

Preface and Acknowledgments

Maunalua is a traditional land division and bay located in the southeastern tip of O'ahu in the Hawaiian Islands. This area historically claimed a vibrant and bountiful coastal ecosystem. However, dramatic degradation of its 'āina (land), wai (fresh water), muliwai (estuaries or enclosed waters) and kai (sea) have been observed over the past 80 years by resident kūpuna (elders).

Maunalua community members and the Pacific Islands Fisheries Group (PIFG)¹ strongly felt that the stories of these kūpuna and nā lawai'a (fishermen)² who fish Maunalua would provide an understanding of the events leading to these substantial changes. They also believed that sharing the collective experiences of those who lived, fished and played in Maunalua could inform current and future generations about important traditions once used to protect the beauty and bounty of Hawai'i, such as kuleana (responsibility) and the mauka-makai (mountain-sea) relationship.

In early 2022, PIFG initiated a literature search of the area's history and sought residents, fishermen and visitors of Maunalua to interview about the changes they have observed. Then on an especially gorgeous day on the bay in August, PIFG gathered community members at the historical Bayer Estate on the shores of Maunalua at Wailupe, O'ahu. The talk story with Uncle Frank Farm, Uncle Charles Ka'ai'ai, Uncle Bob Sing, Uncle Roy Morioka, Leonard Yamada, John Clark, Chris Cramer, Dennis Wong, Dean Sensui, Brendt Chang, Mike Sur, Brian Funai, Clay Tam and Mark Mitsuyasu was recorded as they recalled their experiences and the changes they have witnessed at Maunalua during their lifetimes. PIFG recognizes that the group represents a small fraction of the kūpuna who reside within Maunalua and looks forward to documenting additional talk story sessions in the future.

The following is a brief summary of what has been learned through this effort.

¹ PIFG is a 501c(3) established in 2005 to perpetuate Pacific Island culture, tradition and heritage through awareness and active engagement in the responsible management and conservation of island fishery resources.

² The term "fishermen" is used to refer to both men and women engaged in this activity at the request of the women.

Overview

Maunalua is an area with a rich history, and one that was significant to the Hawaiian royalty. The name Maunalua means "two mountains," in reference to the peaks Kohelepelepe (Koko Crater, elevation 1,207 feet, or 368 meters) and Koko Head (elevation 645 feet, or 197 meters).

Historically, Maunalua was originally an 'ili kupo (small land division) in the ahupua'a (traditional land resource division) of Waimānalo in the moku (traditional political district) of Ko'olaupoko. Today, some recognize Maunalua as an ahupua'a of Waimanalo, but was made part of the Honolulu District in 1859 (King 1935:216). Many know the area as Hawaii Kai. (Ko'olaupoko Hawaiian Civic Club n.d.)

Maunalua Bay (also historically known as Wai'ālae Bay; see map on the front cover from early 1900s) extends from the 'ili of Maunalua in the Waimanalo ahupua'a, moku of Ko'olaupoko, to the Wai'ālae ahupua'a in the moku of Kona (figure 1). This area

encompasses seven miles of shoreline and 28 square miles of land, extending to the summit of the Ko'olau mountains.

Following Western contact, significant physical, ecological and cultural ruin was inflicted on the 'āina (land), wai (fresh water), muliwai (estuaries or enclosed waters) and kai (sea) of Maunalua and Maunalua Bay. Damage was largely a result of urban expansion and associated development, which accelerated in the years following Hawai'i statehood in 1959. Careless deviation from the Hawaii State Planning Act, codified in Chapter 226 of the Hawai'i Revised Statutes, resulted in the decay and loss of Maunalua's historical legacy—the beauty, rural nature and lifestyle that are the essential characteristics of old Hawai'i.

By remembering and readopting traditional Native Hawaiian stewardship practices, it is possible to rectify, in part, the failure by the state and its residents to fulfill their kuleana (responsibility) to Maunalua. Doing so could ensure the sustainability of Maunalua's remaining resources for the benefit of its residents and visitors alike.

