

**Commission Meeting  
Paia Community Center, Maui  
December 16, 2009**

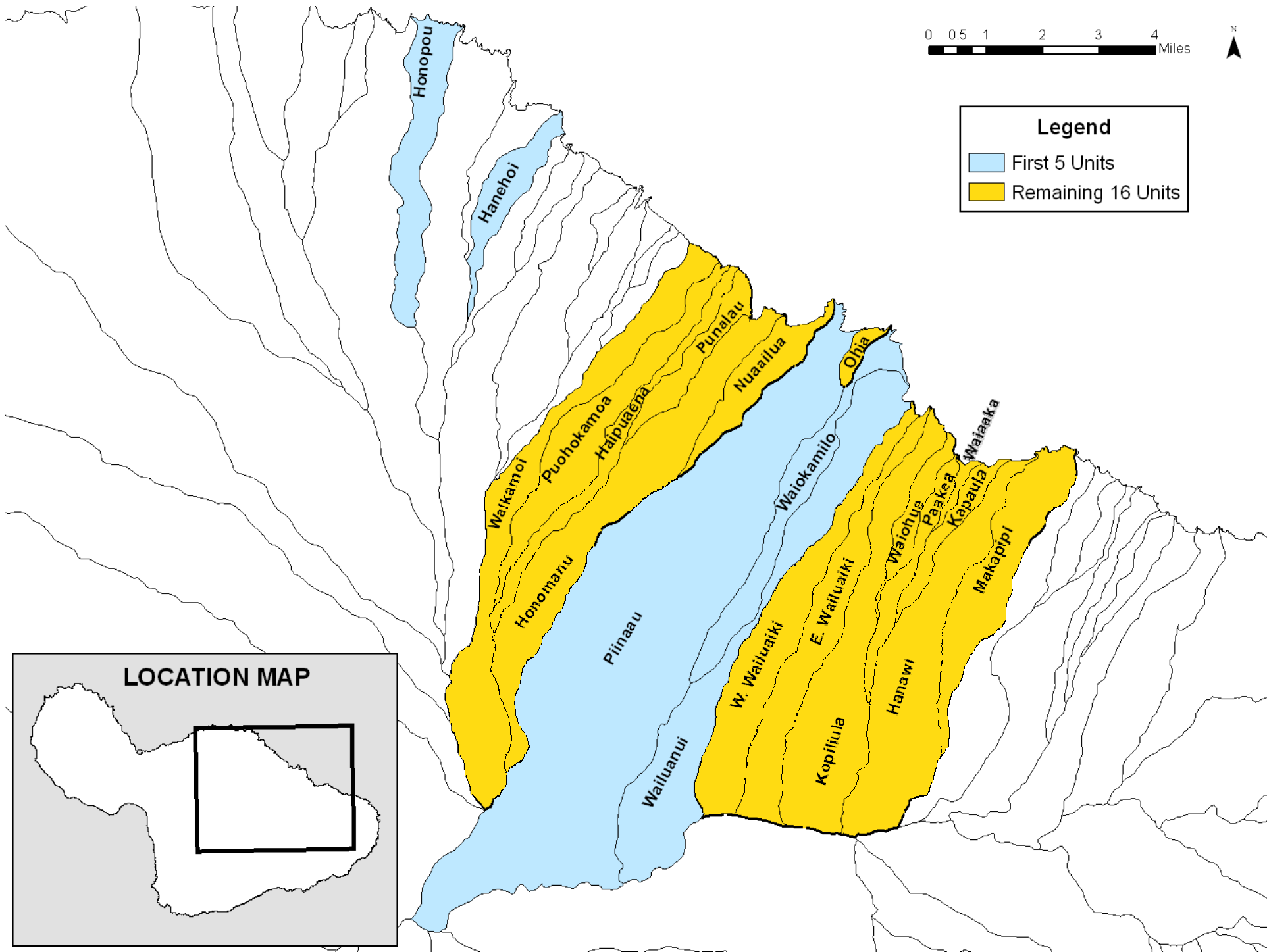


**Staff presentation on the  
Petition to Amend the Interim Instream Flow  
Standards for the Surface Water Hydrologic Units of**

Waikamoi, Puohokamoa, Haipuaena, Punalau, Honomanu, Nuaailua,  
Ohia (Waianu), West Wailuaiki, East Wailuaiki, Kopiliula, Waiohue,  
Paakea, Waiaaka, Kapaula, Hanawi, and Makapipi



**State of Hawaii  
Department of Land and Natural Resources  
Commission on Water Resource Management**



# Presentation Outline

## Background

- Implementation Update
- Interim IFS Process

## Issues / Analysis

- Instream Uses
- Noninstream Uses
- Assessment Summary
- Proposed interim IFS
- Adaptive Management



# Petition to Amend IIFS

## HONOPOU

- Honopou Stream

## HANEHOI

- Hanehoi and Puolua Streams

## PIINAAU

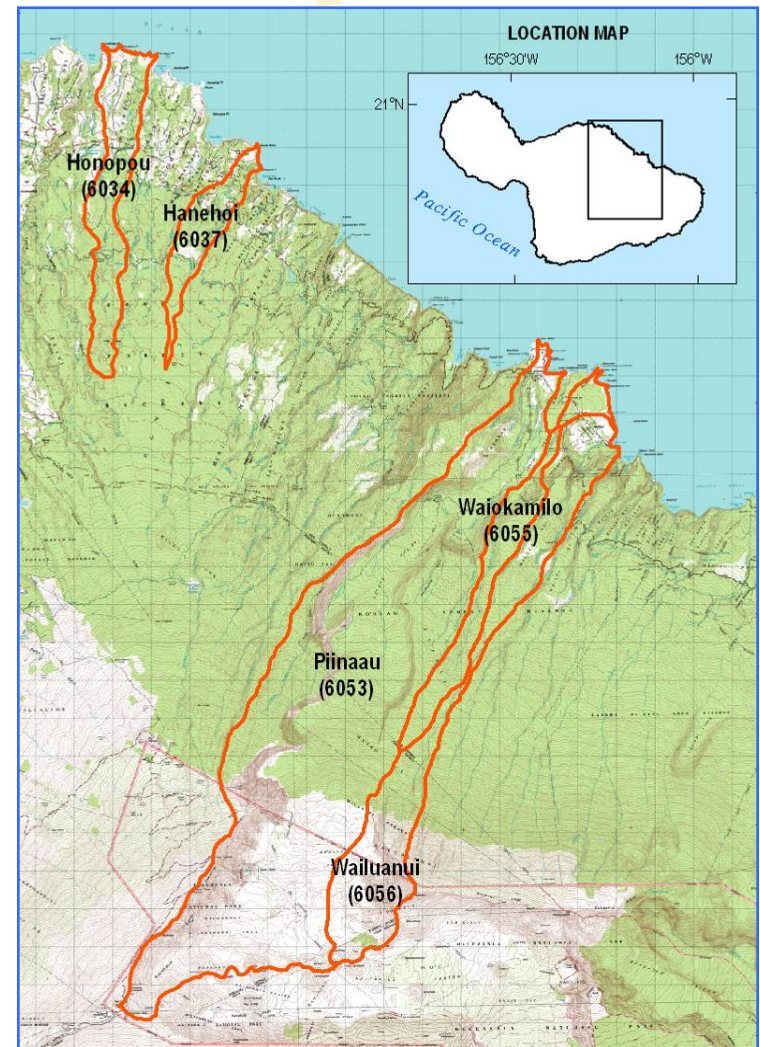
- Piinaau Stream
- Palauhulu Stream

## WAIOKAMILO

- Waiokamilo Stream
- Kualani Stream

## WAILUANUI

- East and West Wailuanui Streams
- Waikani Waterfall [Stream]



# Approved Recommendations

Hydrologic Unit	Interim IFS Site	Decision
Honopou	Honopou Site A	2.00 cfs (1.29 mgd)
	Honopou Site B	0.72 cfs (0.47 mgd)
Hanehoi	Huelo Site A	0.89 cfs (0.57 mgd)
	Hanehoi Site B	0.63 cfs (0.41 mgd)
	Hanehoi Site C	1.15 cfs (0.74 mgd)
Piinaau	Piinaau Site A	Status quo
	Palauhulu Site B	5.50 cfs (3.56 mgd)
Waiokamilo	Waiokamilo Site A	4.90 cfs (3.17 mgd)
	Kualani Site B	Status quo
Wailuanui	Wailuanui Site A	3.05 cfs (1.97 mgd)



