Developing Hawai‘i’s First Protection & Restoration Strategy for Wetlands

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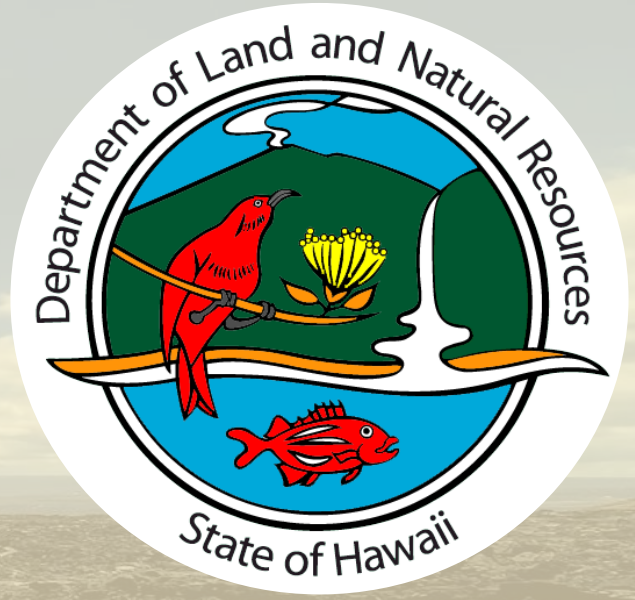
The Department of Land and Natural Resources

- Responsible for managing and administering public lands, natural resources, and coastal areas
- Consists of 10 divisions, each with a different scope of responsibility
- Two separate divisions for aquatic (DAR) and terrestrial (DOFAW) resources



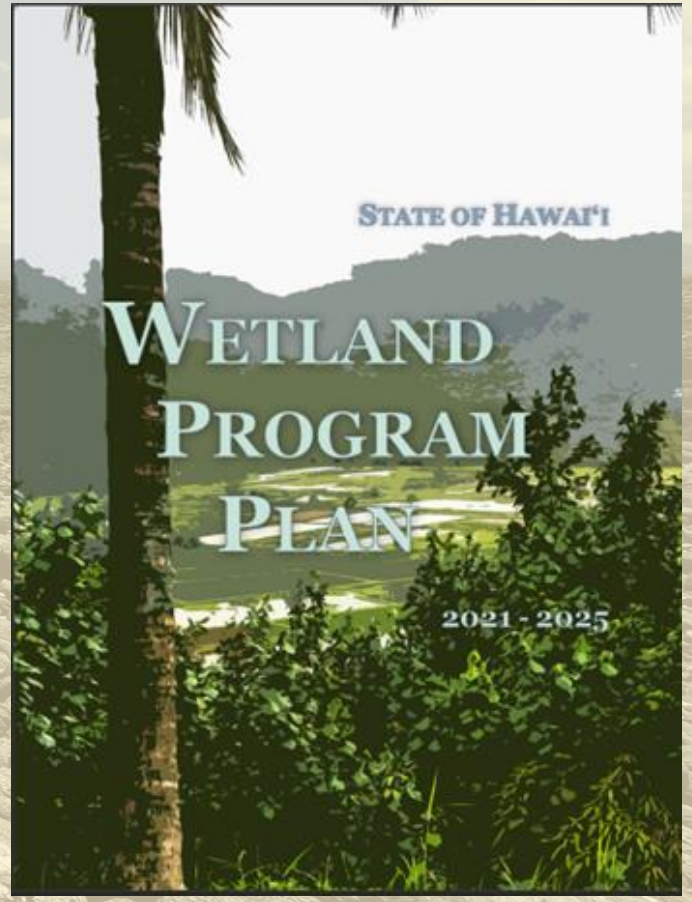
2020: The Hawai‘i Wetland Program Plan (HWPP)

Mission: Align management priorities for wetlands within DLNR, and to enhance, protect, conserve, and manage Hawai‘i’s wetland ecosystems

- Facilitate collaboration with the Division of Aquatic Resources and Division of Forestry and Wildlife

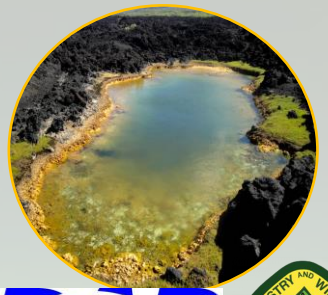
Hawaii Division of Aquatic Resources

FORESTRY AND WILDLIFE HAWAII



2020: The Hawai‘i Wetland Program Plan (HWPP)

- Focus on 4 types of wetlands



Anchialine pools: brackish water pools that are landlocked, but are connected to the ocean and groundwater underground.