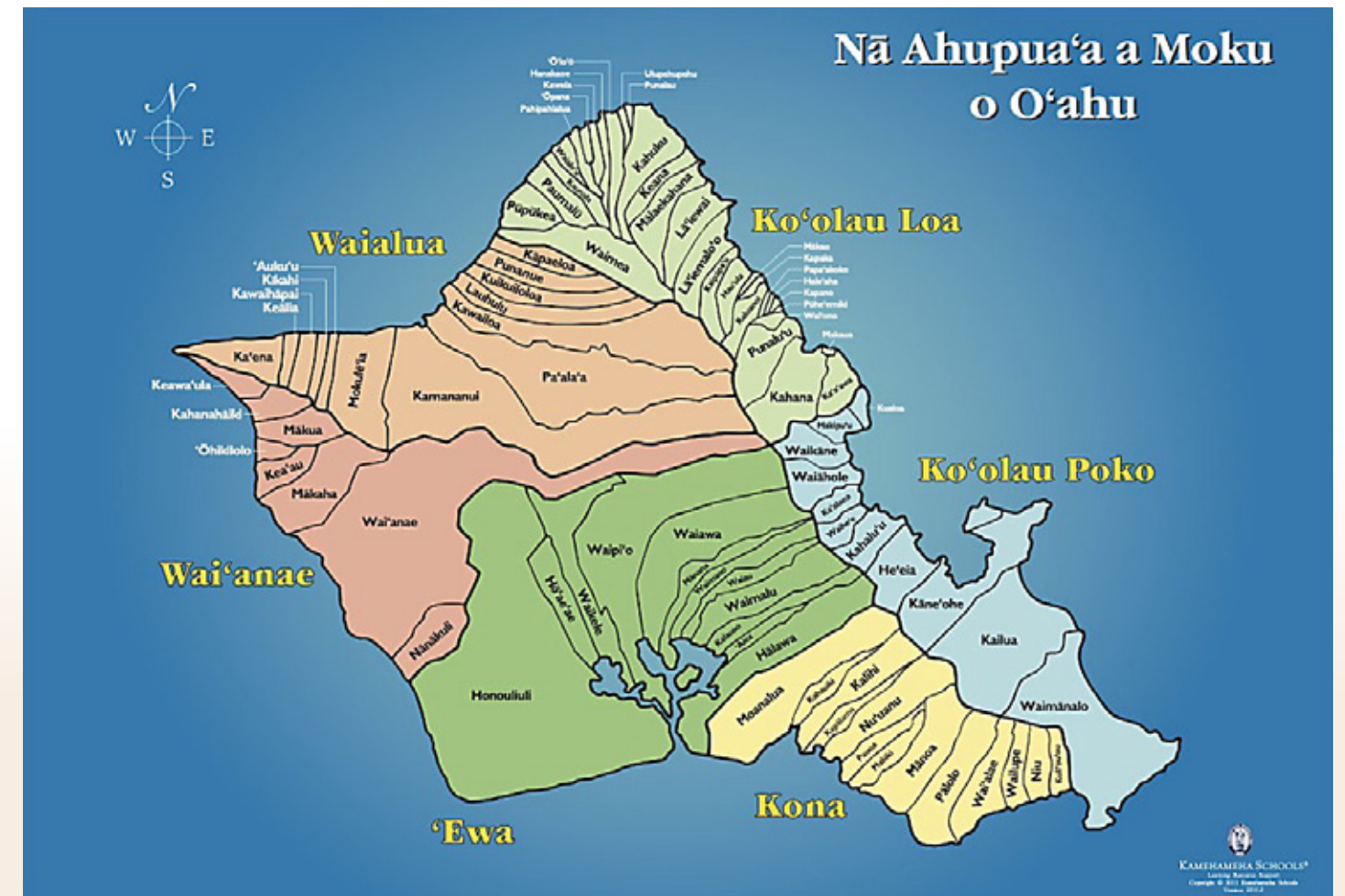


Fig. 1. Maunalua is located in the southern section of the Waimanalo ahupua'a in the moku of Ko'olaupoko. Maunalua Bay extends from the southern point of the moku of Ko'olaupoko to the southern point of the Wai'ālae ahupua'a in the moku of Kona. Source: Kamehameha Schools.

Maunalua before Western Contact

According to *mo'olelo* (Native Hawaiian narratives), Maunalua was a landing spot of some of the early Polynesian people coming to Hawai'i from central Polynesia (Place Names of Hanauma n.d.; Takemoto et al. 1975). It is said that Pele, the fire goddess, had a fondness for Maunalua. Another story about Maunalua concerns a sacred drum that traveled from Kahiki (possibly Tahiti or elsewhere in Eastern Polynesia) and was placed in Hawea *heiau* (Native Hawaiian temple).

Self-sustainability was a way of life for Native Hawaiians. The inhabitants of Maunalua were probably mainly fishermen, but the area was also known for its sweet potato farming. Marine life caught in the area include 'ama'ama (native striped mullet, *Mugil cephalus*), *akule* (scad), goatfish and octopus.

Early inhabitants developed many ways to provide for themselves. One was the practice of *kapu* (forbidden activities). This system was used, for example, to manage and regulate resource access and use. Species or areas were restricted depending on biology, season, community need and the close monitoring and understanding of the ecosystem. Another practice was *kuleana* (responsibility) as expressed in the saying “*E malama 'oe I ka 'āina, e malama ka 'āina ia 'oe*” (“Take care of the land, and the land will take care of you”).