# Approved Amendments

- Moving forward on the staff's recommendation is the first step in an integrated approach to all 27 streams that are subjects of these petitions
- Staff shall provide progress reports to the Commission at regularly scheduled meetings during the year
- In cases of return of water to losing streams, staff and all parties shall monitor and report whether there are increases in either downstream flow or ground water in the vicinity



# Implementation

## Site Visits

- Oct. 2008 – Sept. 2009
- 9 trips, 72 investigations

## Restoration

- Honopou – Haiku and Lowrie Side Ditch
- Hanehoi, Puolua – Haiku Ditch
- Palauhulu, Wailuanui – Koolau Ditch

*Interim action at Haiku Ditch on Huelo (Puolua) Stream*



# Implementation



## Staff Gages

- Installed at 5 IIFS sites

## Next Steps

- Rating curves
- Re-evaluate interim IFS
- Flow restoration at Honopou and Hanehoi
- Evaluate impacts of flow restoration
- Assess biota after restoration





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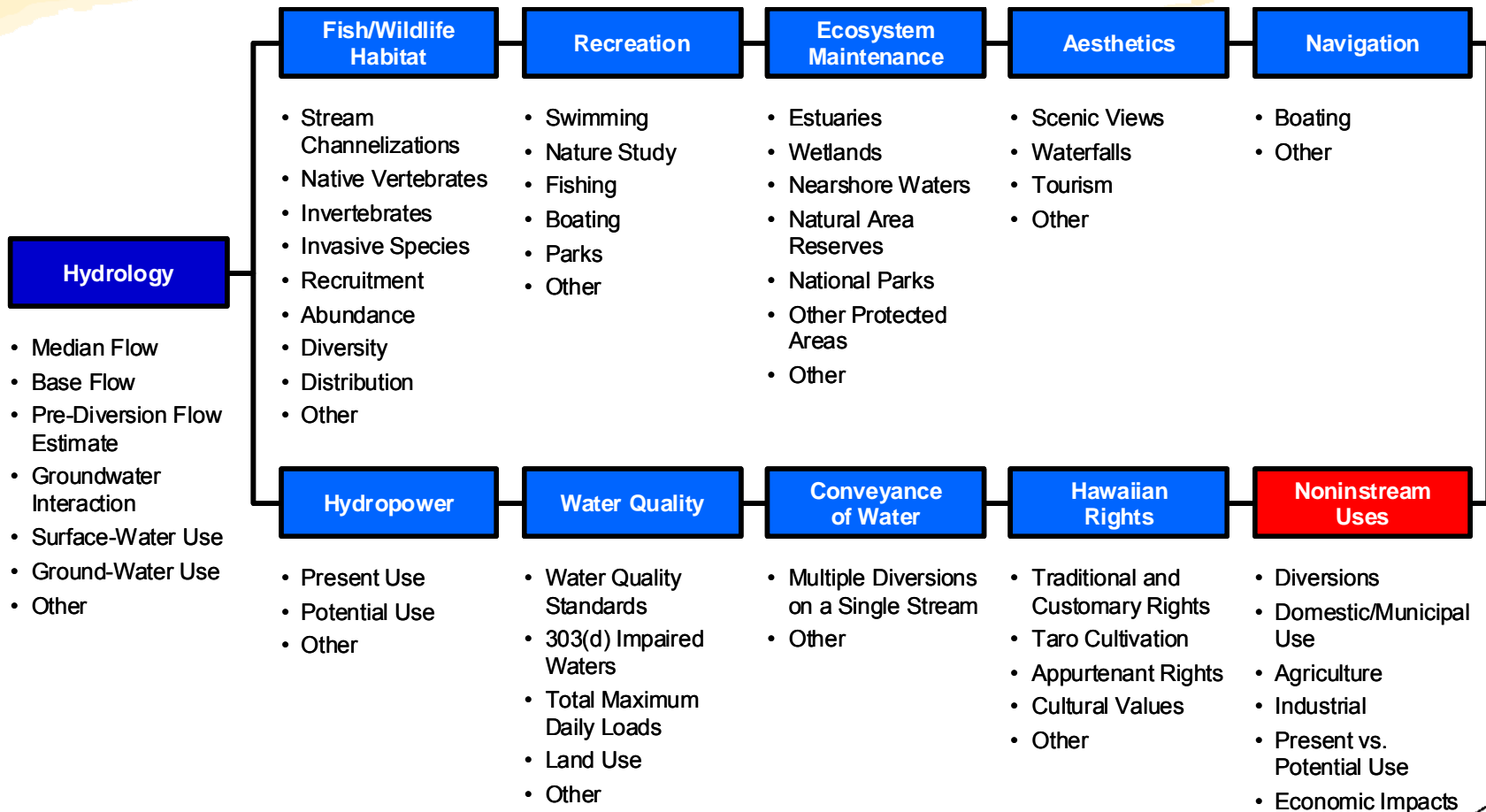
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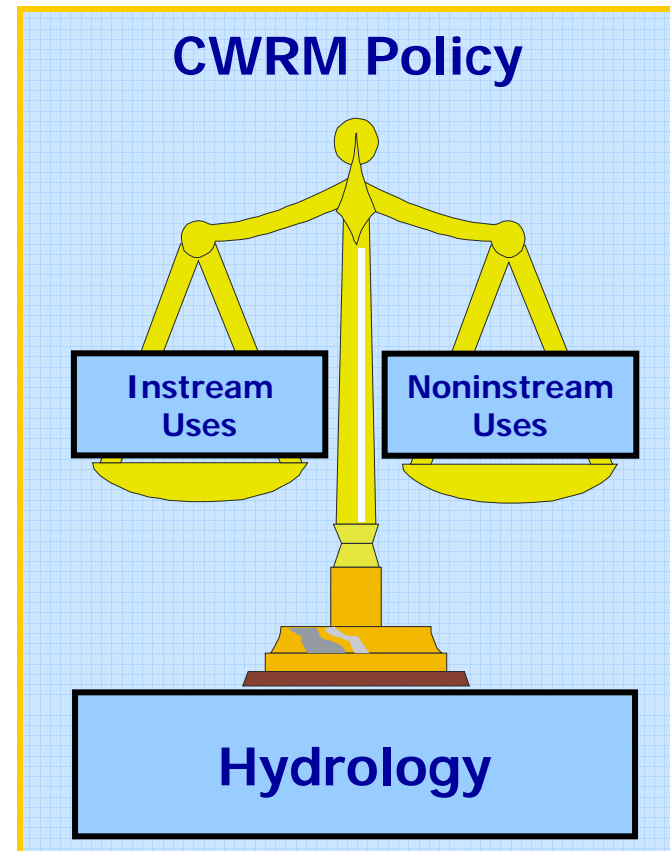