Marshes: areas of land covered by water for long periods of time, generally covered by grasses and other herbaceous plants.

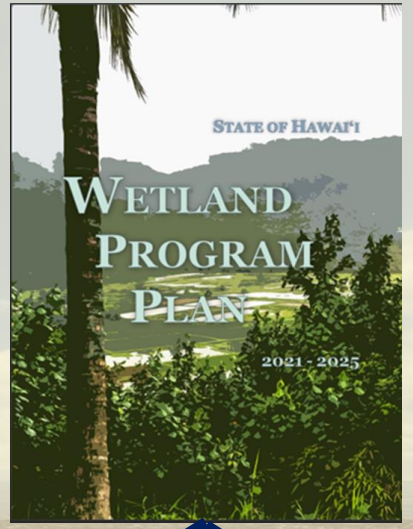
Estuaries: coastal nursery habitats where fresh and saltwater mix.

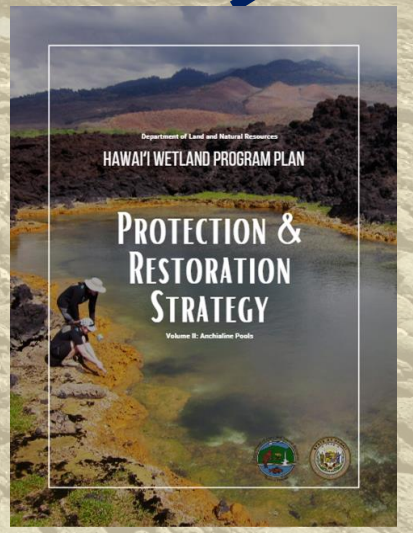
Coral reefs: submerged marine habitat characterized by reef building corals

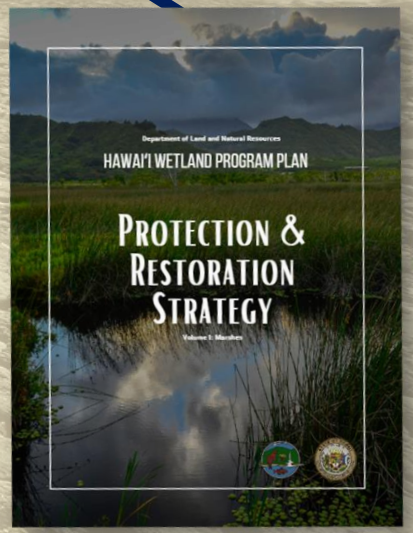
2021: Protection & Restoration (P&R) Strategy for Marshes & Anchialine Pools

- A resource guide for DLNR and partners to improve the protection & restoration of wetlands throughout Hawai‘i

<u>Protection Goal</u>: Prioritize management, access, and regulatory enforcement of anchialine habitats threatened by direct human impacts and changing environmental conditions.

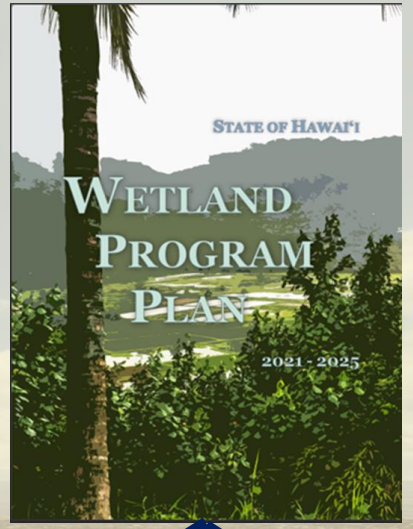






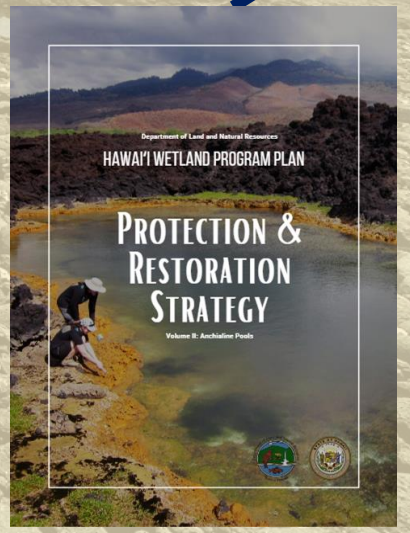
2021: Protection & Restoration (P&R) Strategy for Marshes & Anchialine Pools

