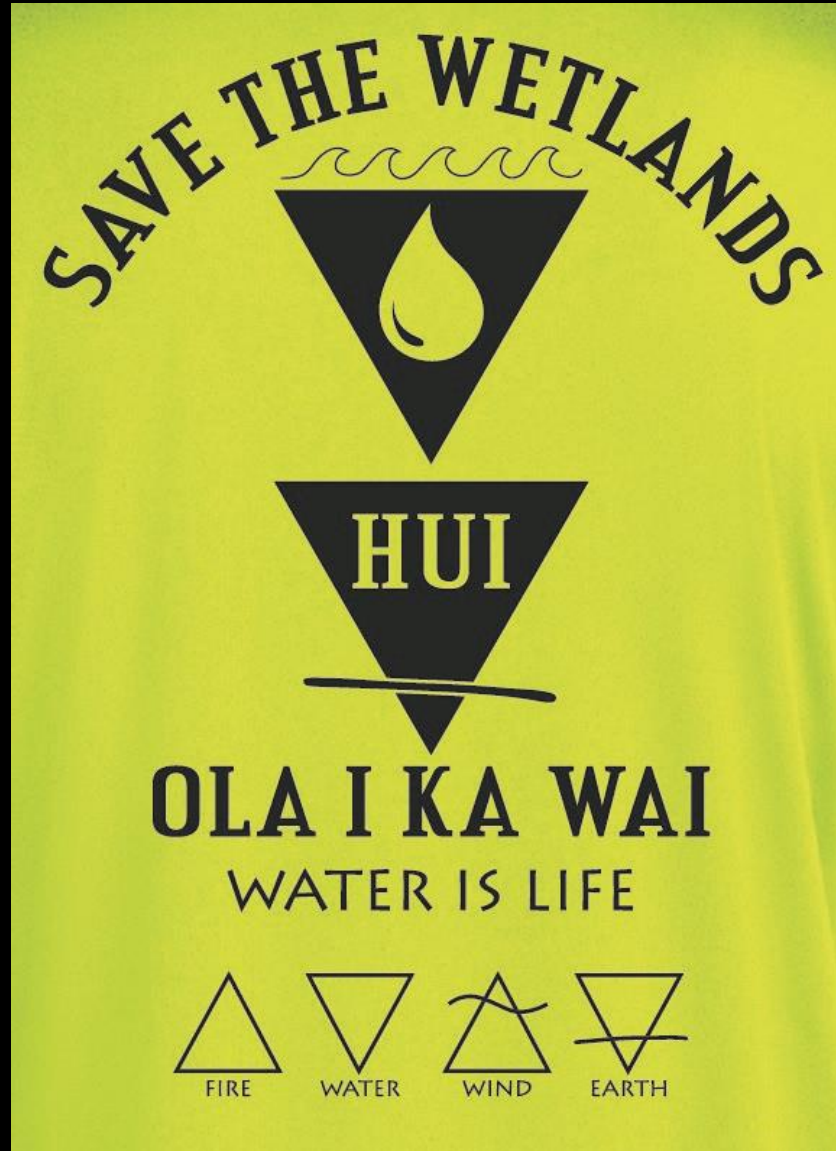


Wetland
Functional
Assessment

Wetlands of
Kula Kai
Pulehunui to
Kalama



Presentation to
Maui County Council
ADEPT Committee
March 20, 2025

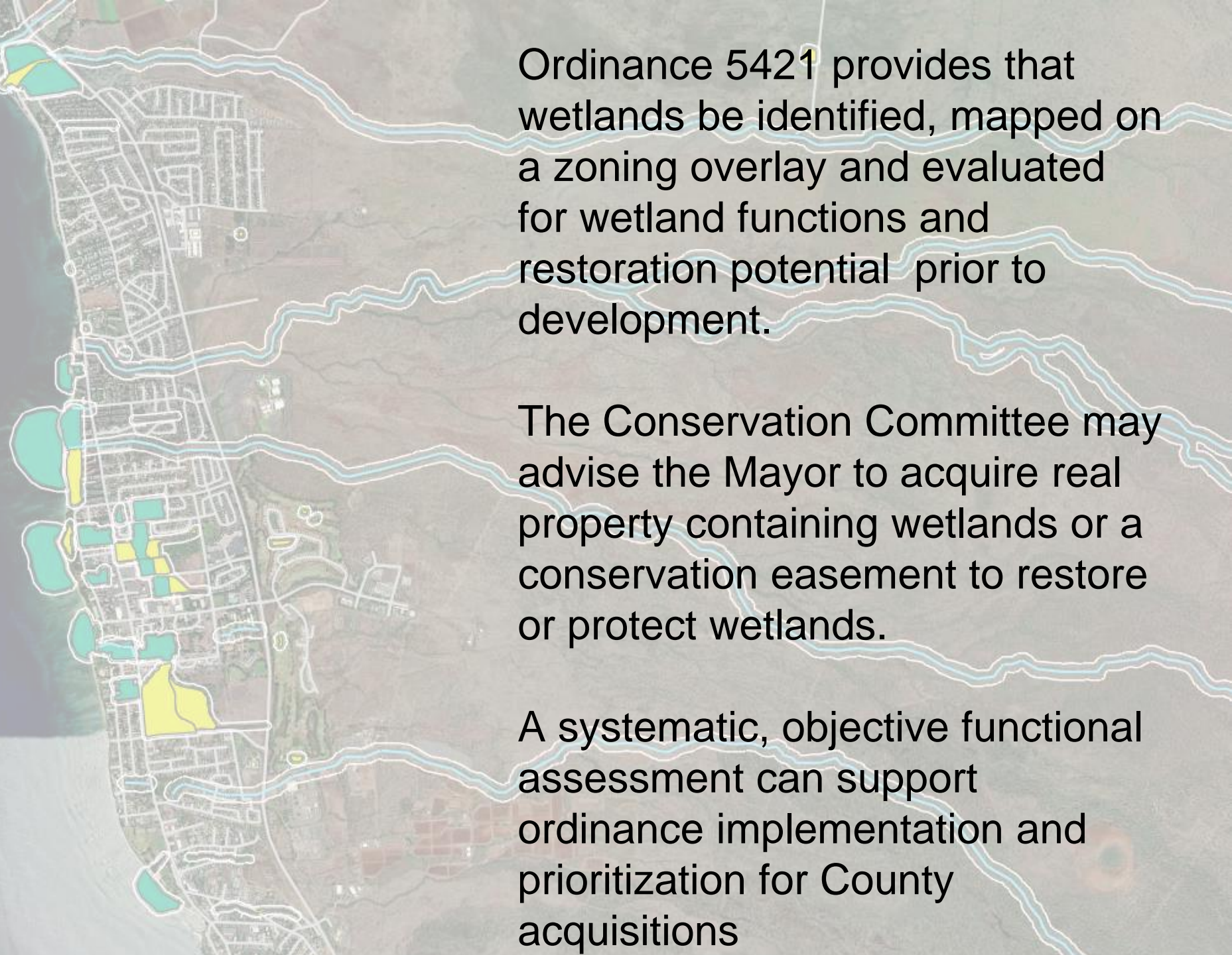


Save the Wetlands Hui is a group of residents with a mission to protect and restore wetlands in Maui County.



Why do we care about wetlands?

Wetland functions provide ecological services of value to our community.



Ordinance 5421 provides that wetlands be identified, mapped on a zoning overlay and evaluated for wetland functions and restoration potential prior to development.

The Conservation Committee may advise the Mayor to acquire real property containing wetlands or a conservation easement to restore or protect wetlands.

A systematic, objective functional assessment can support ordinance implementation and prioritization for County acquisitions

Wetland Functions and Values

- Wetland functions are the physical, chemical, and biological processes that occur naturally in wetlands
- Wetland values are the benefits that wetlands provide; can be environmental or societal
- The wetland functions and value to human society **depend on relationships between the wetland and the other ecosystems in the watershed**
- Functions and values can be diminished by ecosystem degradation
- Functions and values are independent ; e.g. high function such as water storage may not be high value if flooding is not an issue in the area.

Wetland Function	Wetland Values
Sediment retention and stabilization	Erosion control, better water quality in streams and ocean for recreation, fishing, and drinking water
Nutrient and chemical attenuation and reduction	Better water quality in streams and ocean for recreation, fisheries and drinking water, cleansing of waste materials, including nutrients, pesticides and herbicides
Water storage and delay	Flood control, public safety within flood zones, groundwater recharge
Native plant diversity	Education and research, agriculture, urban quality of life, open space and aesthetics, historical and cultural importance, protection of native, threatened or endangered resources
Fish and Waterbird Habitat	Education and research, birdwatching, urban quality of life, aesthetics, hunting and fishing, historical and cultural importance, protection of native, threatened or endangered resources
Groundwater recharge and discharge	Groundwater use potential, increase water supply
Shoreline or stream bank anchoring	Protection of Property; Prevention of bank and shoreline erosion
Carbon Sequestration	Mitigation of climate change

