



E Ola Mau Nā Manu o Kawainui! Live forever the birds of Kawainui!

This poster is dedicated to Charles Pe'ape'amakawalu Burrows, Susan Elliott Miller, and Muriel B. Seto.

Native species clockwise from upper left: pinao (dragonfly); ae'ō (Hawaiian stilt); 'akiohala or hau hele wai (hibiscus); koloa (Hawaiian duck, male); kalo (taro); kaluhā (sedge); 'auku'u (black-crowned night-heron); koloa (Hawaiian duck, female); 'alae ke'oke'ō (Hawaiian coot); 'alae 'ula (Hawaiian moorhen chicks in background, adult in foreground); 'o'opu nākea (freshwater goby fish); hapawai (freshwater mollusks); pinao naiad on kaluhā; neke (native fern); ae'ō (Hawaiian stilt); 'uki (sedge).

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Mahalo nui loa to the following individuals and organizations for sponsoring this year's poster: Isabella A. Abbott; Louis & Irma Agard; Leslie Agorastos; 'Ahaui Mālama I Ka Lōkahi; Aka'ula School; Allen Allison & Isabella Forster; Annette's Adventures; Ken Armstrong; Byron Barth & Morris Wise; Steve Bartlett; Stephen & Kathleen Berg; Amy Bernstein; Harold K. L. Castle Foundation; Moira Chapin; Cinnamon's Family Restaurant in Kailua; Charles Cook; Tom & Nancy Crawford, Jr.; Ralph & Heidi Elston; Environment Hawai'i; Beth Flint; Betsy Harrison Gagné in memory of Wayne C. Gagné; William Gilman & Casey Jarman; Robert B. Green; John & Marcia Harter; Hawai'i Audubon Society; Hawai'i Botanical Society; Hawai'i Department of Health Clean Water Branch; Hawai'i Department of Land & Natural Resources Division of Forestry & Wildlife; Hawai'i Forest & Trail; Hawai'i People's Fund; Hawai'i's Thousand Friends; Hawai'i Wildlife Fund; Nelson & Jennifer Ho; Lance Holter; Honolulu Zoo Society; Deborah Hootman-Ng; KAHEA: The Hawaiian-Environmental Alliance; Bob & Carol Keane; Kokua Hawai'i Foundation; Fred Kraus; Kulamānu Farm; Doug Lamerson; Dolores E. Layton; Julie Leialoha; Matt Little, National Wildlife Federation; Lyon Foundation; Mālama O Puna; Martin & MacArthur; Sharon McCarthy; Mark Merlin & Claire Shimabukuro; Dieter Mueller-Dombois; Na Maka O Ka 'Āina; National Audubon Society; Jay W. Nelson; Patricia Novsam; O'ahu Nature Tours; Office of Hawaiian Affairs; Steve, Gigi, & Kekoa Olive; Peiterson Family; Jay Pell; Peter & Myrtle Rappa; Pauline Sato; Rick Scudder, Ka'imi Ventures; Casey Seaman; Sierra Club, Moku Loa Group; Scot Lucas Spicer; Oswald & Ku'ulei Stender; Linda K. Stiefel; Sabina F. Switt; Rep. Cynthia Thielens; Umemoto Cassandro Design Corporation; U.S. Fish & Wildlife Service Honolulu; Mashuri Waite; Ron Walker; Jacey Waterhouse & Adam Spurgat; Tekla & Carlos Weber; Windward Ahupua'a Alliance; Marjorie Ziegler in memory of Alan Conrad Ziegler; and poster partners wishing to remain anonymous.



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*He 'o'opu ku'ia, ka i'a hilahila o Kawainui.
A bashful 'o'opu, the shy fish of Kawainui.
Said of a bashful person.*

– Mary Kawena Pukui, 'Ōlelo No'eau

Looking to the Past

Hele mai, come, and find a spot at Nā Pōhaku o Hauwahine. Settle in and gaze out over Kawainui Marsh. Feel the Malanai wind on your face and listen for the calls of the 'alae 'ula nesting below. Watch for the native sedge, 'uki, to turn yellow – a sign that the spiritual *mo'ō*



guardian of the marsh, Hauwahine, is present. Let the *mana* and the peacefulness of this place take hold and take you back to another time – about 250 years ago when Hawaiians cultivate fish in a vast

fishpond. The 450-acre inland pond is said to have the sweetest 'ama'ama found anywhere in the Islands. Surrounding the pond *mahi'ai* grow *kalo* in the many *lo'i* that are fed by the rushing waters of Maunawili and Kahana Iki streams. Adze makers grind the dense basalt they have quarried nearby to make their tools.