Loko i'a (fishponds) was another practice that allowed ancient Hawaiians to be self-sustaining. Fishponds were believed to have been built around the 15th century and were used to cultivate and harvest fish. Maunalua Bay was particularly prominent for its numerous fishponds and was renowned for its 523-acre *loko i'a* called Kuapā or Keahapua-o-Maunalua (the shrine of the baby mullet of Maunalua). Fishponds were essential to the community as they allowed fish to be harvested during the seasonal *kapu* when fish spawned. Because of the fishpond's importance to isolated island communities, controlling one or more fishponds was considered a symbol of chiefly status and power (Young 2019).

Maunalua Early History to Modern Times

In 1786, Captain Portlock, a British captain who commanded the ships *King George* and *Queen Charlotte*, dubbed Maunalua Bay as “King George Bay,” but that name did not last long (Maunalua.net n.d.(a)).

During the Great Mahele (division) in 1848 by Kamehameha III, Maunalua was awarded to Victoria Kamamalu, who was the sister of Kamehameha IV and V and the granddaughter of Kamehameha the Great. The Mahele allowed fishponds to become private property and a part of the adjoining land (Young 2019). The Mahele and the privatization of specific resources

such as the fishponds spelled the beginning of the end for areas such as Maunalua. In 1856, Maunalua was leased to William Webster for cattle ranching and then transferred to Bernice Pauahi Bishop in 1866 after Kamamalu's death.

Throughout the 1900s and especially after WWII, the *loko i'a*, *muliwai* and surrounding lands of Maunalua Bay were dredged and filled to accommodate the demand for cattle ranching and dairy farming and then as real estate for housing development (Atkinson 2007). Urban development spiked after January 1, 1960, when the majority of farming and ranching leases expired. Many farms sat idle in 1959 in preparation for their upcoming expiring leases (Atkinson 2007).

These changes devastated fishponds, compromised native marine habitats and drastically reduced Maunalua Bay's capacity to provide fish for the island. By 1960, only 14 of the 74 fishponds on O'ahu were still in use. As time progressed, the bay experienced many more developmental changes that led to its current disintegrated state.

Maunalua Bay Fisheries and Fishponds

In 1778, O'ahu had the greatest number of fishponds of all the Hawaiian Islands (Atkinson 2007). A prominent contributor to fishponds on O'ahu was Maunalua Bay. At one point in time, the fish caught in the bay accounted for over 80 percent of all money earned from fish caught throughout the islands (Takemoto et al. 1975). However, fishing activity has since significantly diminished, with fishery landings declining by 90 percent in 1966. This decline has been attributed in large part to changes to the ecosystem and habitat loss resulting from urban development, e.g., dredging and filling fishponds for real estate (Mālama Maunalua 2006). Much of Maunalua Bay's original land and coastline have been forever lost to development and cannot be fully restored back to what they were in the 1700s.

Wai'alaie (mudhen water) is an area split into two smaller divisions known as Wai'alaie Nui (large) and Wai'alaie Iki (small). This area is also known as **Kahala**, the Hawaiian name for amberjack, one of the fish that were caught in abundance there (Cassady 2022). In 1887, Daniel Paul Rice Isenberg invested in a 3,000-acre ranch in the Wai'alaie area. Eleven years later in 1898, Theodore Lansing began construction of a residential district. Wai'alaie soon became a thoroughfare for areas such as Kapahulu, Kaimuki and Koko Head as well as a place for business as infrastructure and transportation capabilities increased in the early 1900s. The Royal Hawaiian Hotel and Waialae Golf Course began construction in 1927, and, on July 1 of the same year, the Isenberg ranch was converted into a clubhouse for the golf course. More houses were built along the beachfront in the 1930s, and, following a petition passed on December 20, 1938, more than 50 pig farms were removed due to concerns about rat and mice infestations (Young 2016).