Kula Kai Functional Wetland Assessment

Study area from Pulehunui to Kalama

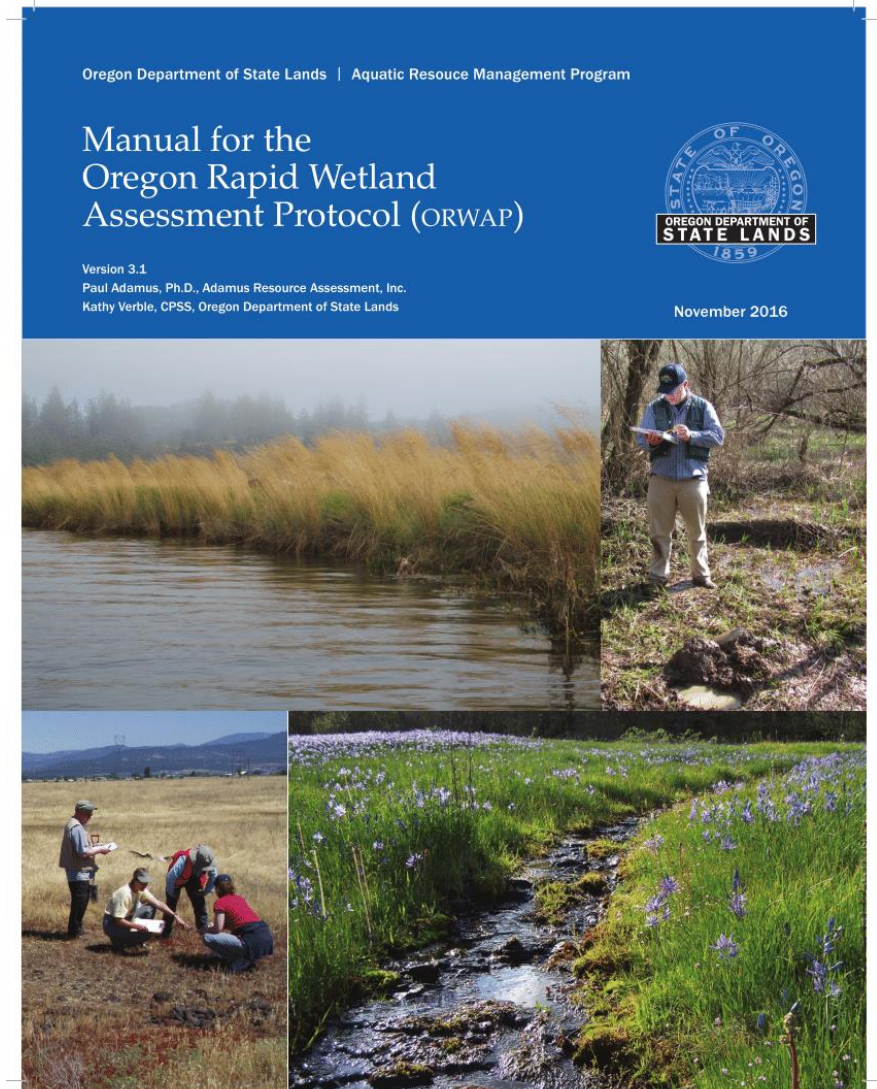
- Includes Pulehunui, Ka'ono'ulu, Waiohuli, Kēōkea, Waimahaihai, and Kalama ahupua'a from the coast to the Pi'ilani Highway
- Includes 43 wetland features previously identified by Save the Wetlands Hui
- Pilot project to explore use of Wetland Functional Assessment Model in Maui Wetland Protection Program



Functional Wetland Assessment Method

Wetland function categories from the USEPA and Oregon Rapid Wetland Assessment Protocol modified for Hawaii.

- Systematic and objective and based in laws of physics (fluvial geomorphology) and chemistry (pollutants and sediment)
- Uses information about a wetlands surface hydrology, plant communities, fisheries, water chemistry, soils, and human impact to assess the performance of selected functions by that wetland.