'Āina Momona: A Productive Land

This is a time when the productive and rich land of Kailua is the seat of political power in the Ko'olaupoko District of O'ahu. A powerful chief must have overseen the building of the massive Ulupō Heiau that rises 30 feet above the fishpond. Some traditions credit the building of this ancient structure to the *menehune*. The stones were passed from hand to hand, and according to different traditions, their source may have been Kualoa, ten miles away, or even distant Wai'anae.

Kāhuna are likely to conduct ceremonies at Ulupō to honor the gods Kāne and Lono to insure healthy crops and life. From the 140-foot wide stone terrace, powerful chiefs can see for miles over this 'āina momona. A spring at the base of the *heiau* seems to appear like magic and make its way down to the *lo'i* that surround the pond. Its

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small size belies its stature, as this spring is important in the ceremonies that occur here.

Nearby are two other *heiau* on the slopes of Ulumawao: Holomakani Heiau, which is attributed to Paumakua, a 10th century chief; and Pahukini Heiau, attributed to Tahitian chief, Olopana, in the 14th century.

Wetland Wildlife

The spring flows into *lo'i* and into the fishpond, where waterbirds search for food and find places to build their nests and raise their young. Listen for the calls of the *ae'ō* as they fly overhead. Watch them stalking the pond on those ungainly long, pink legs searching for small fish, crabs, or other invertebrates that dwell in the water. Another sharp-eyed stalker, the 'auku'u, is perching on a branch watching intently for fish below. The perfectly camouflaged 'o'opu *nākea* darts along the bottom of the pond, eluding these predators above. This native goby can even burrow into the bottom with only its eyes revealed. When the heavy rains come, it will swim closer to the bay to spawn. The fish larvae will spend five to six months in the ocean before returning to their freshwater home.

On the surface of the pond, sunlight dances off the ripples the 'alae *ke'oke'ō* creates as it swims and dives to scoop up *limu*. The sun's rays light up the fiery red bill of the 'alae 'ula as this native moorhen moves through the shallow water in search of food. Its bill is said to have been scorched when the bird brought the secret of fire to the people. Both birds are sacred to the goddess Hina, who can take the form of the Hawaiian coot or moorhen.

A pair of *koloa* searches for a suitable nesting spot among the tall bulrushes. The native sedges, bulrushes, and the abundant *neke* fern provide shelter for all of these birds in this watery home. The native hibiscus 'akiohala or *hau hele wai* has adapted to this aquatic environment too. Can you spot the *pinao*? When it skims and darts over the water in search of insects, the sunlight transforms its

wings to golden lace. This nimble flyer is the largest dragonfly in the United States. Watch it take off with front legs held together to form a "basket" that is custom-made for catching a meal on the fly!





Olomana, Ahiki, and Pāku'i

Looming silently more than 1,600 feet above all of the wetland activity, sits Olomana. This mountain bears the name of an O'ahu chief as well as a giant warrior. Olomana, the warrior, is said to have been slain here by Palila, a small and agile soldier who sought to put an end to the misdeeds of the lazy but powerful giant. Palila is said to have cut the giant in two and left half of him to be the mountain that bears Olomana's name. The three peaks of Olomana are Ahiki, Pāku'i, and Olomana. Ahiki and Pāku'i were *konohiki* who were keepers of the fishponds during the reign of the chief, Olomana.

One *mo'olelo* tells of a time when Pāku'i called the people of the *ahupua'a* to come and *kōkua* – help remove the *limu* that had overgrown Kawainui. A young red-haired boy, Kahinihini'ula, was among those who answered Pāku'i's call for help. He worked along side the people to clear the *limu*. At the end of the day the *konohiki* awarded fish from the pond to all who helped, but none was given to Kahinihini'ula. The boy went away disappointed, but returned the next day and the next to work, and each time he went away empty-handed. His grandmother was angry that the boy was not given fish like the others. She took him up to the forests of Maunawili, to the place where the life-giving rains gave birth to the waters that feed the streams, the *lo'i*, and the fishponds. There she showed him a very special tree – the Mākālei tree. He touched the tree and it was transformed into a branch. He carried this sacred branch down to the fishpond. When he placed the branch in the water all of the fish – the *'ama'ama*, *awa*, and *'o'opu* were drawn to it. The fish gathered around the Mākālei branch and then followed Kahinihini'ula upstream into the uplands of Maunawili. When the *konohiki* returned and saw that the fish were gone, he knew he had made a terrible mistake. He apologized to Kahinihini'ula for not sharing with the boy. Kahinihini'ula forgave him and the fish returned to Kawainui.

