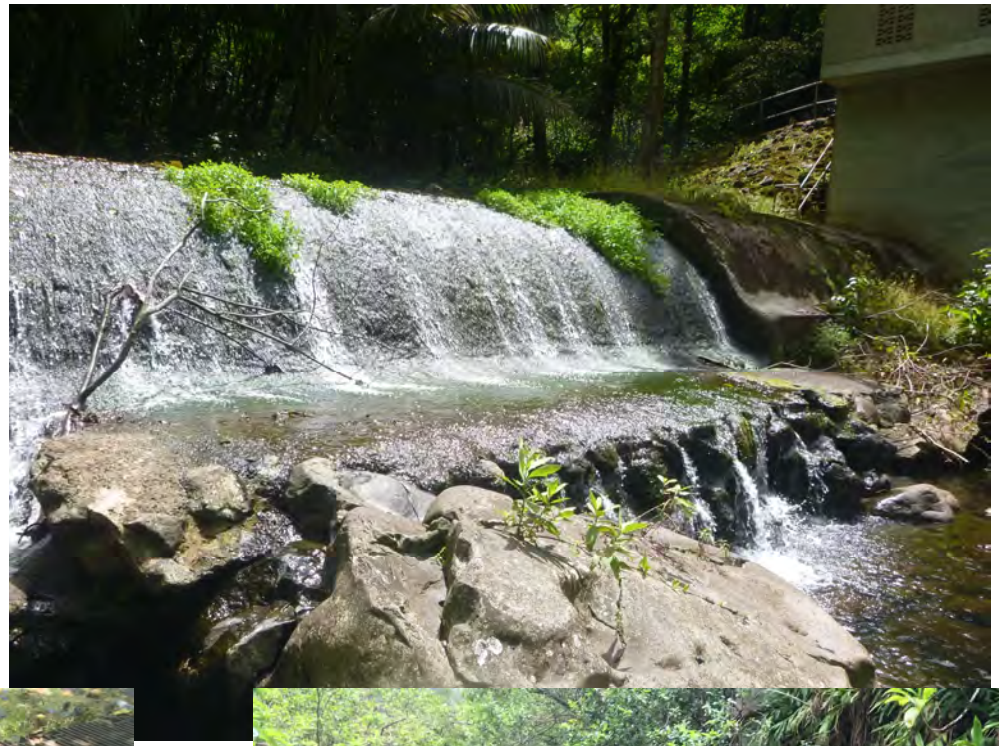


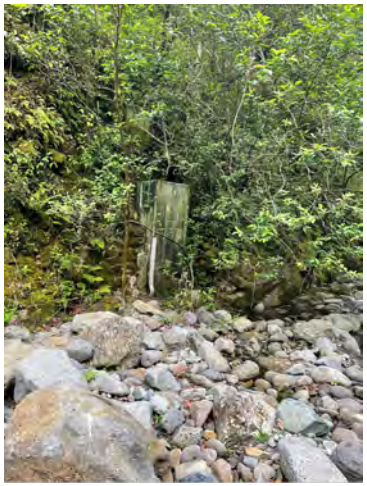
Plate on Dam #1

Molokai Irrigation System Recommendations: Interim IFS

PROPOSED ACTION: INTERIM IFS ON WAIKOLU STREAM at 900ft (USGS 16405500)

interim IFS of a mean daily flow of 0.95 cfs (0.61 mgd) at 900 feet in elevation at the first crossing





PROPOSED ACTION: INTERIM IFS ON WAIKOLU STREAM at 250ft (USGS 16408000)

interim IFS of a mean daily flow of 5.3 cfs (3.5 mgd) at 250 feet in elevation



Kawela/Waikolu Petition
Next Steps

1. Consider testimony provided by agencies and community

2. March/April 2022 - Final Recommendation for action by Commission


Mahalo