# Balancing the Needs

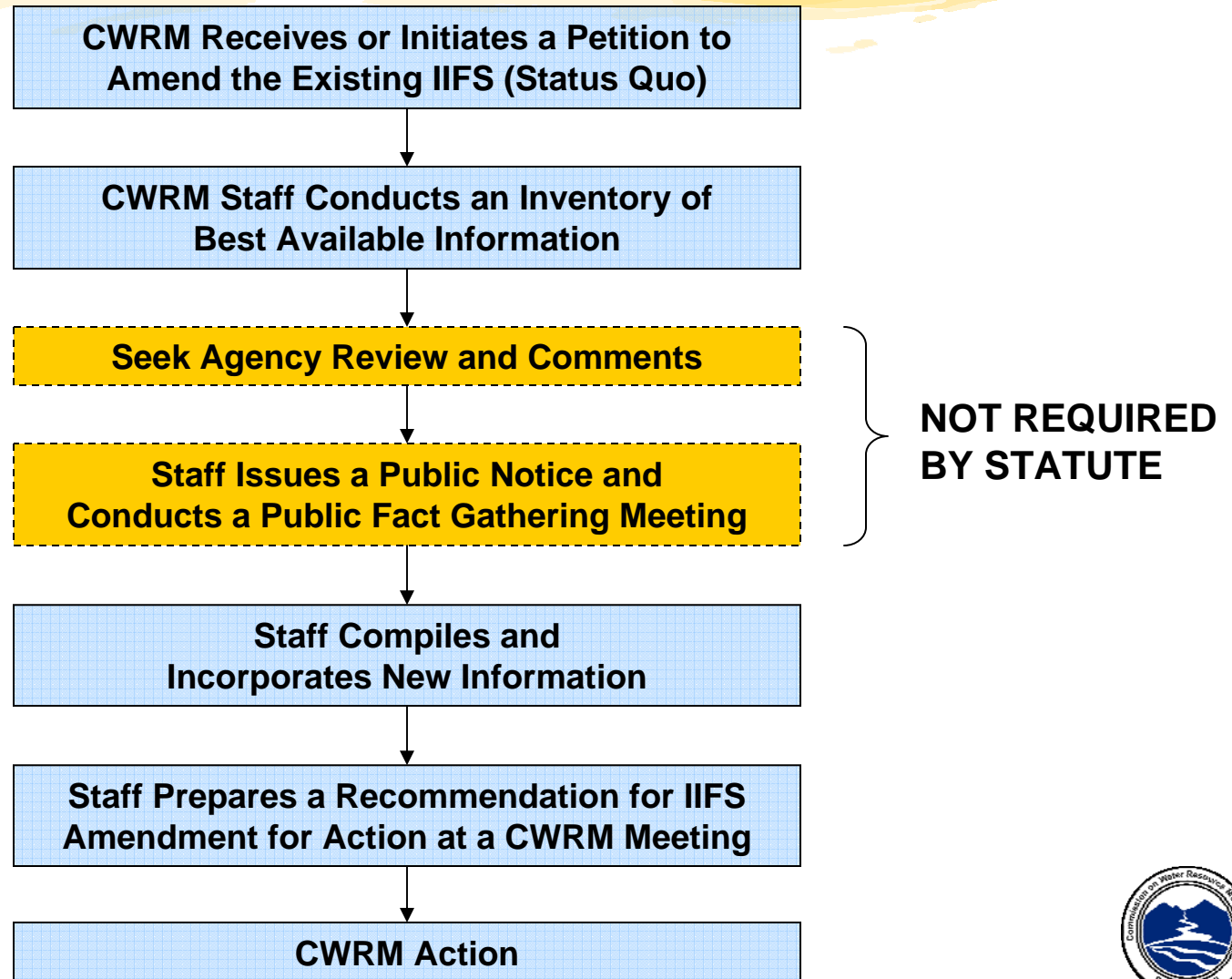


# State Water Code

*“The Commission shall weigh the importance of the present or potential instream values with the importance of present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses.”*



# Interim IFS Process



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# Instream Uses

## Traditional and customary Hawaiian rights

- Mauka-to-makai flow
- Recreation
- Gathering
- Taro cultivation





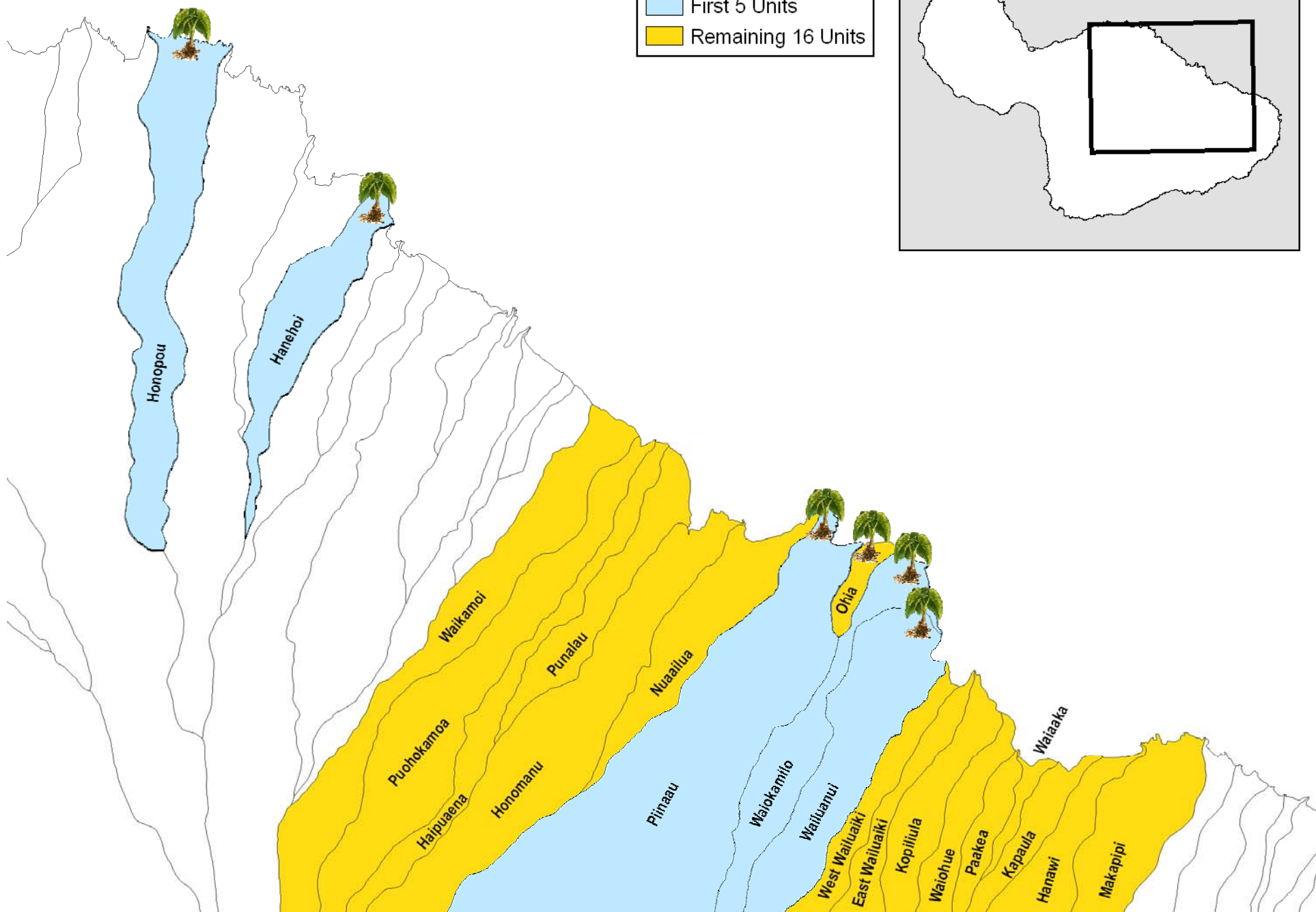
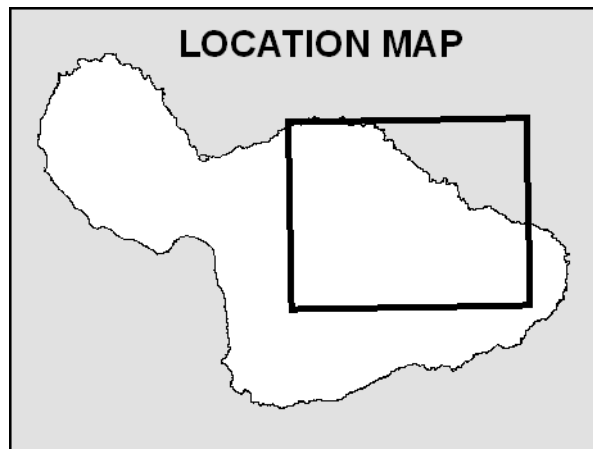
*Wailua Valley taro lo'i*