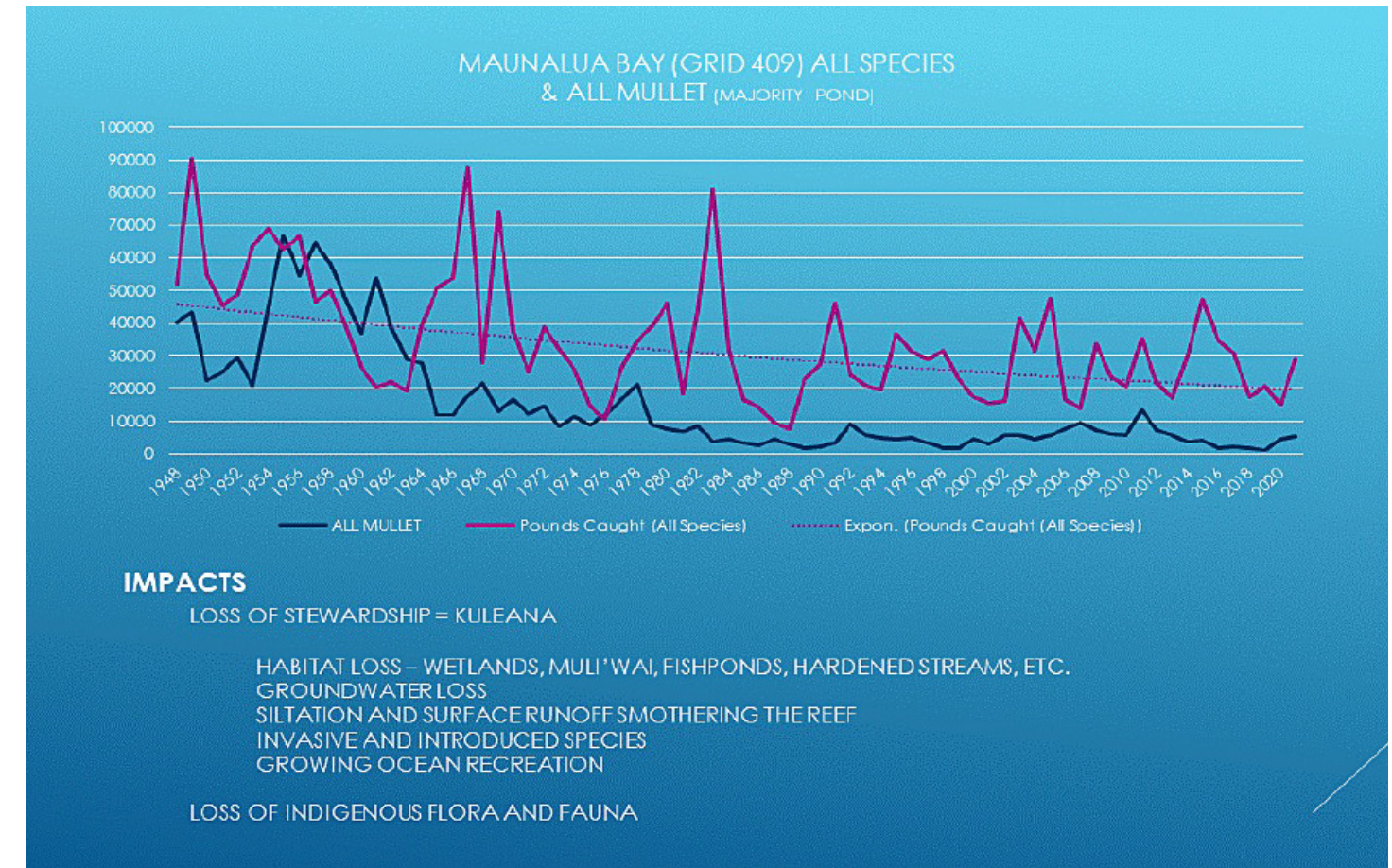


Fig. 2: Fisheries data for Maunalua Bay. Data source: Hawai'i Division of Aquatic Resources, Department of Land and Natural Resources

Wailupe, or “kite water,” was one of the only places kites were permitted to be flown. The area is now commonly known as **Āina Haina**. In the 1880s, the area was used for ranching and dairy farming under John Perry. It was then transitioned to dairy under the Hind family in 1924. The Hinds bought 2,090 acres of land, thus the area eventually being renamed to Āina Haina (Hind's land) (Young 2013). In an interview with Carolyn Fujishima, Chris Cramer of the Maunalua Fishpond Heritage Center, shared a story about how her grandfather, Sankichi Nakano, learned how to take care of the Wailupe fishpond from the Hawaiian community. Nakano's life revolved around caring for the pond sleeping according to moon phases and tides. Fujishima explained how her grandfather was devastated when the military took control of Wailupe fishpond during World War II. The end of World War II and the return of veterans increased the demand for housing (Vukelich 2019). Fishponds in the area were filled in 1945 and then again in 1947, creating today's Wailupe Peninsula and Wailupe Circle (Franklin 2007; Young 2013).

After the closure of the Hind-Clark Dairy operation in 1948, the Wailupe area transitioned to real estate in 1949. The residential subdivision was finally finished in 1957 under Robert Hind's son, Robson (Atkinson 2007; Honda 2020).

Niu (meaning “coconut”) and **Kuli'ou'ou** (meaning “sounding knee drum”) were formerly the location of Kamehameha the Great's summer home. These lands were claimed by Alexander Adams in 1848 after the Great Mahele. The area contained two large gulches, substantial springs or subsurface flow, and agricultural terraces.