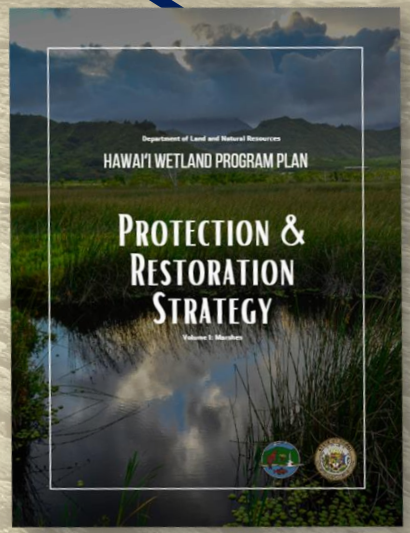
- A resource guide for DLNR and partners to improve the protection & restoration of wetlands throughout Hawai‘i



Protection Goal: Prioritize management, access, and regulatory enforcement of anchialine habitats threatened by direct human impacts and changing environmental conditions.

Restoration Goal: Prioritize impacted habitats facing present and/or future risks to native biodiversity and biocultural significance.





P&R Strategy addresses the needs mentioned in the HWPP

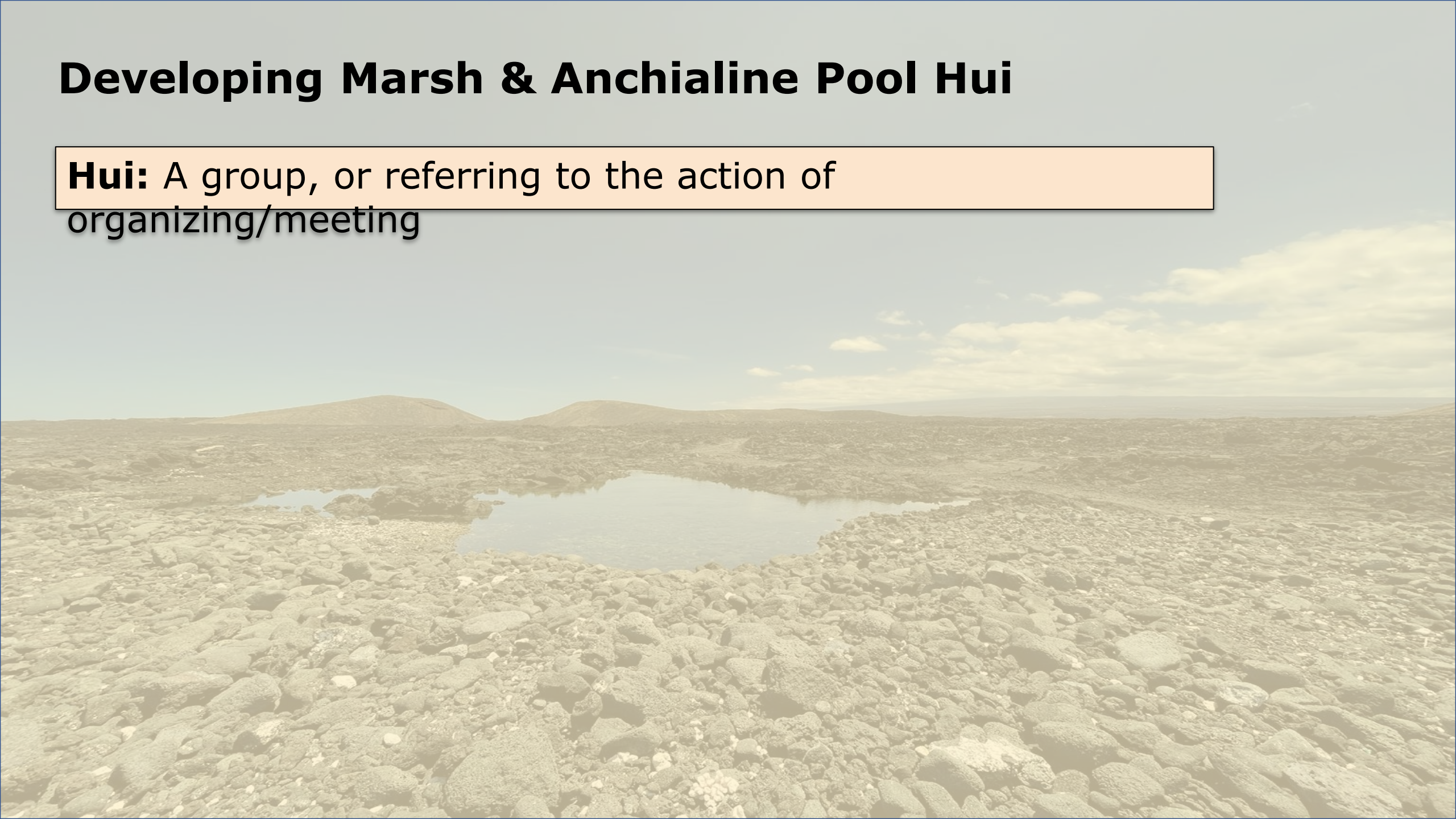
- Identifying priority restoration sites & actions
- Set guidelines for monitoring & assessment