**Legend**

-  First 5 Units
-  Remaining 16 Units



# Instream Uses

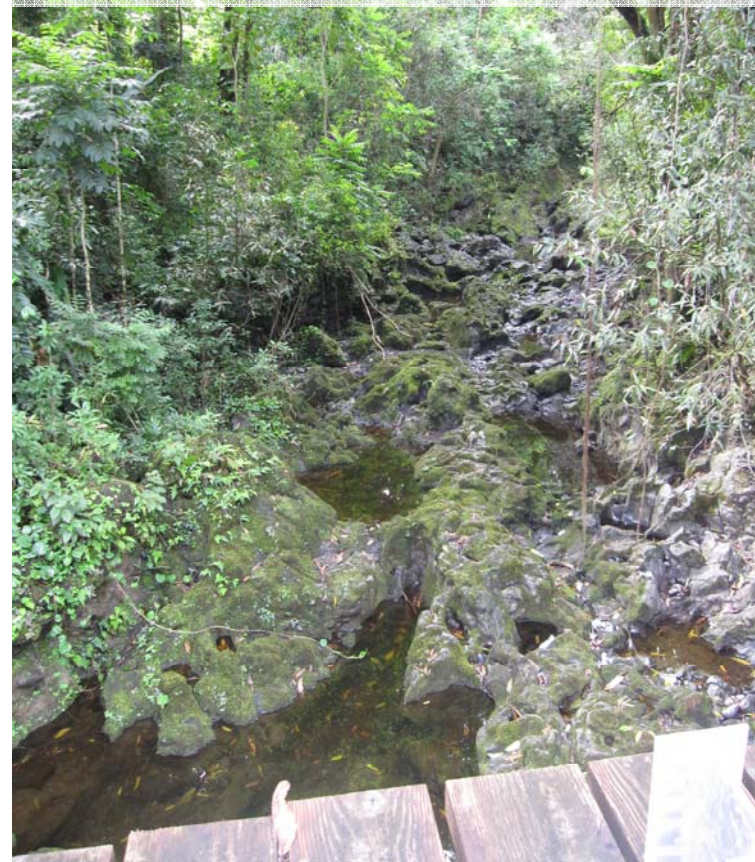
## Stream habitats

- Dry reaches prevent upstream migration
- Surviving animals restricted to disconnected pools









*Native Hawaiian fish: Oopu alamoo (Lentipes concolor)*

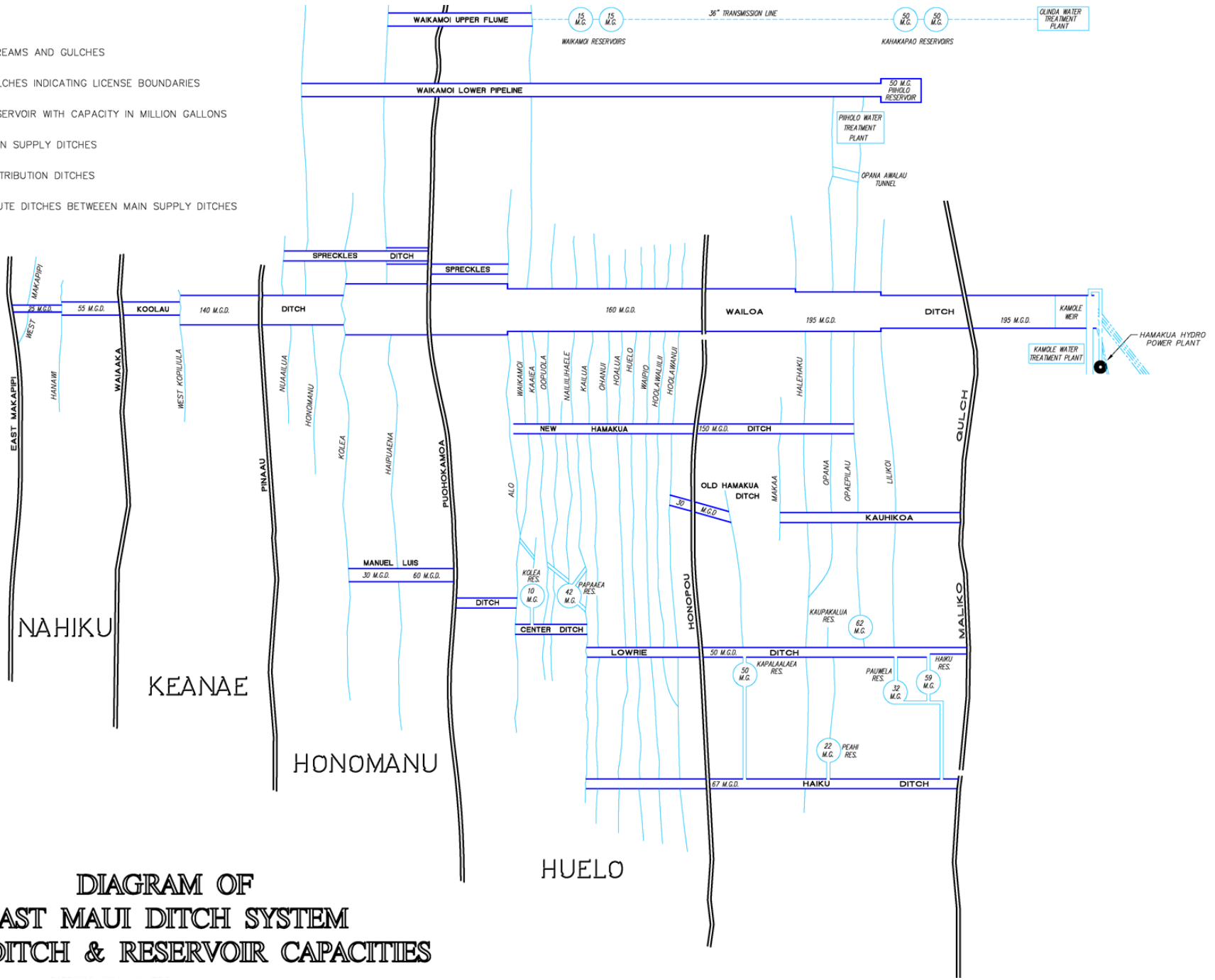
*Makapipi Stream upstream of Lower Nahiku Road*