Aside from fishing and fishpond cultivation, Niu was also used for cattle operations in the late 1800s. Then in the 1940s, **Niu** and **Kupapā fishponds** were filled to create Niuiki Circle, also known as Niu Peninsula (Maunalua.net n.d.(a)). In the 1950s, post-World War II demand for real estate further increased. The population and urbanization of the area expanded with the purchase of second homes by investors (Atkinson 2007). This process of growth



Figure 3: Lucas Pond. Hawaii News Now photo.

eventually led to the east end of Niu beach being lost to erosion between 1971 and 1975 (Climate Resilience Collaborative 2021).

Among the other fishponds in Niu Valley is **Kalauha'īha'ī**. Formerly Kamehameha the Great's *kalo* (taro) patch, Kalauha'īha'ī was a thriving fishpond due to its freshwater artesian spring, where fish such as *awa* (milk-fish), *āholehole* (flagtail) and mullet were cultivated. It is also known as **Lucas Pond** (figure 3), named after the family that inherited it from King Kamehameha. The pond was used until the 1990s, when its freshwater supply was disrupted by the Kalaniana'ole Highway widening project. This fishpond is now under the care of the Maunaloa Fishpond Heritage Center.

Kānewai Fishpond located at the western boundary of Kuli'ou'ou valley is fed by one of the few remaining freshwater springs on O'ahu. It feeds the *muliwai* or estuary for a wide variety of native fish and endangered waterbirds including the few remaining endangered *ae'o* (Hawaiian stilt) and native fish. Noted Ewa Limu expert, Henry Chang Wo, explained Kānewai Spring as "where the mountain gives birth to the ocean." This pond is also under the stewardship of the Maunaloa Fishpond Heritage Center.

Paiko Lagoon is named after Manuel Paiko, who raised cattle commercially on half of the Kuli'ou'ou *ahupua'a* in the 1870s. The area naturally formed the Paiko peninsula and lagoon from a naturally expanding sandbar around the 20th century. It was eventually stabilized by housing and vegetation in the 1930s. This lagoon is located at the west entrance of a marina and is an area that miraculously avoided the housing development trend in the 1960s. In 1959, the City and County of Honolulu planned for 25 acres of the lagoon to be dedicated to housing development and creation of a harbor and marina. However, community efforts to preserve the lagoon as a coastal bird habitat prevented the development. The lagoon was dredged in 1972 to remove intertidal flats and obnoxious odors. It was converted into a marine embayment and bird sanctuary in 1974 for endangered native Hawaiian birds, such as the stilt (Atkinson 2007).

Kuapā Pond, also known as Keahapua-o-Maunaloa, is located in the *'ili* of Maunaloa, Waimanalo *ahupua'a*. It historically encompassed 523 acres and was the largest fishpond on O'ahu (figure 4). Changes began taking place in 1888 when Charles Bishop leased the area for 10 years to S.M. Damon and G.J. Campbell for cattle ranching. From 1900 to 1926, Damon established the Maunaloa Ranch Company, which worked with mules, pigs, horses and cattle. Additionally in the 1920s, the area was leased to the Honolulu Honey Company to operate eight apiaries. From the 1930s to the 1950s, 15 percent of the area around the pond produced 60 percent of the flowers, pigs and lettuce on O'ahu. Consequently, this boom in productivity caused the region to become an odiferous area (Atkinson 2007). Kuapā became increasingly silted over the years resulting in 5 to 6 feet of mud. Still, by 1960, Kuapā was one of the last 7 out of 74 fishponds on O'ahu to be stocked and tended.

California entrepreneur Henry J. Kaiser began operations to transform this pond into a marina in 1959. The pond and Maunaloa Bay were dredged to create the 260-acre marine embayment now known as the Hawaii Kai Marina (Atkinson 2007). The former pond is reinforced with retaining walls and now has two rim islands created from dredged material deposits (Atkinson 2007; Young 2012). In April 1961, Kaiser leased 521 acres from the Bernice Pauahi Bishop Estate to build residential homes around the marina and on the two rim islands (Atkinson 2007) (figure 5).

Ecological Impacts

Natural effluents from farms, dairies and ranches once added to the vibrancy of the Maunaloa Bay. Old-timers recalled the decaying biomass of thick black mud that accumulated along the shoreline creating habitat for crabs and shrimp and most likely providing nutrients for the flora and fauna. However, most of the ecological impacts of development have had been overwhelmingly negative for Maunaloa's marine inhabitants. Today, pollution, non-native species, erosion and the loss of native marine life plagues the bay.