Additionally:

- Establish regulatory protections for anchialine pools
- Create a management plan for anchialine pools

Developing Marsh & Anchialine Pool Hui

Hui: A group, or referring to the action of organizing/meeting



Developing Marsh & Anchialine Pool Hui

Hui: A group, or referring to the action of organizing/meeting

- Formed separate hui for marshes and anchialine pools to identify P&R needs
- Also identify management-specific evaluation criteria
- Marshes Hui members consisted of individuals from DAR & DOFAW
- Anchialine Pool Hui consisted of individuals from State, Federal, and non-governmental organizations

Development of Evaluation Criteria for Wetlands

- Evaluation of each site's resilience, which gives an idea on how to initiate restoration & allocate funds for each site.
- Each evaluation tool goes through two rounds - Priority & Feasibility
- Priority round consists of essential P&R criteria, and the Feasibility round evaluates its usef

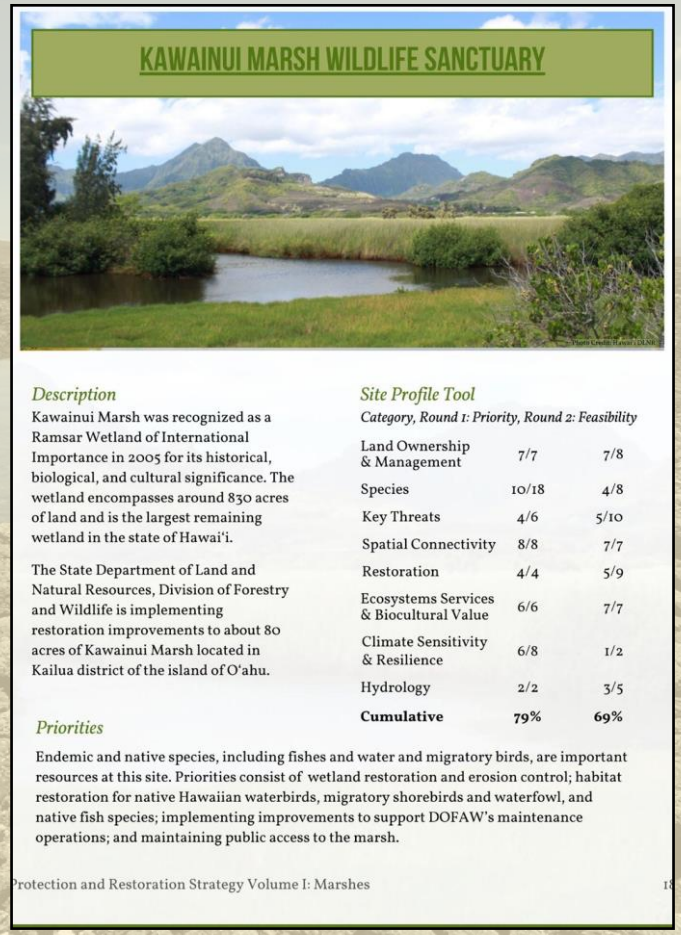
Criteria Categories	Round 1 Priority	Round 2 Feasibility
Geological Factors	/5	/5
Hydrology	/4	/9
Land Ownership, Regulatory, Management	/1	/2
Native Biodiversity	Type	/7
Biocultural Value	/8	N/A
Climate Sensitivity	/2	/10
Restoration	/2	/14
Key Threats	/1	/9
Cumulative Scores	/23 = %	/46 = %

