

# HAWAI'I WETLAND INFORMATION NETWORK

## Wetland Site Description

### ‘Āhihi-Kīna‘u Natural Area Reserve **Hālua and Kauhioaiakini Ponds**

**Island:** Maui

**Ahupua‘a & Moku:** Kualapa ahupua‘a of the Honua‘ula moku

**USGS Watershed:** La Perouse Bay (HUC12: 200200000504)

**HI DBET Watershed:** ‘Āhihi-Kīna‘u

**HI DAR Watershed:** None

**Lat/Long Coordinates:** Hālua Pond: 20°35'49"N 156°25'47"W

Kauhioaiakini Pond: 20°35'52"N 156°25'42"W

**Ownership/Management:** Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW).

**NWI Wetland Types:** Estuarine

#### **Fascinating Fact**

The first European to arrive on Maui was French explorer Jean-François de Galaup, Comte de La Pérouse, who came ashore in the Bay of Keone‘ō‘io, now known as La Pérouse Bay, located on the south end of AKNAR.

The word "anchialine" is derived from the Greek word "anchialos", meaning near the sea.

#### **Ecological Significance**

The anchialine pools at AKNAR contain only native Hawaiian biota! This is rare as only 5% of anchialine pools in Hawai‘i have not been invaded by non-native species.

#### *Learn more....*

Anchialine pools found pocketed amongst the lava flows near the shoreline at ‘Āhihi-Kīna‘u Natural Area Reserve are in and of themselves a rare and unique ecosystem supporting a suite of native biota. But, these particular pools also support the highest diversity of anchialine shrimp in the Indo-Pacific, half of which are designated as candidate species for listing under the Endangered Species Act. The State of Hawai‘i established Natural Area Reserves (NAR) to protect the best representations of intact ecological and geological systems in the state. By containing these anchialine pools, the most biologically intact and diverse aquatic habitats in Hawai‘i, ‘Āhihi-Kīna‘u was designated as the first NAR in 1973 and is the only NAR that extends into the ocean to include marine resources.

#### **Geography**

The Hālua and Kauhioaiakini Ponds are brackish anchialine pools within the ‘Āhihi-Kīna‘u Natural Area Reserve (AKNAR), a 2,045 acre state-owned site on the southern tip of Maui that encompasses Cape Kīna‘u and adjacent marine environment. Cape Kīna‘u is almost entirely unweathered, rough ‘a‘ā lava which slowly discharged from the Kālua O Lapa cinder cone, also located within AKNAR, only 200 - 750 years ago. This lava spilled out into the Pacific Ocean, creating ‘Āhihi Bay to its northwest and the Sea of Keone‘ō‘io (La Pérouse Bay) to its southeast.

The 0.4 acre Hālua Pond is within 30 yards of the ocean on the southern edge of Cape Kīna‘u, just beyond a small kīpuka, a small vegetated oasis surrounded by lava. The lava surrounding the oblong, basin-like Hālua Pond averages 3 feet above average mean sea level (amsl), while the larger Kauhioaiakini Pond is part of an intricate complex of anchialine pools located just 200 yards inland in lava that gradually slopes seaward from 24 to 12 feet amsl.

AKNAR is in the leeward rain shadow of Haleakalā, sheltering it from the precipitation-laden northeasterly trade winds coming across the island. Rather, this area is subject to the winter Kona winds coming from the south and west, bringing only 14 to 15 inches of rainfall to the coastline where the Hālua and Kauhioaiakini Ponds are located. The fresh black lava accentuates the already hot conditions, absorbing solar radiation and creating a warmer climate here than in surrounding areas.

There are no streams anywhere near AKNAR because the young, highly porous basaltic lava is incapable of carrying water along its surface. Instead, groundwater and sea water mix in a subterranean network of interstitial spaces and lava tubes, creating a brackish environment that is occasionally exposed to the atmosphere via the anchialine pools. This groundwater comes from a freshwater perched aquifer sitting on an impermeable substrate layer within the Kama‘ole formation and/or the slightly brackish basal aquifer floating on top of sea water within the porous volcanic rock underneath the island.

Beginning in the 1970's, Maui began experiencing a population boom that made the preservation of AKNAR even more imperative. In 1973, AKNAR was the first reserve established under the Natural Area Reserves System (NARS) of DOFAW whose mission it is to protect natural resources first and compatible public uses secondarily. Among these natural resources are many anchialine pools, a sensitive microcosm of habitat that is incredibly rare worldwide. The Hawaiian Islands have the greatest known concentration of anchialine pools in the world and represent the only ecosystem of its type in the entire United States. Hālua and Kauhioaiakini Pond are the largest pools on Cape Kīna‘u, whose suite of anchialine pools are considered the most biologically intact and diverse aquatic habitats in Hawai‘i.

