

Maui Nui Conservation Action Plans

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Kahului Harbor Community Action Plan

Wailuku Community Managed Makai Area
2016



Kahului Harbor Community Action Plan

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EXECUTIVE SUMMARY

Before European contact, modern Kahului was low-lying wetlands comprised primarily of Hawaiian villages and *lo'i* (taro patches). Kanahā, just east of Kahului Bay, was part of an extensive fishpond complex. The area's rivers, streams, *lo'i*, and wetlands carried abundant freshwater into Kahului Bay, creating an important transition zone between freshwater and saltwater. This valuable estuary provided a healthy nursery habitat for fish and *limu* (algae) and served as an important area for subsistence and commercial fishing.

However, after a century of fishing pressure, development, and agriculture, Kahului Harbor's (Harbor) once healthy fisheries have been deteriorating. Concerned at the steady decline, local fishers lobbied the state government for formal protection, and in 2009, the legislature designated Kahului Harbor as a Fishery Management Area (FMA).

To improve and maintain the Harbor and its surrounding area, a group of local fishers established the Wailuku Community Managed Makai Area (CMMA) in 2010. Since then, we have worked with community members, scientists, fishers, natural resource managers, businesses owners, canoe clubs and others with a vested interest in Kahului Harbor to better understand the condition of harbor resources and to develop a Community Action Plan (CAP).

Our goals—a Healthy Harbor Fishery and a Healthy Harbor Community for recreational users—embrace our cultural heritage and support the needs of the greater Kahului community. As such, we hope to increase community engagement in our efforts to restore and maintain the vital components of each: the forage fish, akule, limu, water quality, beaches and dunes that contribute to a healthy Harbor fishery, and the recreation areas and public access that contribute to a healthy Harbor community. The objectives and strategic actions we've developed to restore each component address the issues and concerns that put them at risk and will guide all of our work. Important components will be monitored at regular intervals to ensure that the actions we take are achieving their desired results or can be modified in a timely manner.

The CAP was developed using The Nature Conservancy's simple, science-based approach for planning, implementing, and measuring the impacts of management activities. It reflects our best thinking and highest priorities at this point in time and will be adapted in response to changing circumstances and opportunities.

The Wailuku CMMA extends a warm *mahalo* to the local residents and fishers, non-profits and community organizations, and state and county agencies that contributed to the CAP.

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OUR VISION AND VALUES

The Wailuku Community Managed Makai Area (CMMA) is a community organization established in 2010 by a group of committed fishers concerned about water quality, non-compliant fishing, and the noticeable decline of coastal habitats, coral reefs, and nearshore fisheries of the *moku* of Wailuku.

We will pursue our vision of a **healthy functioning ecosystem, providing safe environmental use and abundance that sustains people in a pono way** guided by the stewardship traditions that allowed generations of Hawaiians to flourish in the *moku* of Wailuku and by the values they practiced:

Lōkahi • Kūpaku • Kūpono • Kuleana • Hō'ihi • Ho'oponopono • Ma'a • Laulima

Unity Restoration Honesty Responsibility Respect Reconciliation Understanding Cooperation

UNDERSTANDING OUR PLACE

The Moku and Ahupua'a of Wailuku

Under the Hawaiian land division system, each island was divided into large sections, or *moku*, stretching from mountaintops to the sea. Rivers sub-divide each *moku* into narrower self-sustaining wedges, or *ahupua'a*, from *mauka* to *makai* (mountain to sea). Wailuku translates to 'water of destruction' and speaks to how great the stream flow must have been in the past.

From its high point near Pu'u Kukui, the *moku* of Wailuku extends across West Maui's isthmus to its north and south shores, and includes *Nā Wai 'Ehā* (The Four Great Waters) of the Waikapu Stream, Wailuku (Īao) River, Wai'ehu, and Waihe'e Streams.

Wailuku *ahupua'a* spans seven miles of coastline, from the Wailuku River to Kailua Nui Gulch at Baldwin Beach Park and includes Kahului and Kanahā. Before European contact, much of modern Kahului was low-lying wetlands comprised of Hawaiian villages and *lo'i* (taro patches) irrigated by the Wailuku River. The streams, *lo'i*, and wetlands carried abundant freshwater into Kahului Bay, creating an estuarine ecosystem and a healthy nursery habitat. Kanahā was once an extensive fishpond complex said to have been built by Kapiihookalani, a chief from O'ahu and part of Moloka'i during the 1500s and completed by Kamehamehanui, king of Maui.¹ Today, the fishpond is a State Wildlife Sanctuary and the only intact wetland habitat remaining in Kahului.