Kawainui Today

Look out over Kawainui, "The Great Freshwater," and see a place where native plants and animals are returning after years of decline. Kawainui, like wetlands statewide, has witnessed many changes. By the 1880s, Chinese farmers were cultivating rice where the *lo'i kalo* had flourished. Around 1920, the marsh began to form as disturbances to upland areas caused silt to fill in the abandoned rice fields and fishponds. Cattle were released to graze on the marsh grasses and, sadly, a cattle pen was constructed on the stone terrace of Ulupō Heiau. Alien invasive grasses and plants, such as cattail, moved into the marsh and began to replace native plants. As the marsh silted in, waterbirds lost the open water habitat they need to thrive. Additionally, introduced animals, such as rats and mongooses, along with feral cats and dogs prey on the eggs and young of these ground-nesting birds.

To bring back Kawainui, many dedicated groups and individuals give generously of their time to *mālama* this special place. Residents and visitors help care for Kawainui Marsh and its cultural sites. They restore *lo'i*, remove alien species, and replant native species. They learn the stories of Kawainui and watch anxiously for the *'alae 'ula* to come into view, knowing these endangered birds have completed another successful nesting season. They watch from Nā Pōhaku o Hauwahine and see the *'uki* turn yellow, a sign Hauwahine is present. They feel the Malanai wind and let the peacefulness of Kawainui take hold.

Malanai Wind

The Malanai wind is referred to in a chant of Hi'iaka as she responds to her traveling companion, Wahine'ōma'o, about the two beautiful women they spot sitting on the bank of a stream near Kawainui fishpond. Hi'iaka knows them to be *mo'o*, but Wahine'ōma'o doubts this. Hi'iaka tells her that, "I will chant and if they remain where they are, they are human, but if they vanish, they are lizards."

"Kailua is like hair tousled by the Malanai wind,
The leaves of the uki are flattened down,
You are startled as though by the voice of a bird,
You think they are human
But they are not.
That is Hauwahine and her companion,
The supernatural women of peaceful Kailua."

Upon hearing her chant, Hauwahine and Kilioe disappear.

Rocks and Sediments Tell a Story

The dense rocks of Olomana tell the story of a fiery birth in the large caldera of the Ko'olau Volcano, which formed about 2.5 million years ago. These massive dike rocks and the large boulders at Nā Pōhaku o Hauwahine are erosion-resistant remnants of the caldera. Imagine Kawainui, which lies above the approximate center of the Ko'olau caldera, to be a volcanic crater where magma fed to the surface and lava once flowed. Scientists have discovered evidence on the ocean floor of a massive landslide that took away much of this caldera along with a good portion of the northeastern side of the Ko'olau Volcano.

Scientists have taken core samples in the marsh sediments that date back 4,000 to 6,000 years ago. These sediments reveal three distinct layers and "reading" them is like turning the pages of a book that takes us back in time:

- The reef layer (down to about 125 feet) is composed of marine sediments from a time when sea level was higher and Kailua Bay extended well inland.
- The lagoon layer: Approximately 3,000 years ago, a large sandbar began forming across Kailua Bay, which set the stage for the lagoon layer. By the time Polynesians arrived, about 1,500 years ago, they may have sailed into Kawainui lagoon that formed behind the sandbar. The fine-grained clays from this lagoon layer overlay the reef deposits in the core samples taken from the marsh.
- The top layer of sediment is the marsh layer, which is made up of peat and the roots of plants growing in the marsh today. The peat is composed of dead plant material that built up in the acidic and low-oxygen environment of the marsh. What you see today is a floating grass mat, which in some places is floating atop 60 feet of fresh water!

Native Plants and Animals Featured on Poster

'akiohala or hau hele wai – hibiscus (*Hibiscus furcellatus*)

kaluhā – bulrush (*Bolboschoenus maritimus*)

neke – fern (*Cyclosorus interruptus*)

'uki – sedge (*Cladium jamaicense*)

ae'ō – Hawaiian stilt (*Himantopus mexicanus knudseni*)

'alae ke'oke'ō – coot (*Fulica alai*)

'alae 'ula – moorhen (*Gallinula chloropus sandvicensis*)

'auku'u – black-crowned night-heron (*Nycticorax nycticorax hoactli*)

koloa – Hawaiian duck (*Anas wyvilliana*)

'o'opu nākea – goby (*Awaous guamensis*)

pinao – dragonfly (*Pantala flavescens*)

All of Hawai'i's endemic waterbirds – the *ae'ō*, *'alae ke'oke'ō*, *'alae 'ula*, and *koloa* – are listed by the state and federal governments as endangered species. Historically, these endangered waterbirds were found on all of the main Islands, except Kaho'olawe and Lāna'i. Data collected by the U.S. Fish and Wildlife Service over the past 30 years show that the number of *ae'ō*, *'alae ke'oke'ō*, and *'alae 'ula* are either stable or increasing. The number of *koloa* is more difficult to estimate since the birds are hybridizing with related mallard ducks. The loss of habitat and predation by alien species are the biggest threats to the survival of these birds. Today, Kawainui is being maintained by the State and citizen organizations. Plans are underway to restore more waterbird habitat.