Dredging and filling of fishponds, building over permeable lands on hillsides and valleys, channelizing and hardening stream beds, and developing road and highway drainage systems have caused runoff water and sediments to enter into and pollute the bay. Increased sedimentation in particular has been a major cause of the bay's declining health. Sedimentation nine times higher than its historic natural rate has smothered coral and other marine life, introduced bacterial disease and affected the reproduction of some species (Atkinson 2007).

A 2005 study also revealed changes in water quality and turbidity due to sediment and pollutants from activities such as dredging and filling. In 1961, Kuapā pond was filled, reducing



Fig. 4. Kuapā fishpond circa. 1915. Maunaloa.Net photo



Fig. 5: Hawaii Kai today. Locations Hawaii'i photo

it to less than 300 acres from its original 523. Furthermore, the opening of a new main channel into the pond in 1959 caused an increase in salinity levels, and the pond was no longer able to support the estuarine environments due to the resultant hypersaline, hyper-turbid conditions (Atkinson 2007).

Construction activities, such as road widening, has also affected salinity levels, severing fresh groundwater channels and contributing to the loss of freshwater springs along Maunaloa's shores. Maunaloa Bay, once a paramount resource for food and fresh water, has become incapacitated.

The presence of non-native invasive species in the ecosystem, introduced as a result of construction projects, was revealed in a 2002 study of Hawaii Kai Marina, formerly Kuapā Pond. Non-native algae (*Acanthophora spicifera*, *Gracilaria salicornia*, *Hypnea musciformis* and *Avrainvillea amadelpha*) now compete for space with native algae species. *A. amadelpha* is the most prominent algae and is believed to have been introduced to the



Fig. 6. *Limu kala*. Maunalua Fishpond Heritage Center photos.

bay in 1981. This algae creates layers of mud through the entrapment of sediment over time. The non-native snowflake coral (*Carijoa riisei*) is also present in the bay, predominantly on bridge pilings and hard surfaces, and was first identified in Pearl Harbor in 1972 from a ship's hull.

An online article "When the Limu Kala Disappears" by the Maunalua Fishpond Heritage Center highlights the loss of *limu kala* (*Sargassum aquifolium*, formerly *S. echinocarpum*), a culturally important native species that once dominated and carpeted much of the outer reef of Maunalua Bay (figure 6).

"This reef along Maunalua Bay was thickly carpeted with golden *limu kala*. Then five years ago something caused the entire field of *limu kala* to disappear. *Limu kala* is Hawaiian medicine from the sea. It is difficult to put in words the significant cultural value of this *limu* (edible seaweed).

"Along with forgiveness and prayer, *limu kala* is an essential part of *ho'oponopono* [reconciliation and forgiveness] and

purification ceremonies. *Kala* means to loosen or release. There is no staying dry when gathering this *limu*, as it grows in the breaking surf. Those who are sick wear a lei of *limu kala* when swimming seaward to cleanse disease and burdens. A natural pain reliever, it is applied to bruises.

Gone today are the schools of mullet and akule that once blackened the waters of Maunalua Bay during their annual 'anae holo (spawning migration). Joseph "Joe" Lukela (1879 to 1966), *konohiki* (a traditional concept of ocean resource rights and management) of the ocean area from Kuli'ou'ou to Makapu'u for over 50 years, recalled the spectacular return of the mullet annually into Kuapā Pond when he opened the *mākāhā* (sluice gate) to allow them to enter to replenish there (Maunalua.net n.d.(b)). Besides the loss of the ponds and estuary habitat especially at Maunalua, the "accidental" introduction of the non-indigenous *kanda* (Marquesan mullet, *Valamugil engeli*) also contributed significantly to the demise of the 'anae holo through habitat displacement. The Marquesan mullet was introduced to O'ahu in 1955 and has subsequently established itself throughout the Hawaiian Islands (Hawaii 24/7 2015).



Fig. 8. Mullet fishing chairs along the Ala Wai (circa 1931).



Fig. 7. News article announcing the annual mullet run in 1939. Source: Honolulu Advertiser

Gone too are the mullet fishing chairs that dotted the south and eastern shores of O'ahu (figures 7 and 8). Coastal fishermen at Ala Moana, Ala Wai and Wailupe awaited the annual run as it also attracted predator fish like the *ulua* (giant trevally). The loss of the annual 'anae holo of the native striped mullet may be the most notable ecological and cultural change experienced at Maunalua.³

Gone too are the endangered *ae'o* (Hawaiian Stilts) from Kuapa Pond due to habitat lost from alterations to vital estuary systems.

Gone too are the reef walks at night to torch fish at night. The reefs have been smothered and hardened by silt, urban runoff and invasive species and are disturbed by ever increasing ocean recreation activities. Following the construction of Hawaii Kai Marina, these activities expanded exponentially in Maunalua Bay and led to the establishment of an Ocean Recreation Management Area (ORMA). This in turn resulted in ramp permits, Ocean Recreational

³The spawning migration of striped mullet still occurs off the southeastern coast of the U.S. Mainland (<https://youtu.be/zA5mn423F9g>).