Location	AU	Map Key	Frequency	Flooding		Ponding			AU	Site Name	Site ID		NO3+NO2 (µg/L)	NO2 (µg/L)	SiO2 (µg/L)	PO4 (µg/L)	NH3 (µg/L)	TN (µg/L)	TP (µg/L)
				Duration	Months	Frequency	Depth	Duration											
Pūlehunui/Waiakoa	1	16	Frequent	very brief	Dec-Jan	Frequent	1-4 feet	very long	Pulehunui	Waiakoa	011601	min	0.8	0.2	39.7	0.3	1.0	1104.8	10.8
Kaonoulu/Kūlanihakoi	2	6, 7	Frequent	very brief	Dec-Jan	Frequent	1-4 feet	very long				max	2162.4	283.2	4019.0	2994.6	2002.6	1657.6	24039.4
Waiohuli/Waipuilani	3	6, 7, 18, 20, 23	Frequent	very brief	Dec-Jan	Frequent	2-6 feet	very long				avg	272.0	79.8	1516.5	677.9	420.9	1404.3	6105.6
Waiohuli/Waipuilani	3	6, 7, 18, 20, 23	Frequent	very brief	Dec-Jan	Frequent	2-6 feet	very long	geo	3.3	14.8	664.2	46.2	59.2	1387.3	682.1			
Waiohuli/Waipuilani	3	6, 7, 18, 20, 23	Frequent	very brief	Dec-Jan	Frequent	2-6 feet	very long	Ka'ono'oulu	Kūlanihāko'i Mauka	020701	min	2.0	0.0	85.9	0.1	1.4	752.7	0.9
Waiohuli/Waipuilani	3	6, 7, 18, 20, 23	Frequent	very brief	Dec-Jan	Frequent	2-6 feet	very long				max	4457.0	200.8	5744.1	1039.0	1006.7	2323.6	23392.4
Waiohuli/Waipuilani	3	6, 7, 18, 20, 23	Frequent	very brief	Dec-Jan	Frequent	2-6 feet	very long				avg	1260.5	71.1	2010.9	319.2	312.8	1217.7	5076.7
North and South Ponds	4	13	rare	unknown	Nov-Apr	Frequent	1-3 feet	very long	geo	164.9	8.0	1141.3	24.8	65.0	1120.8	157.7			
Keokea/Lā'ie Mauka	5	9	Frequent	Very brief	Nov-Feb	Frequent	0-6 feet	very long	Waiohuli I	Waipuilani South	032301	min	7.9	1.4	111.3	2.0	5.6	1108.9	33.2
Keokea/Lā'ie Makai	6	8	Frequent	Very Brief	Dec-Jan	Frequent	0-6 feet	very long				max	2078.0	151.1	5572.9	802.3	490.5	2015.5	436.3
Halama Kalama	7	2	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				avg	462.8	44.3	2065.0	237.7	290.1	1688.4	117.7
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long	geo	80.1	13.8	991.1	54.5	143.3	1644.0	61.8			
Welakahao/Keokea	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long	Waiohuli II	Pi'ikea N	041301	min	0.2	0.1	72.9	0.2	1.9	1032.4	7.5
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				max	2071.6	122.2	4033.1	653.8	421.9	1993.4	1234.6
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				avg	585.2	50.0	1699.7	137.9	110.8	1417.1	263.4
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long	geo	105.3	13.2	762.4	6.2	33.0	1356.3	40.8			
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long	Waiohuli II	Pi'ikea S	041302	min	1151.8	850.4	2158.9	4345.3	<1.20		41896.2
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				avg	110.6	143.3	10234.9	4064.8	73.1		34507.5
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				max	32.9	3.1	8070.4	95.5	93.8	367.1	348.5
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long	Kēōkea	Lā'ie Makai	050804	min	1161.9	65.2	13376.8	709.5	141.3	382.8	4169.9
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				avg	628.0	34.7	10731.3	406.5	108.9	375.0	1805.9
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				geo	289.7	16.4	10425.5	271.3	107.4	374.9	1093.2
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long	Kēōkea	Lā'ie Mauka	050901	min	1.4	0.1	169.7	0.3	1.4	145.8	25.1
Wesco	5	25, 26	Frequent	Very brief	Dec-Jan	Frequent	0-2 feet	long				max	2966.6	225.1	15007.1	2581.0	654.6	482.4	19135.4

Data sources included previous surveys, wetland delineations, watershed plans, and environmental impact statements, aerial photography, STW Hui hydrology and water quality data and anecdotal community data.