Figure 1: The moku of Maui.

Kahului Harbor

The commercialization of sugar led to an economic boom on Maui and in 1879, the first small landing was created in Kahului Bay. In the early 1900's, dredging of Kahului Bay and construction of a 1,000-foot breakwater was completed to create a safe harbor during winter months and storms. Over the last 100 years, the Harbor was modified and expanded to meet the needs of Maui's growing population and economy.

Today, Kahului harbor is the only deep-draft commercial harbor on the island of Maui. Its three piers serve various types of commercial vessels and operations, including container ships, cruise ships, coal import, molasses export,

¹ Sterling, E. P. (1998). Wailuku. In *Sites of Maui* (pp. 103–109). Honolulu, HI.: Bishop Museum.

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Figure 2: A historical image of Kahului Harbor from 1907

liquid gas import, dry bulk cargo, and vessel haul out.

Kahului Harbor Fishery Management Area

Kahului Harbor Fishery Management Area (FMA) is fed by freshwater carried through rivers, streams, seeps, and springs; this estuary, or transition zone between freshwater and saltwater, provides vital habitat for important species.

At the request of concerned fishermen, the State Department of Land and Natural Resources (DLNR) designated Kahului

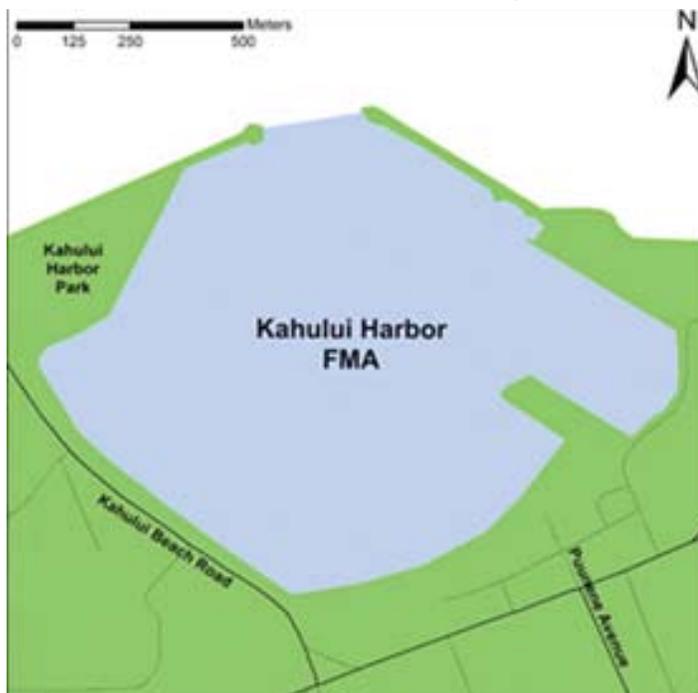


Figure 3: Kahului Harbor FMA. Image provided by DAR

Harbor as a 200-acre Fishery Management Area (FMA) in 2009. The productive and popular FMA lies entirely within the Harbor. Since then and in accordance with Chapter 13-51 Hawai'i Administrative Rules, the Division of Aquatics Resource (DAR) has managed the Harbor, enforcing specialized fish catch rules and regulations, which:

- Prohibit use of any net, except as indicated in permitted activities to take a total of no more than 50 marine life per person per day, except baitfish with a baitfish license or akule with a valid commercial marine license;
- Prohibit snagging of any marine life, use of more than two poles per person with more than two hooks per pole and the use of any multiple point hooks; and
- Require fishermen to check in and out and to report their activities and catch at either of the two fisher check stations located at the Harbor's west jetty parking lot or Pu'unene Avenue access point.

WAILUKU CMA PROJECT AREA AND PARTICIPATORY PLANNING PROCESS



Figure 4: Group photo of the Wailuku CAP team at the first planning workshop in November 2014. Photo by Manuel Mejia (TNC)

Our initial efforts focus on improving conditions of the Kahului Harbor FMA, a vital fishing resource for the communities of the *moku* of Wailuku. Our project area spans the Harbor inside the jetties and includes shoreline and coastal ecosystems. Community members, fishermen, and non-profit and government representatives with a

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diverse range of skills and backgrounds and a vested interest in Kahului Harbor contributed to the Wailuku CMMA Community Action Plan (CAP).