Table 13a

Combined Counts of Ae'o on Kuapa and Paiko Lagoon, 1959 to 1969

No. Seen	Date	Appendix Record No.
68	27 Dec. 1959	2351
80	up to Jan. 1962	2355
ca. 80	23 Dec. 1962	2357
52	29 Dec. 1963	2358
64	27 Dec. 1964	2359
4 counts ranged 21-44; breeding probable	few years prior 1966	2361
42	2 Jan. 1966	2362
47	26 Dec. 1966	2363
3	31 Dec. 1967	2364
0 Kuapa... "bid goodbye-pau"...	28 Dec. 1969	2368
30 Paiko	28 Dec. 1969	2368

c. Combined census data for Kuapa and Paiko Lagoon supports a relatively high value of these areas before development reduced use of each to insignificance, as indicated in Table 13g. Source: Audubon Annual Christmas Bird Count. The following Table 13g and Item c. are from Chris Cramer, Director, Maunalua Fishpond Heritage Center.

Management Area Use Permits for thrill craft and parasailing, and Commercial Use Permits (CUP) by the state Department of Land and Natural Resources. Commercial uses include surfing, canoe and SUP (stand-up) board instruction, canoe and kayak tours, fishing tours, scuba diving, parasailing, whale watching and day tours. The reef adjacent to the main channel is agitated almost daily by these activities, causing the loss of habitat for indigenous fishes.

Our Failed Kuleana and Restoration Efforts

The failure of the state and its residents to meet its *kuleana* at Maunalua has resulted in a conscious anthropogenic environmental degradation that has effectively destroyed this historical, vibrant, and productive native ecosystem.

There is much talk today about the relationship between *mauka* and *makai*. Meanwhile, construction continues on residential subdivisions, shopping centers, golf courses and supporting infrastructure. And so too continues the introduction of alien species, severing of aquifers, hardening of streams, diversion of surface runoff into sewers emptying directly into the ocean and destruction of fishponds, wetlands and muliwai ecosystems. Through the urbanization of Maunalua, most of the accessible permeable valleys, hillsides and mountains—which have historically fed the aquifers through the percolation of rainwater—have been built over (figure 9).

For millennia, Native Hawaiians ensured Maunalua’s sustainability, defined as the “avoidance of the depletion of natural resources in order to maintain an ecological balance” for future



Fig. 9: A satellite image of the urban sprawl that has forever altered Maunalua. Wikipedia image.

generations. It is time to embrace their knowledge and proven practices and to stop the willful degradation of this place many call home.

Several groups have been active in attempts to restore Maunalua and openly invite others to join them.

The non-profit group **Mālama Maunalua**, founded in October 2005, works to restore the health of the bay “through habitat restoration, science and planning, and education and outreach;” Significant progress is being made to the bay’s health and will hopefully continue trending positively. In 2021, Mālama Maunalua and its 1,443 volunteers have removed 41,715 pounds of invasive algae, fragmented 141 coral colonies for planting, deployed 6,000 urchins and educated 2,462 students (Mālama Maunalua n.d.).

The Trust for Public Land and the **Maunalua Fishpond Heritage Center** have embarked on preserving and restoring some of the remaining fishponds including Kānewa’i Spring, which *kūpuna* say is “where the mountain gives birth to the ocean.” In 2021, the Maunalua Fishpond Heritage Center worked with State Representative Mark Hashem to secure \$1 million for the reconnection and long awaited repair of the water flow at Kalauha’iha’i (Maunalua Fishpond Heritage Center 2022).

In 2022, **Livable Hawaii Kai Hui** brokered a deal to purchase a large swath of Paiko Ridge in order to protect it from development (Wu 2022).

The **Pacific Islands Fisheries Group** is also engaged in the efforts to restore Maunalua. Its vision is as follows:

“As islands, protecting our natural resources is essential as we continue to ‘promote’ Hawai’i’s natural beauty and unique resources that drive our visitor industry, but we are failing to ensure the importance of keeping Hawai’i, Hawai’i. We are over-taxing, destroying and depleting our natural resources without care or thought about each island’s unique natural resources, beauty, history, character and, most critically, neglecting their carrying capacity resulting in the exodus of *kama’aina* (native born) and influx of *malihini* (newcomers).

“Topmost on this list of essential natural resources is protecting the sources and flow of our fresh water. The *wai* is the life blood of our survival and demands our immediate attention and action keyed toward ensuring our state’s food security and resource sustainability! The following chant captures the critical role of freshwater in island ecosystems.”