Anecdotal/Community Data

Kula Kai Wetlands - Bird Observations									
Aupua'a	Site	Map Key	Ae'o ¹	'Auku'u	Alae ke'o ke'o ¹	Kōlea	Nene ¹	'U 'au kani	'ūlili
AU			Hawaiian Black Necked Stilt	black crowned night heron	hawaiian Coot	Pacific golden plover	Hawaiian Goose ¹	wedge tailed Shearwater	wandering tattler
Ka'ono'ulu 2	Kulanihakoi Makai	6	X	X		X			X
Waiohuli I 3	Waipuilani kai	21	X	X		X			
Waiohuli II 4	Piikea Pond N	13	X						
Waiohuli II 4	Piikea Pond S	14	X		X				
Keokea 5	Laie Mauka	9	X	X		X			
Keokea 5	Laie Makai	8	X	X	X		X	X	
Keokea 5	Halama	2	X						

**‘O’opu at Waiohuli Kai December 18, 2021
Cody Nemet Tuivaiti posted on Aina Ku Koa O
Waiohuli FB group**





Ka'ono'ulu Assessment Unit
 ★ Sampling Sites 🟠 Wetland Assessment Units ● Inlets and Outlets
 🟡 South Maui Wetland Study Sites 2023 🌀 10ft Contours

GROUPS	Selected Function	Function Rating	Rating Break Proximity	Values Rating	Rating Break Proximity
Hydrologic Function (WS)	Water Storage & Delay (WS)	Lower		Lower	
Water Quality Support (SR, PR, or NR)	Phosphorus Retention (PR)	Moderate	MH	Moderate	MH
Fish Habitat (FA or FR)	Anadromous Fish Habitat (FA)	Lower		Lower	
Aquatic Habitat (AM, WBF, or WBN)	Waterbird Feeding Habitat (WBF)	Moderate		Moderate	
Ecosystem Support (WC, INV, PD, POL, SBM, or OE)	Pollinator Habitat (POL)	Moderate		Higher	



For this Study, the Functional Assessment Protocols have been used to:

- to identify baseline functions and elements of the wetlands
- to define high, medium, and low function for South Maui wetland types and
- to compare the wetlands giving a rationale for prioritizing restoration projects

“ All of the AUs assessed have potential to support wetlands and to be rehabilitated to conditions that have enormous value to those who live in Kihei and environs and those who travel and vacation there.”

	1	2	3/4	5	6	7
	Pulehunui	Ka'ono'ulu	Waiohuli I/II	Keokea	Waimahaihai	Kalama
Restoration Potential Hydrologic Function (WS) Sediment Retention (SR) and Water Quality Support (SR, PR, NR)	Med	High ¹	Med/High	High	Insufficient Data	Insufficient Data
Ecosystem Support Native Plant Diversity (WC, INV, PD, POL, SBM, or OE)	High	Med	High	High	Insufficient Data	Insufficient Data

4.2 Prioritization Criteria

Priority setting should include community input and factors such as cost or feasibility of doing the necessary work. Existing buildings, roads, property ownership must be taken into account

4.2.1 Criteria

Top priority is to address any urgent needs for public safety, flood damage prevention

Preserve rare or only remaining seasonal wetland or gulch connections between the dry uplands and shoreline

Protect lands that can improve water quality by retaining sediments or that introduce springs and seeps from groundwater into the landscape

Preserve remaining undeveloped permeable land areas that have potential for ecosystem uplift since they are becoming scarce but still offer ecological uplift

Protect and examine any lands within residential or commercial settings as they provide value for connection to waters and wetlands and buffers from development

Recommendations

Public education and outreach to increase understanding of the value of the remaining Kula Kai wetlands in providing ecosystem services such as mitigating heat islands, managing floodwater, preserving open space, supporting the aesthetic nature and beauty of Kula Kai.

Protection of public lands and enhancement of wetland functions, for instance the use of Kalama Park and Waipuilani park for stormwater and sediment retention

Better documentation/data of excessive sedimentation and water quality diminishment to support working with responsible authorities, restoration practitioners, and stakeholders on solutions

Continue to develop data collection protocols and functions and values assessments for use by County Managers and Conservation Committee

Use the wetland zoning overlay process to better evaluate the function of land parcels within the whole ecosystem and gain understanding of the value of conservation or restoration

Fully implement protection of the areas identified in the wetland overlay as having wetland function, and the prescribed wetland and gulch buffers in the South Maui Community Plan. Any green space or buffer improves hydrologic functions even if it does not exhibit wetland characteristics

Recommendations –Big Picture

- No new development in wetlands, streambeds, riparian corridors, flood plains
- Restore and enhance functions of existing wetlands
- Restore degraded Watershed and mitigate sediment loss
- Integrated Plan for Watershed Management, Flood Control and Drainage
- Create a Community Working Group with Stakeholder involvement
- Fund implementation of the Integrated Management Plan
- Engage community in Citizen Science in support of Watershed



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ADEPT Committee

From: Robin S. Knox <robin.s.knox@gmail.com>
Sent: Thursday, March 20, 2025 8:09 AM
To: ADEPT Committee
Subject: Link for Robin Knox presentation 3.20.25 Adept Committee

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