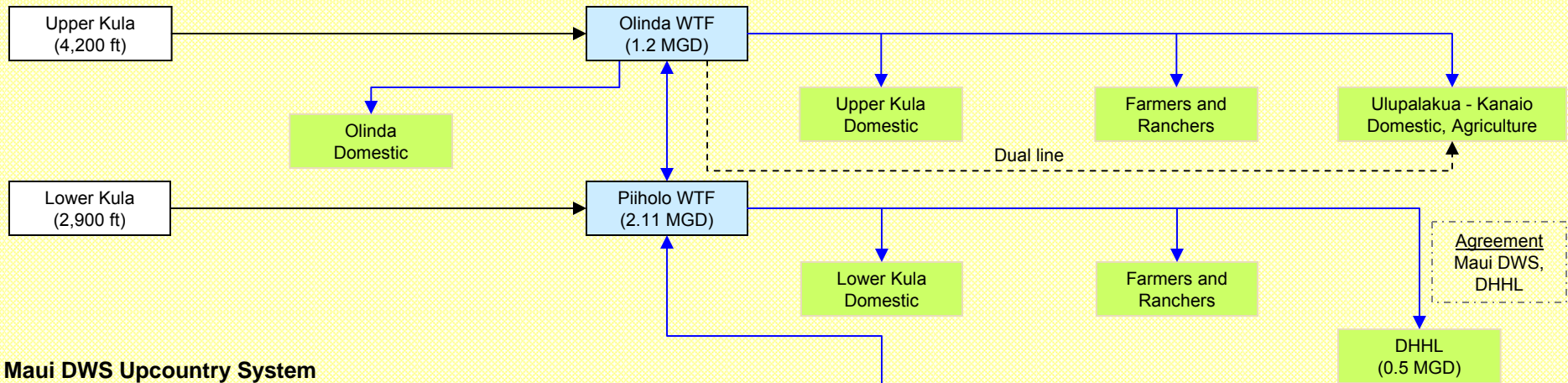


**KEY:**

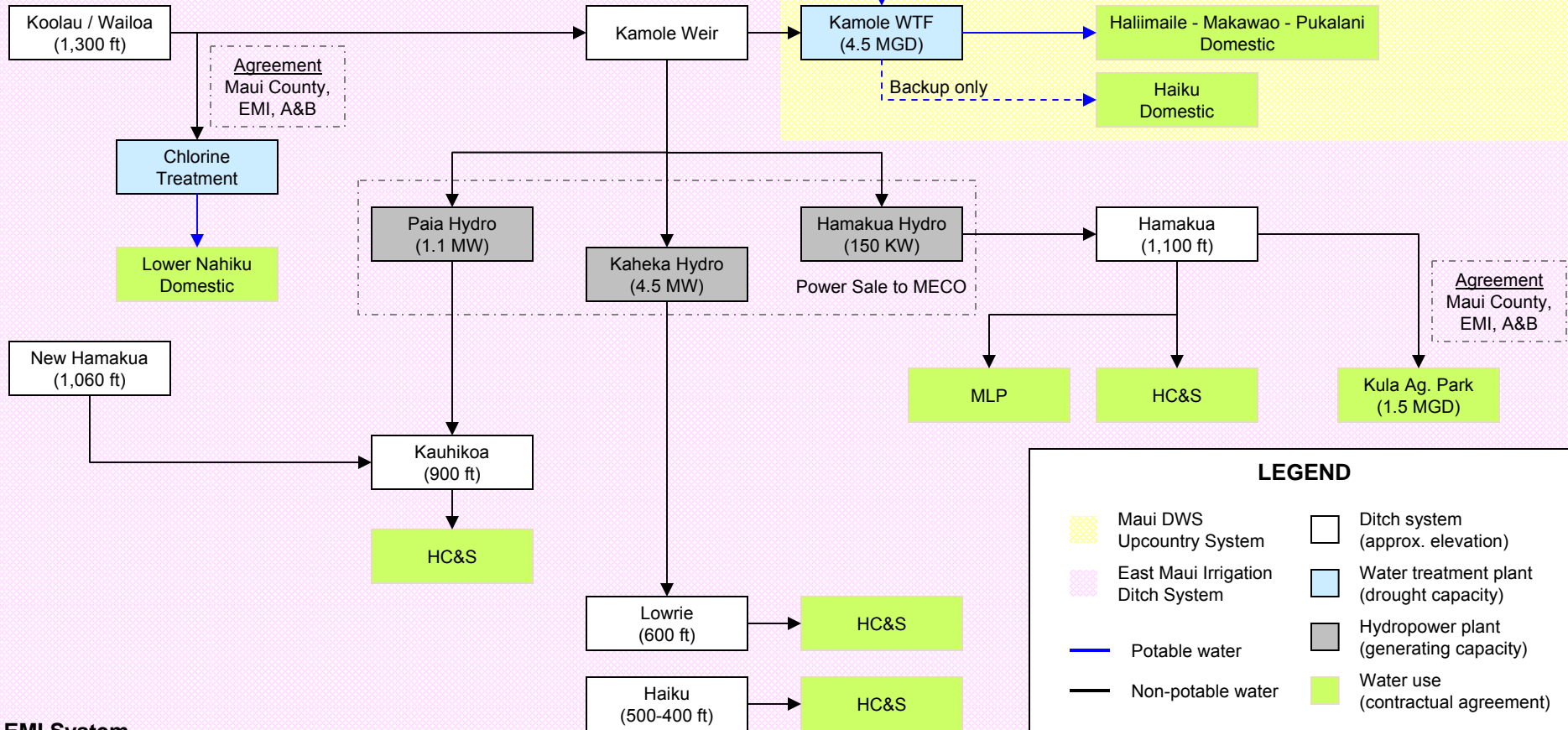
-  STREAMS AND GULCHES
-  GULCHES INDICATING LICENSE BOUNDARIES
-  RESERVOIR WITH CAPACITY IN MILLION GALLONS
-  MAIN SUPPLY DITCHES
-  DISTRIBUTION DITCHES
-  CHUTE DITCHES BETWEEN MAIN SUPPLY DITCHES



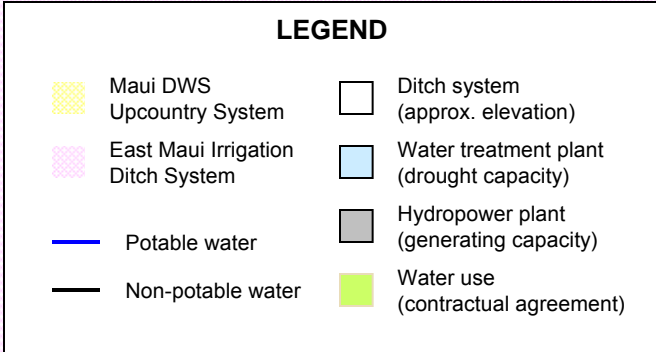
**DIAGRAM OF EAST MAUI DITCH SYSTEM WITH DITCH & RESERVOIR CAPACITIES**



**Maui DWS Upcountry System**



**EMI System**



# Noninstream Uses

## Average water use of the Maui DWS Upcountry System

Upper Kula and Ulupalakua-Kanaio regions 1.5 mgd

Lower Kula region 2.2 mgd

Makawao, Haliimaile, and Pukalani regions 2.0 mgd

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Total Average Water Use 5.7 mgd



# Noninstream Uses

## Average water use of the EMI System

Hawaiian Commercial & Sugar Company 166.4 mgd

Maui Land & Pineapple Company 4.4 mgd

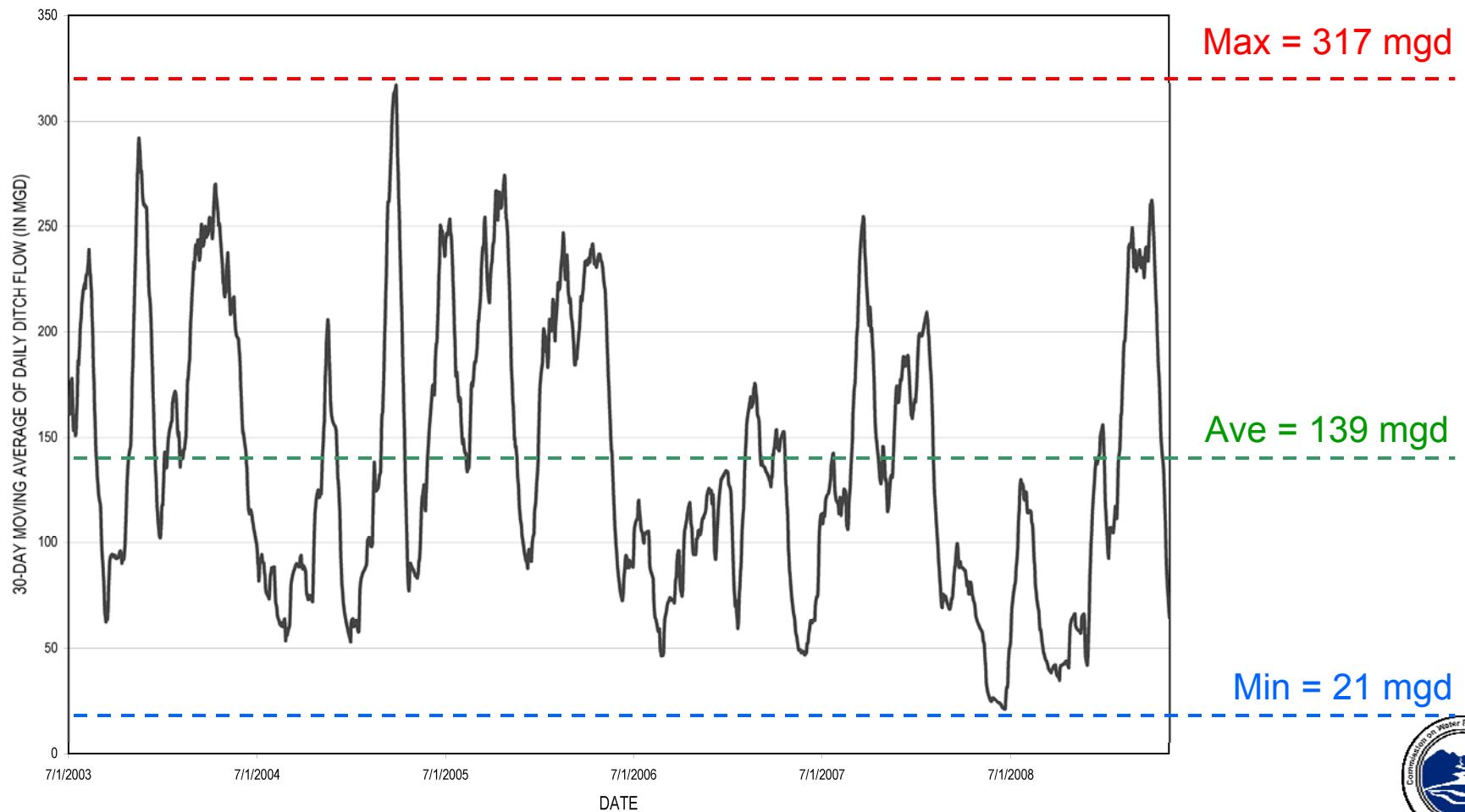
Maui County DWS (includes Kula Agricultural Park) 7.1 mgd