Summary Evaluation Scores by Category	Round 1 Priority	Round 2 Feasibility
Land Ownership & Management	/7	/8
Species	/18	/8
Key Threats	/6	/10
Spatial Connectivity	/8	/7
Restoration	/4	/9
Ecosystem Services & Biocultural Value	/6	/7
Climate Sensitivity & Resilience	/8	/2
Hydrology	/2	/5
Cumulative Score	/59 = %	/56 = %

Marsh & Anchialine Pool Hui Outcomes

- Tested the evaluation criteria using sites throughout the Hawaiian Islands
- Evaluated 11 marshes and 6 anchialine pools

Criteria Categories	Round 1 Priority	Round 2 Feasibility
Geological Factors	___/5	___/5
Hydrology	___/4	___/9
Land Ownership, Regulatory, Management	___/1	___/2
Native Biodiversity	Type	___/7
Biocultural Value	___/8	N/A
Climate Sensitivity	___/2	___/10
Restoration	___/2	___/14
Key Threats	___/1	___/9
Cumulative Scores	___/23 = %	___/46 = %



KAWAINUI MARSH WILDLIFE SANCTUARY

Description

Kawainui Marsh was recognized as a Ramsar Wetland of International Importance in 2005 for its historical, biological, and cultural significance. The wetland encompasses around 830 acres of land and is the largest remaining wetland in the state of Hawai'i.

The State Department of Land and Natural Resources, Division of Forestry and Wildlife is implementing restoration improvements to about 80 acres of Kawainui Marsh located in Kailua district of the island of O'ahu.

Site Profile Tool

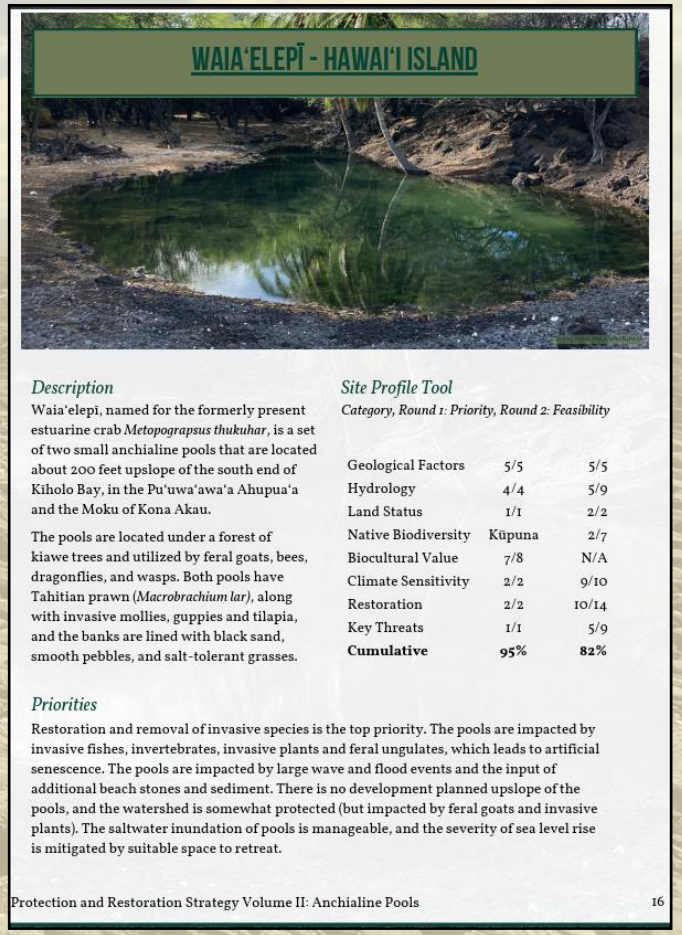
Category, Round 1: Priority, Round 2: Feasibility

Land Ownership & Management	7/7	7/8
Species	10/18	4/8
Key Threats	4/6	5/10
Spatial Connectivity	8/8	7/7
Restoration	4/4	5/9
Ecosystems Services & Biocultural Value	6/6	7/7
Climate Sensitivity & Resilience	6/8	1/2
Hydrology	2/2	3/5
Cumulative	**79%**	**69%**

Priorities

Endemic and native species, including fishes and water and migratory birds, are important resources at this site. Priorities consist of wetland restoration and erosion control; habitat restoration for native Hawaiian waterbirds, migratory shorebirds and waterfowl, and native fish species; implementing improvements to support DOFAW's maintenance operations; and maintaining public access to the marsh.