Rainfall and Maunalua
(Source: He mele No Kualii)
*E Ku-e-ma Kekaha ka uae Ku,
I ai nakaia o Maunalua.*

*Say, Ku, the rain comes by way of Kekaha, Ku,
Bringing food for the fish of Maunalua*

PIFG encourages the government, community members and visitors to embrace the following:



Photo courtesy Shari Tamashiro



Courtesy Gary Soma, Jr.

Respect our island communities - Determine and adhere to the carrying capacities of each Hawaiian island with regard to land and water resources to ensure our sustainable future.

Leadership - Adhere to the Hawaii State Planning Act as codified under HRS Chapter 226:

- Identify critical environmental areas in Hawai'i to include but not limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources;
- Utilize Hawai'i's limited land resources wisely while protecting the environment and ensuring the availability of the shoreline, conservation lands and other limited resources for future generations;
- Direct future urban development away from critical environmental areas OR impose mitigating measures minimizing the negative impacts on the environment; and
- Identify areas where priority should be given to preserving rural character and lifestyle.

Community commitment and actions – Hold elected officials' administrators and community boards accountable to fundamental sustainability goals and protecting them.

- Protect the watershed area at Maunaloa and ensure against future degradation of them (Parham et al. 2008).
 - Kamilo Iki – Hawaii Kai
 - Kamilo Nui – Kuli'ou'ou
 - Pia – Niu
 - Wailupe – Wailupe and 'Āina Haina
- Increase community awareness to protect against pollution in streams and surface runoff.
- Ensure limiting the increased proliferation of ocean activities that further impact Maunaloa's coastal ecosystems and waters.
- Support local non-profits that are protectors of Maunaloa.

Individual commitment and actions

- Respect and live the Hawai'i's state motto, Ua Mau ke Ea o ka 'Āina i ka Pono ("the life of the land is perpetuated in righteousness"). This Hawaiian phrase, spoken by Kamehameha III, was adopted by the state in 1959.
- Practice actions to protect Maunaloa
 - Read E Mālama I Nā 'Āina Kumu Wai O Maunaloa, A Watershed Handbook for the Residents of Maunaloa (Wagner 2011).
- Follow these simple actions for a healthy bay contained in the booklet:
 - Water your yard efficiently. Avoid runoff. (Chapter 2)
 - Keep cuttings and debris out of storm drains.
 - Use the minimum amount of fertilizers and pesticides.
 - A little goes a long way! (Chapter 4)

- Be careful with household chemicals, which can be washed into the bay. (Chapter 6)
- Clean up pet waste. It's best to throw it in the garbage or flush it down the toilet. Pet and animal waste contains bacteria, viruses, parasites, and nutrients that pollute water and are harmful to humans, aquatic life, and the ocean.
- Prevent mud from running off your yard and report mud running off from construction sites. (Chapter 4)
- Take care of your car. If you see fluid under your car, see a mechanic. Make sure your brakes are not worn. Corrosion of vehicle parts is a source of heavy metals that end up on roads and get washed out to the bay.
- Become an ambassador for the bay. Keep your eyes open and report problems. Talk to your neighbors. (Chapter 7)

Fishermen – Take and practice the “PIFG Fishermen’s Pledge for the Future” (www.fishtoday.org/wp-content/uploads/2011/08/the_pifg_pledge_july20.pdf)

- Learn and follow fishing laws and regulations that apply to my fishing location and practices.
- Take only what is needed and practicing “catch & release” of fish that are unwanted or prohibited from being retained.
- Practice safe fishing principles and safety at sea by following the relevant laws and using common sense to prevent injury to one's self, others and property.
- Engage in rule making processes that determine how our shared resources will be managed.

- Be respectful of other resource users:
 - Do not overcrowd areas or interfere with other fishermen or resource users;
 - Observe private property by always ask and receive permission before entering private lands
 - Respect all fishing practices, traditions and cultures and take time to engage others in positive dialog.
- Be knowledgeable about and respectful of all natural resources:
 - Observe, monitor and investigate the condition of our resources;
 - ◆ Learn the life cycles of fish, so you know when it is best to sustainably fish for them;
 - ◆ Be mindful of catching juvenile fish that have yet been able to reproduce
 - ◆ Protect and monitor fish habitat and report changes or degradation to appropriate authorities.
- Properly dispose of 'ōpala (trash):
 - Always contain and remove trash (plastics, old bait, fishing line, etc.), and leave fishing areas cleaner than upon arrival;
 - Help to remove excess trash (go beyond your part)
 - Report the location of large marine debris to proper authorities.
- Set a good example for others to follow—“walk the talk”—as good fishing and conservation practices and fellowship are infectious.

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