The CAP was developed in partnership with The Nature Conservancy, using their science-based approach for planning, implementing, and measuring the success of management activities; and facilitated by the Conservancy's Maui Marine Program.

Though the plan reflects our best thinking and highest priorities at this point in time, we will adjust strategies as necessary in response to new information, changing circumstances and opportunities, and the impacts of management activities.

UNDERSTANDING OUR HARBOR



Figure 5: An illegal ʻōpae net of *Nehu*, > 50 species. Photo courtesy of Wailuku CMMA.

Importance of Forage Fish

Forage fish—small fish near the bottom of the food chain that larger predators consume—are the foundation of a healthy ecosystem. Species of note in Kahului Harbor include *nehu* (*Stelephorus purpureus*), *halalū* (*Selar crumenophthalmus*), and *Mikiawa* (*Etrumeus micropus*). Forage fish typically feed on plankton and use *limu* and shallow waters for protection. These species are not only sought after by larger predator fish but fishermen as well, and are important for both a healthy ecosystem and fishery.

Historically, Kahului Harbor was an important subsistence and commercial fishery for *nehu*, a small, silver schooling anchovy that is an important food source for the community and commercially valuable as the primary bait for *aku* or skipjack tuna (*Katsuwonus Pelamis*). *Nehu* live exclusively in estuaries, migrating daily between nearshore waters, and nocturnal feeding and spawning areas in relatively clear channels offshore, making them relatively easy to catch; their habitat is susceptible to pollution and runoff.



Figure 6: Fishermen at Pier 2. Photo Courtesy of the Wailuku CMMA

Fishing and Recreational Use

To gain a better understanding of fishing and other activities within Kahului Harbor, the Wailuku CMMA partnered with the Fishery Ecology Research Lab at the University of Hawai'i at Mānoa and Conservation International to conduct a creel survey from March 2013 to May 2014. A creel survey records estimated catch through continual observation and interviews with fishers over a set period of time.

The survey recorded an estimated annual number of fishermen at 7,826, with 89.2% of their catch occurring at the West Break Wall or along the sand beach. During the survey period, 33% of the fishing activity was identified as illegal, with the majority (96%) being attributed to the two stick push net method (*ʻōpae* net).¹ These estimates are based on the fact that all observed *ʻōpae* net fishing activities showed fishers catching greater than the allowed 50 specimens of marine life per day. Therefore, all expanded

¹ Koike, Hal, Jay Carpio, and Alan M Friedlander. "Final Creel Survey Report for Wailuku Community Management Area." (2014)

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estimates from the creel data for ‘ōpae net fishing assumed they were being utilized illegally. The target fish for these practices was always *nehu*, which are found in the shallow waters of the sand beach from Pier 2 to The Maui Beach Hotel. *Nehu* fishing is seasonal and opportunistic and only conducted when the *nehu* come into the Harbor—sometimes lasting for weeks or even months. Hence the ‘Ōlelo No‘eau (Hawaiian Proverb), “Pākāhi ka *nehu* a Kapi‘ioho,” (the *nehu* of Kapi‘ioho are divided, one to a person),¹ instructing that when poi is plentiful but fish are scarce, they must be rationed.

The next most common types of illegal fishing activities included “snagging”, catching a fish using hooks without the fish having to take the bait with their mouth, and using more than two poles per fisher. Between 2012-2014, Wailuku CMMA held regularly scheduled meetings and walked the beaches and fishing areas engaging with fisherman about FMA regulations and how to properly abide by them.

In addition to fishers, there was an estimated annual 18,410 recreational users visiting the Harbor. The most common activity of these users was canoeing (about 30%), followed by standup paddle boarding, swimming, boating, surfing, kayaking, windsurfing, and jet skiing. This recreational use was concentrated at the West Break Wall near the surf zone and along the sandy beach where the canoe clubs are located. Along with the fishing and recreational users, there are often homeless people who establish camps in the Harbor’s vicinity.