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Total Average Water Use 177.9 mgd



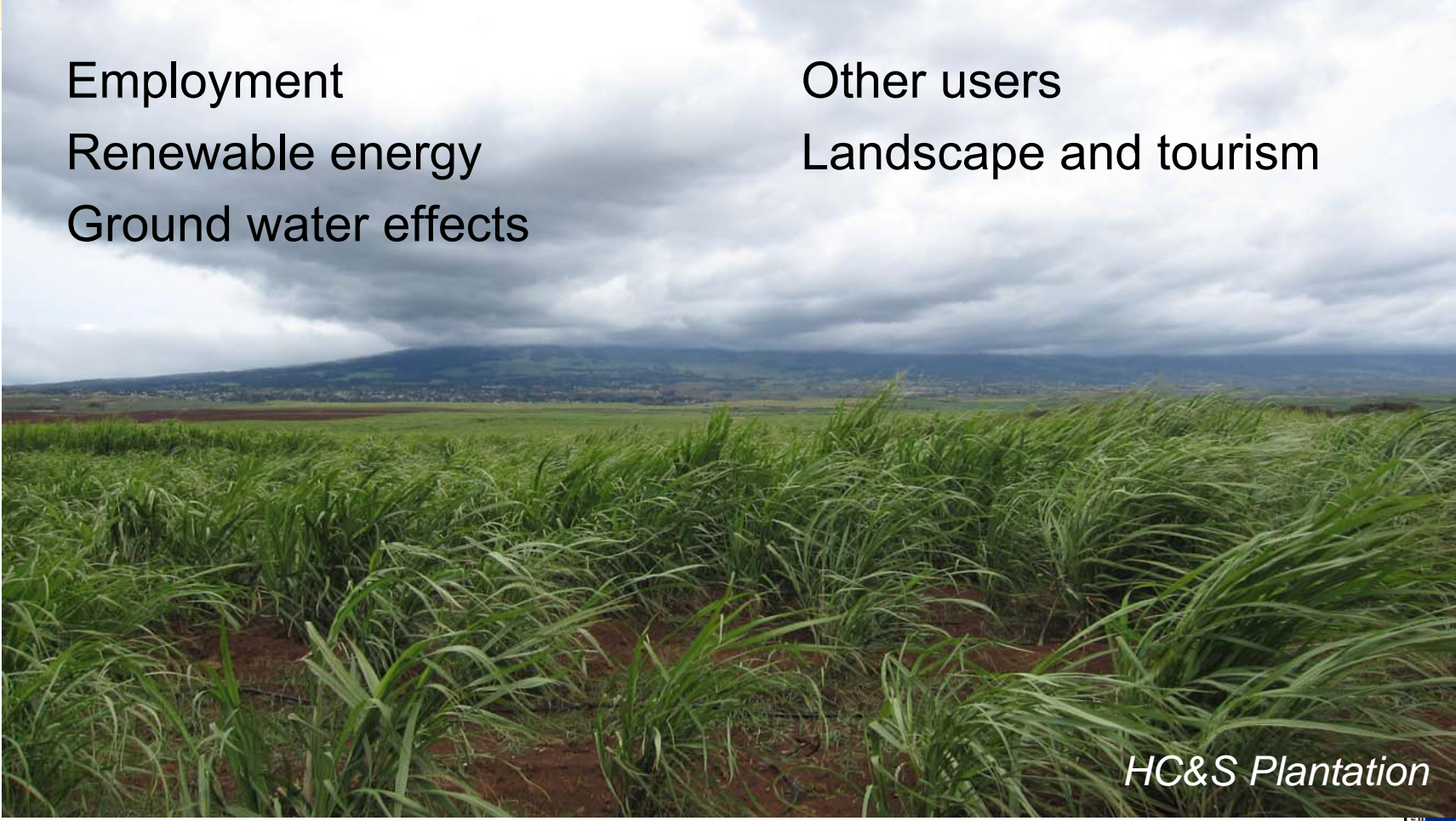
# Averages can be misleading



# HC&S

Employment  
Renewable energy  
Ground water effects

Other users  
Landscape and tourism



*HC&S Plantation*



# Maui DWS

*Olinda Water Treatment Facility*



- Increased power and pumping costs
- Increasing demand
- Existing domestic needs are subject to seasonal restrictions
- Sustainability

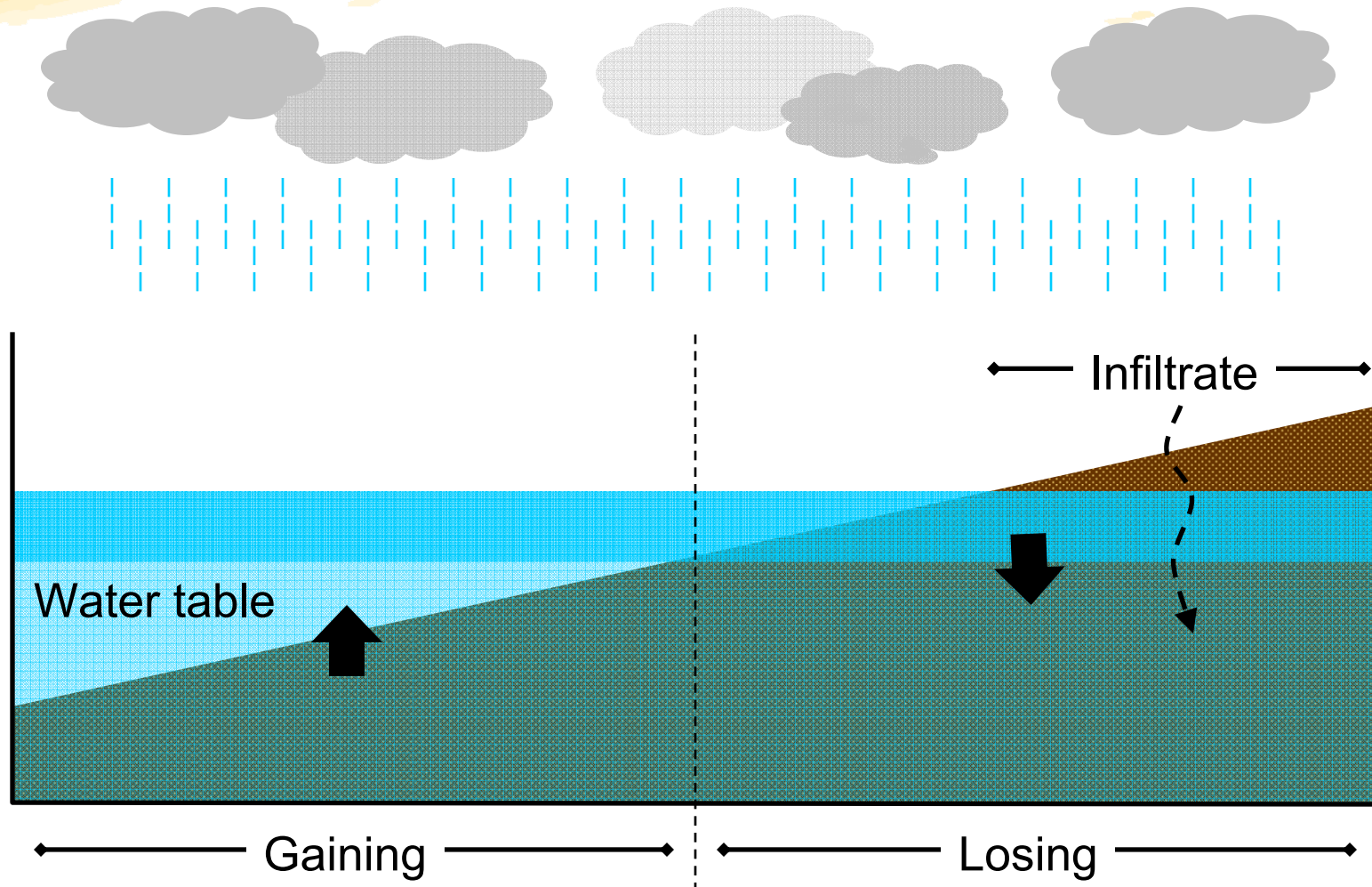
# Other Users

User	Stream Diverted	Purpose
Haleakala Ranch	Honomanu	Domestic, livestock
MLP	Hanawi	Pineapple
State Parks	Haipuaena	Kaumahina State Wayside
	Waiohue	Pua Kaa State Wayside
Private Individuals	Wahinepee	Domestic, agriculture
	Ohia	Domestic, taro, landscaping
	Makapipi	Domestic, landscaping





# Streamflow Characteristics



# Hydrology

	Waikamoi/Alo	Wahinepee	Puohokamoa	Haipuaena	Punalau/Kolea	Honomanu	Nuaailua	Ohia	W. Wailuaiki	E. Wailuaiki	Kopiliula	Puakaa	Waiohue	Paakea	Waiaaka	Kapaula	Hanawi	Makapipi
Headwaters	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Above/Between Ditches	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Below Lowest Ditch	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Stream Mouth	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Spring Input	■					■		■		■	■	■	■	■	■	■	■	■

<sup>1</sup> Hydrology: ■ = gaining stream reach; ■ = losing stream reach; ■ = dry stream reach; ■ = Uncertain.