Additionally, this reserve protects fragile coral reefs, coastal marine habitats, native shrublands and forests, and a culturally significant landscape, all of which are within one of the most recent and fully intact lava flows on Maui. Before the value of these biological and cultural resources were fully appreciated, Cape Kīna‘u was used for bombing practice by the Navy from 1945-46, leaving remnant munitions throughout the area. AKNAR sits adjacent to a large private ranch, a few residences, state-owned Hawai‘i Department of Hawaiian Home Lands, and the Hawaii Humpback Whale National Marine Sanctuary off its coast.

### **Soils**

No official soil types are classified in either pond. Rather, their substrate is composed completely of lava flows, ‘a‘ā (rLW) originating from the Kālua O Lapa cinder cone in one of the youngest lava flows on Maui.

### **Hydrology**

Like all anchialine pools, the depths of the Hālua and Kauhioaiakini Ponds vary with the tides, but Hālua is basin-like and can measure more than 16 feet deep. Kauhioaiakini is further inland and not as deep as Hālua, with a more undulating shoreline of shallow bays and surrounded by a complex of smaller pools. The ebbing and flowing tides mix with groundwater in the underground environment

underneath AKNAR, resulting in variable salinities (8 - 22 percent) and water temperatures (71.5°F - 82.5°F) in the pools. Neither of these estuarine subtidal wetlands ever fully expose their unconsolidated bottom substrates (E1UBL). This landscape of highly porous basaltic lava with no formed soils is incapable of having streams, drainages, or significant surface water features. In fact, the only other inland water features in the area are other smaller anchialine pools within AKNAR.

### **Ecology**

AKNAR was established to protect a wide range of coastal natural resources within a landscape unimpeded by structures, artificial lights, noise, and relatively few human impacts. This protection provides habitat connectivity for species sensitive to these disruptions like seabirds, bats, and flying insects that move across the landscape. In fact, all of the land within the reserve is considered critical habitat for the endangered 'ōka'i 'aiea (Blackburn's sphinx moth) that drinks nectar from the sweet smelling flowers of the pilo shrub (Hawaiian caper) that blooms at night.

Anchialine pools are their own unique ecosystem supporting crustaceans, snails, sponges, tunicates, aquatic insects, and algae, but despite appearing to be physically separated from each other, they are not isolated. Rather, the small pool inhabitants are able commute between the pools via volcanic pores and tiny fissures in the brackish to saline subterranean environment. The flagship fauna of AKNAR's anchialine pools are their native anchialine shrimp, the diversity of which is the greatest known in the Indo-Pacific. Unfortunately, this diversity is fragile, with five of the ten species of shrimp designated as candidate species for listing under the Endangered Species Act. These shrimp are critical to the ecology of the pools, as their grazing activity on foods trapped in the orange-yellow mat of cyanobacteria coating the pool edges and shallows also maintains the mat itself. Migratory waterfowl, shorebirds, and native Hawaiian waterbirds like the ae'o (Hawaiian stilt) swim and forage in the pools, with one or two ae'o successfully nest each year at Kauhioaiakini Pond.

The Hālua and Kauhioaiakini Ponds are situated amongst young, porous, rough 'a'ā lava on which almost no vegetation grows except for some lichen and an occasional plant in a crevice. However, these pools and their immediate surroundings are bastions of life, inhabited by both native plants like beaked ditch grass and non-native plants like 'ākulikuli kai (pickleweed). Non-native and even aggressive native vegetation like milo (portia-tree) has the potential to overrun the pools, filling them up with dense organic matter and disrupting their delicate balance. While control of these plants is possible through physical removal, staff must be mindful not to trample the loose ashy cinder burrows surrounding the pools made by the native wolf spider. Between Hālua Pond and the ocean is a small kīpuka (vegetated oasis within the lava beds), which are remnants of a lowland dry ecotype on Maui, most of which has been destroyed or taken over by non-native plants.

While these anchialine pools are relatively pristine, they face the constant threat of anthropogenic disturbance in part due to AKNAR's heavy recreational use, with around 250,000 visitors per year in the mid 2000's. The Hālua and Kauhioaiakini Ponds are over 0.5 miles from the Mākena-Keone'ō'io Road and a public parking area, but some of the pedestrian trails that spaghetti throughout the reserve go directly to both pond areas and on through to the shoreline. Footprints have been found in the pools and shrimp harvesting is suspected. The potential for further impacts has been reduced with the closure of 90% of ANKAR's land area in August 2008 for public safety reasons and several rangers patrol the reserve to educate its visitors to the sensitive nature of the reserve's natural resources. Still, developments continue to encroach southward from the resort towns of Wailea and Mākena, increasing