We All Need Wetlands

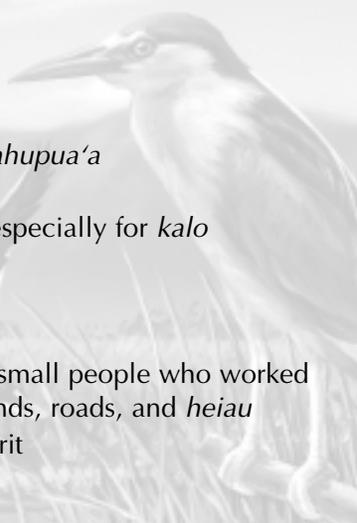
There was a time when many people viewed wetlands, such as Kawainui Marsh, as wastelands. The pressure to drain and develop wetlands has been intense, which makes the efforts of knowledgeable citizens vital in the struggle to save these wet and wild places. Wetlands...

- control flooding during heavy rainfall
- trap pollutants and silt, which helps to protect coral reefs
- provide habitat for native plants and animals, including migratory birds
- may contain important cultural sites – vital links to the past that need to be protected
- provide educational sites for students
- offer sources of inspiration and peaceful places we can all enjoy



Hawaiian Terms

ahupua'a – land division, often extending from mountain summits to outer edge of the reef
'āina momona – “fat” productive land
heiau – temple; place of worship
hele mai – come
kāhuna – priests
kalo – taro
kōkua – help
konohiki – overseer of *ahupua'a*
limu – algae
lo'i – irrigated terrace, especially for *kalo*
mahi'ai – farmer
mālama – care for
mana – divine power
menehune – legendary small people who worked at night to build fishponds, roads, and *heiau*
mo'o – lizard; water spirit
mo'olelo – legend



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Mālama Our Wetlands

Many coastal areas in the Hawaiian Islands formerly had wetlands. Today, most of the wetlands have been drained and developed. To protect the endangered waterbirds and all of the native wetland plants and animals, it is essential that we *mālama* all of our remaining wetlands.

What can you do?

- Control your pets. Do not let them run wild near wetlands. Cats and dogs prey on ground-nesting birds and eat their young and eggs.
- Volunteer to help restore wetland habitat by pulling invasive plants and replanting native species.
- Use organic fertilizers and natural pest controls to prevent pollutants from entering streams and wetlands.
- Educate others about the value of wetlands and why we need to protect them.
- Support legislation to allocate funding for the protection of wetlands and endangered species that rely on these environments.
- *Mālama* Kawainui! It is the largest wetland in the state, covering approximately 1,000 acres.

Curriculum Materials, Wetland Field Trips, & Service Projects

- 'Ahuhui Mālama I Ka Lōkahi offers natural and cultural history tours of the Kailua *ahupua'a* and Kawainui Marsh. 'Ahahui's website lists dates for these tours as well as information for groups wanting to volunteer for service projects. See ahahui.net
- Hawai'i Nature Center offers wetland field trips for Grade 3 classes to Honouliuli National Wildlife Refuge. See hawaiinaturecenter.org/school
- Moanalua Gardens Foundation offers class and field trip sessions on wetlands & waterbirds of Hawai'i for Grades 3-6. A class session precedes the multi-stop field trip that includes the James Campbell National Wildlife Refuge in Kahuku. Participating teachers may also utilize the Foundation's Wetlands & Water Birds Teacher Resource Kit. Free downloads of related 'Ōhi'a Project lessons are also available. See mgf-hawaii.org.
- Pacific American Foundation. 2007. *Project Aloha 'Āina. A Teacher's Guide to the Ahupua'a*. Pacific American Foundation. Honolulu, HI. The Grade 3 teacher's guide focuses on wetlands and includes a field trip to Kawainui Marsh for O'ahu students and 'Ōhi'apilo for Moloka'i students. See thepaf.org

This poster can be found at the Conservation Council for Hawai'i website: conservehi.org. For copies, contact CCH at 808 593-0255 or info@conservehi.org.