- Streams east of Keanae Valley are mostly gaining from springs
- Waikamoi and Ohia have springs at headwaters
- Limited data on Makapipi Stream



# Instream Uses

		Waikamoi/Alo	Wahinepee	Puohokamoa	Haipuaena	Punalau/Kolea	Honomanu	Nuaailua	Ohia	W. Wailuaiki	E. Wailuaiki	Kopiihula	Puakaa	Waiohue	Paakea	Waiaaka	Kapaula	Hanawi	Makapipi	
Fish and Wildlife	Terminal Waterfall	■	■		■												■		■	
	Estuary						■	■		■	■	■	■	■	■			■	■	
	Biological Rating	4		5	5	5	8	7	5	7	7	7		8	6			4	8	6
	Oopu except alamoo			■	■	■	■	■		■	■	■		■	■				■	■
	Oopu alamoo	■		■	■		■	■	■	■		■		■	■				■	■
	Opae kalaole	■		■	■		■	■	■	■	■	■	■	■	■			■	■	■
Hihiwai						■	■	■	■	■	■		■	■				■	■	
Recreation - HSA Rating <sup>3</sup>		S	S	S	M		O	S	S	O	O	S		O	S	S	S	O	S	
Aes.	Park/Trails/Lookout					■								■		■	■	■	■	
	Waterfalls	■	■	■	■	■	■	■		■	■	■	■	■				■	■	
Hydropower Potential										■	■							■		
Traditional - HSA Rating <sup>3</sup>									S										O	



<sup>3</sup> HSA Rating: O = Outstanding; S = Substantial; M = Moderate; and W = Without.

<sup>4</sup> Reserves, Wetlands: Value represents the area ratio of reserves and wetlands to that of the hydrologic unit.

<sup>5</sup> Vegetation Dominance: N = native; A = alien; Ø = no dominance (i.e., half native, half alien species).



# Noninstream Uses

	Waikamoi/Alo	Wahinepee	Puohokamoa	Haipuaena	Punalau/Kolea	Honomanu	Nuaailua	Ohia	W. Wailuaiki	E. Wailuaiki	Kopiliula	Puakaa	Waiohue	Paakea	Waiaka	Kapaula	Hanawi	Makapipi
 = Lack of a given characteristic																		
 = Not surveyed																		
<b>Kula Pipelines</b>	■		■	■		■												
<b>Koolau/Wailoa</b>	■		■	■	■				■	■	■	■	■	■	■	■	■	■
<b>New Hamakua</b>	■																	
<b>Spreckels</b>	■		■	■	■	■	■											
<b>Manuel Luis / Center</b>	■	■	■	■	■													
<b>Active Taro Diversions</b>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<b>EMI Major Diversions</b>	5	1	4	2	3	5	1	0	1	1	1	1	2	2	1	2	5	1
<b>MDWS Major Div.</b>	4	0	4	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<b>EMI Minor Div.</b>	5	9	3	7	8	5	3	0	5	3	7	1	5	3	0	5	11	2
<b>MDWS Minor Div.</b>	8	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Other Diversions</b>	0	1	0	1	0	2	0	1	0	0	0	0	1	0	0	0	1	2



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# Proposed Interim IFS

	Waikamoi/Alo	Wahinepee	Puohokamoa	Haipuaena	Punalau/Kolea	Honomanu	Nuaailua	Ohia	W. Wailuaiki
<b>Estimated Flow (CFS)</b>	0.20	0.50	0.40	0.10	2.10	0.00	0.30	4.60	0.20
<b>Estimated Flow (MGD)</b>	0.13	0.32	0.26	0.07	1.36	0.00	0.19	2.00	0.13
<b>Altitude (Feet)</b>	550	575	565	510	40	20	110	195	1,185

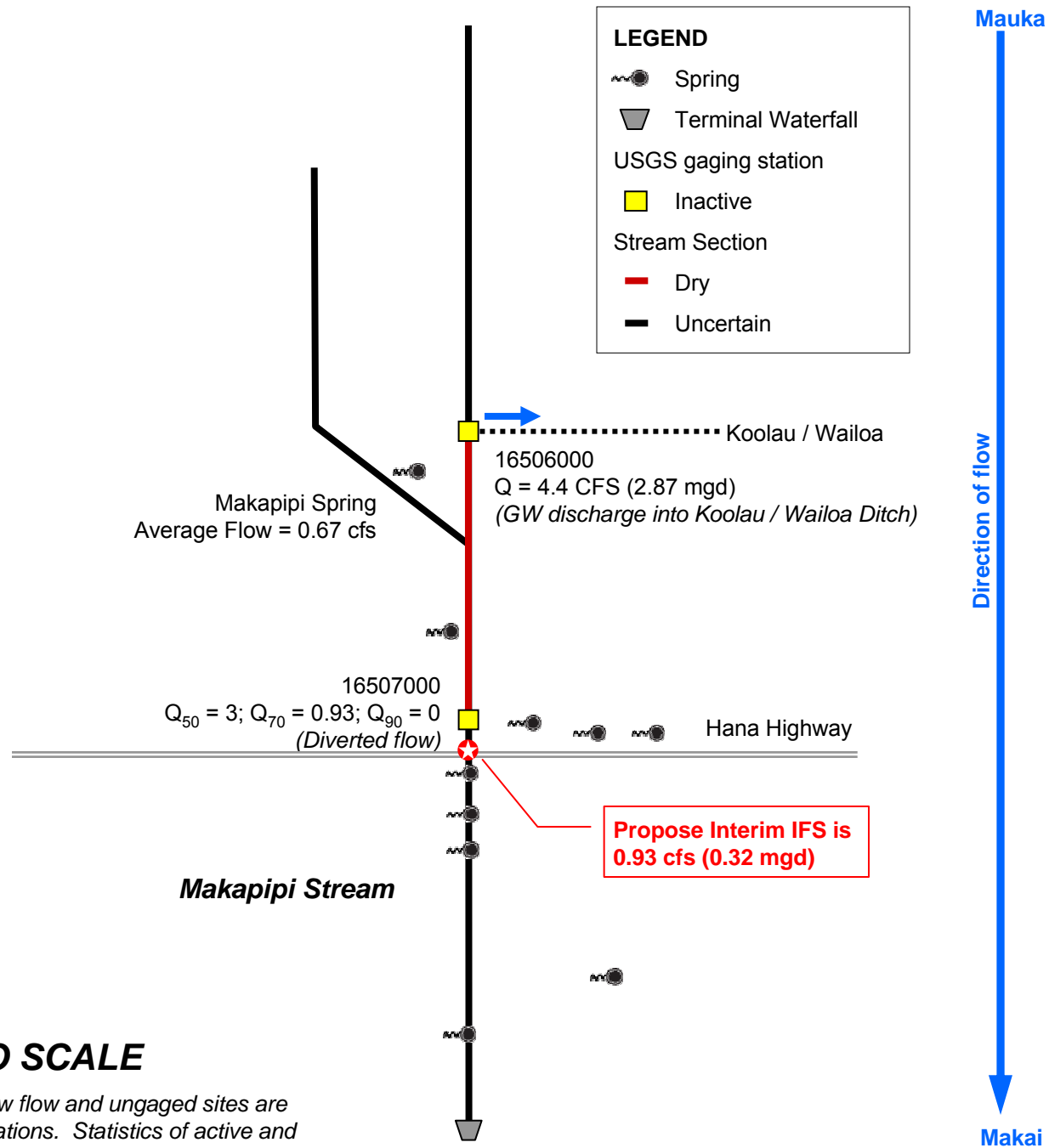


# Proposed Interim IFS

	<b>E. Wailuaiki</b>	<b>Kopiliula</b>	<b>Puakaa</b>	<b>Waiohue</b>	<b>Paakea</b>	<b>Waiaaka</b>	<b>Kapaula</b>	<b>Hanawi</b>	<b>Makapipi</b>
<b>Estimated Flow (CFS)</b>	0.20	0.50	0.60	0.80	3.20	0.60	2.00	17.00	0.93
<b>Estimated Flow (MGD)</b>	0.13	0.32	0.39	0.52	2.07	0.39	1.29	10.99	0.32
<b>Altitude (Feet)</b>	1,235	1,270	1,235	1,195	1,265	1,235	1,194	1,045	935