Protection and Restoration Strategy Volume I: Marshes



WAIA'ELEPĪ - HAWAI'I ISLAND

Description

Waia'elepī, named for the formerly present estuarine crab *Metopograpsus thukuhar*, is a set of two small anchialine pools that are located about 200 feet upslope of the south end of Kiholo Bay, in the Pu'uwa'awa'a Ahupua'a and the Moku of Kona Akau.

The pools are located under a forest of kiawe trees and utilized by feral goats, bees, dragonflies, and wasps. Both pools have Tahitian prawn (*Macrobrachium lar*), along with invasive mollies, guppies and tilapia, and the banks are lined with black sand, smooth pebbles, and salt-tolerant grasses.

Site Profile Tool

Category, Round 1: Priority, Round 2: Feasibility

Geological Factors	5/5	5/5
Hydrology	4/4	5/9
Land Status	1/1	2/2
Native Biodiversity	Kūpuna	2/7
Biocultural Value	7/8	N/A
Climate Sensitivity	2/2	9/10
Restoration	2/2	10/14
Key Threats	1/1	5/9
Cumulative	**95%**	**82%**

Priorities

Restoration and removal of invasive species is the top priority. The pools are impacted by invasive fishes, invertebrates, invasive plants and feral ungulates, which leads to artificial senescence. The pools are impacted by large wave and flood events and the input of additional beach stones and sediment. There is no development planned upslope of the pools, and the watershed is somewhat protected (but impacted by feral goats and invasive plants). The saltwater inundation of pools is manageable, and the severity of sea level rise is mitigated by suitable space to retreat.

Protection and Restoration Strategy Volume II: Anchialine Pools 16

Additional Anchialine Pool Hui Outcomes

- Sent out a monitoring & assessment questionnaire to the hui
- Aim to better understand current monitoring & assessment practices, along with needs and future aspirations

Responses suggest:

- Water quality and species diversity are the most common assessment methods
- Monitoring is common, but few respondents have formal monitoring plans

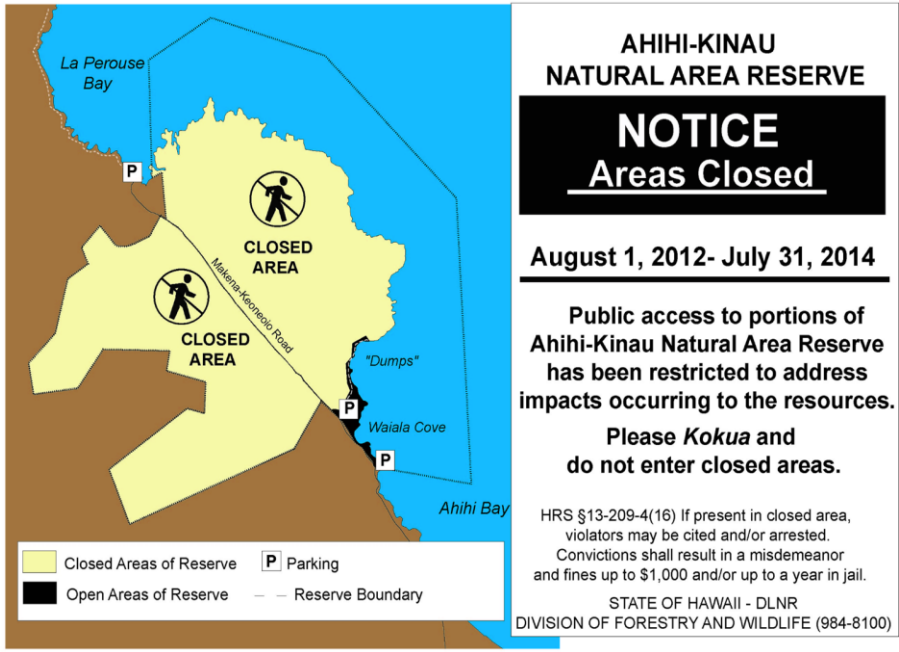
Protection & Restoration Strategy Outcomes

- A step towards establishing rules and regulations for anchialine pools
- Identified priority interventions to support restoration activities
- Engaged with stakeholders and facilitated discussion between DAR, DOFAW, and community organizations
- A better understanding and consensus amongst stakeholders on how to protect and restore marshes & anchialine pools




Next Phase: Completing the HWPP P&R Strategy

- Identify management priorities to support estuary P&R
- Host wetlands workshops on the 4 main Hawaiian islands
- Research regulatory mechanisms to improve P&R capacity for wetlands




Mahalo!
Any Questions?