# 6065 Makapipi

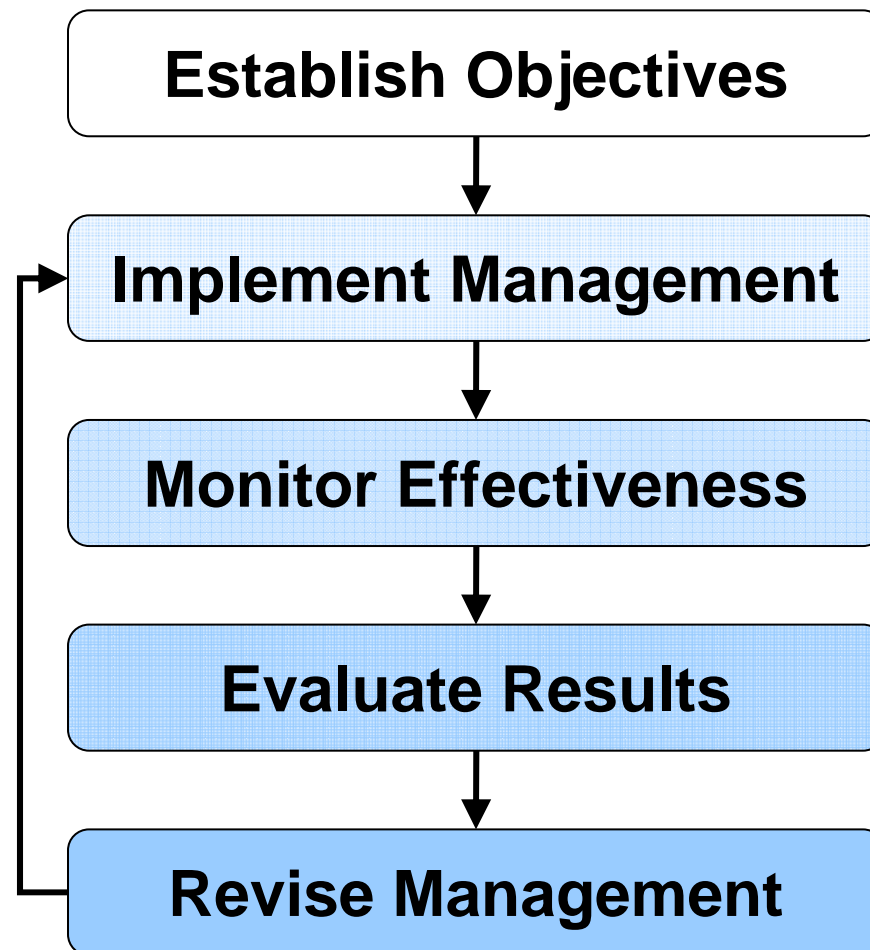


## DIAGRAM NOT TO SCALE

NOTE: Statistics of gages at low flow and ungaged sites are estimated from regression equations. Statistics of active and inactive gages are derived from historic data.



# Adaptive Management



# Adaptive Management



*Upper Waikamoi Flume*

**For Waikamoi,  
Puohokamoa, Haipuaena,  
and Honomanu:**

Improvements to the Upper  
and Lower Kula Systems to  
reduce inefficiencies and  
waste.

Focus - wooden Upper  
Waikamoi Flume.

# Adaptive Management



*Nahiku Pump on Hanawi Stream*

**For Hanawi and Makapipi:**

Determine the disposition of surface water diversions and ground water wells owned by MLP.

Focus - Nahiku Pump and Kuhiwa Well.

# Adaptive Management

## For Makapipi:

Uncertain if restored flow would result in continuous flow to the ocean due to hydrology of the stream.

Conduct short-term conditional release of flow past the EMI diversion.



# Recommendations

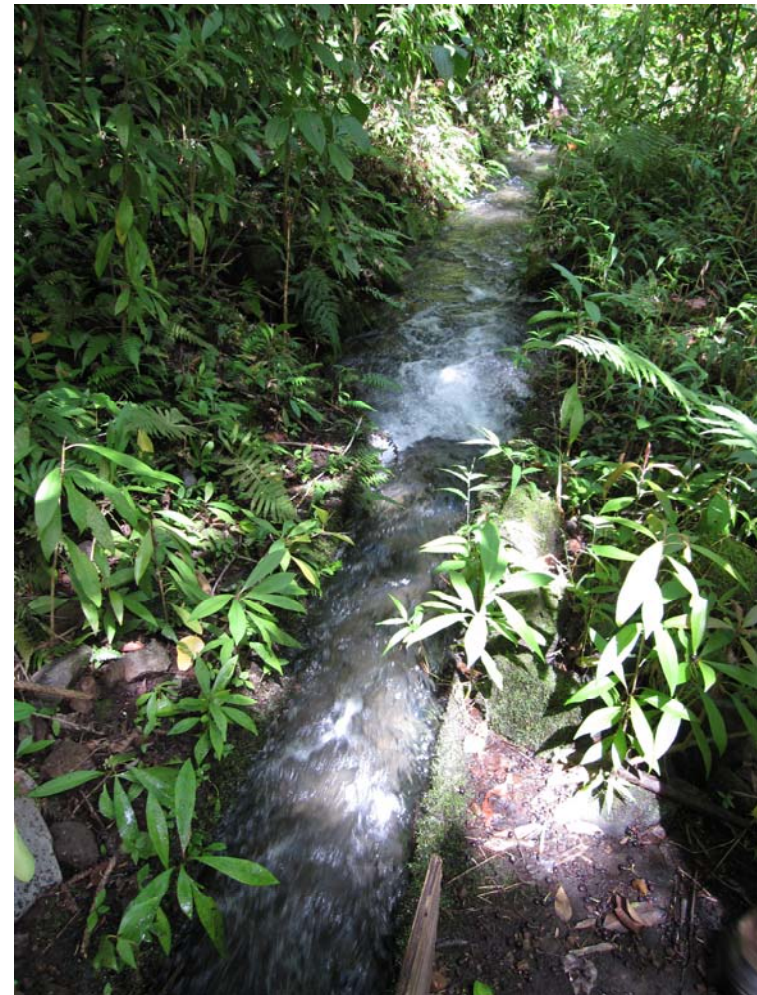
## Implementation

- Comply with State Water Code for unregistered diversions
- Collaborate with agencies and diverters to determine appropriate actions in regards to proposed interim IFS
- Coordinate with EMI and DAR to assess existing conditions and status of EMI diversions
- Diverters should take steps to reduce system inefficiencies and losses via system maintenance



# System Maintenance

Feb. 2009



Flow before (left) and after (right) the auwai intake was cleared



# Recommendations

## Monitoring

- EMI and Maui DWS notify Commission staff of any repairs/maintenance/alterations to existing diversion structures
- Within one year, EMI to develop monitoring plan to address the amount of water diverted
- Within one year, Maui DWS to develop monitoring plan to determine system losses
- EMI and Maui DWS to provide monitoring data



# Recommendations

## Monitoring

- Monitor streamflow by taking periodic measurements
- Conduct periodic biological surveys
- Affected parties monitor and document the negative impacts of diversions or adopted interim IFS
- Conduct investigations with granted access to stream channels and private property





# Recommendations

## Evaluation

- Report to Commission within one year from date of adoption
- Within one year, EMI and Maui DWS to report on status of monitoring plan
- Provide quarterly updates to the Commission
- Assess implementation of adaptive management strategies
- Future evaluation of interim IFS will take a comprehensive watershed approach, subject to the following:
  - Changes to HC&S operations
  - Changes to water usage / needs