Native Limu

Limu (algae) is a primary component of the traditional Hawaiian diet. Forage fish and other small animals in estuarine ecosystems also rely on *limu* and coral for essential habitat and food sources. Unfortunately, the Harbor ecosystem has changed significantly over the past century: coral has largely disappeared and the once plentiful and nutritious *limu wāwae‘iole* (*Codium edule*) and *limu manaua* (*Gracilaria parvisipora*) have become less abundant across the *moku* of Wailuku, and are rarely seen in the Harbor today. The reason for the reduction of native

limu inside the Harbor is currently unknown, but according to Hawai‘i’s Division of Aquatic Resources (DAR), *limu wāwae‘iole* was recorded as being commercially harvested in the commercial fishery reporting grid (area 302) in 2013 with a catch of 43,660 lbs.² This reporting area is a 30 mile stretch of coastline on the Northshore of Maui, defined as up to 2 miles offshore from Nākālele Point to Pauwela Point.



Figure 7: Kahului Harbor looking west toward Īao Valley. Photo by Manuel Mejia (TNC).

Harbor Water Quality

Little is understood about the water quality in the Harbor and its effects on the estuarine ecosystem, the fishery, and native algae. However, with the continuing growth of Maui’s population, the abundance and quality of clean, clear fresh water flowing into the Harbor has been of concern. Most of the public water supply in west Maui is from a freshwater lens in the Wailuku area of the island. Population growth has increased ground-water withdrawals from wells in this area from less than 10 Mgal/d during 1970 to about 23 Mgal/d during 2006.³ This large increase in groundwater uptake has shrunk the freshwater lens and most likely the amount of subsurface water flowing into the Harbor. Other factors that may be contributing to the current state of water quality are the modifications to coastal habitats and to the Harbor itself.

1 Pukui, M. K. (1983). ‘Ōlelo No‘eau: Hawaiian Proverbs & Poetical Sayings. Honolulu, HI: Bishop

2 Koike, Hal, Jay Carpio, and Alan M Friedlander. “Final Creel Survey Report for Wailuku Community Management Area.” (2014)

3 Gingerich, S.B., 2008, Ground-water availability in the Wailuku area, Maui, Hawai‘i: UGS Scientific Investigations Report 2008-5236, 95 p.

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To better understand the current conditions, we requested the services of Pacific Islands Ocean Observing System (PacIOOS) to conduct a water quality study within the Harbor. Researchers used a 24 hour deployment of oceanographic instruments and bottle samples in front of the Maui Beach Hotel at a freshwater seep. The study indicated inputs of groundwater and high levels of nutrients and a low and variable salinity of 25-34‰ indicating a variable flow of freshwater at the sample site.³ Nitrates were also detected, where higher concentrations coincided with low tides. This data demonstrates that the freshwater is the source of nitrates and that during high tides the signal is diluted higher in the water column by the addition of ocean water compared to the deeper fresh water. While this study provides a snap shot of some aspects of water quality of Kahului Harbor, PacIOOS recommends further studies to increase the understanding of the water quality and the ecosystem effects.

WHAT WE WANT TO MĀLAMA

Our restoration efforts are focused on two goals, or targets—a Healthy Harbor Fishery and a Healthy Harbor Community. The nested targets listed in **Table 1** are vital components and indicative of the overall health of these targets. We enlisted community members and experts to conduct and analyze research to help determine the current status for each of the nested targets (see **Appendix D** for additional details) and will use this information to guide and measure the impacts of our efforts.

Targets and Nested Targets

Healthy Harbor Fishery – A Healthy Harbor Fishery is a place where juvenile fish take refuge and is an essential component of healthy fisheries.

- **Forage Fish** - Also known as prey fish or bait fish, forage fish are the small pelagic fish that come into the Harbor seasonally and are eaten by larger fish, caught for bait and caught for consumption. The fish of focus are *nehu* (Hawaiian anchovy), *halalū* (juvenile akule, big eye scad),

Targets	Nested Targets	Current Status	Desired Status
Healthy Harbor Fishery	Forage Fish	Fair	Good
	Akule	Fair	Good
	Limu	Fair	Good
	Water Quality	Fair	Good
	Beaches & Dunes	Fair	Good
Healthy Harbor Community	Water Quality	Fair	Good
	Community Stewardship	Fair	Good
Very Good	Functioning at ecologically desirable status; requires little human intervention		
Good	Functioning within range of acceptable variation; may require human intervention		
Fair	Functioning outside of range of acceptable variation; requires human intervention. If unchecked, will be vulnerable to serious degradation		
Poor	Functioning outside of range of acceptable variation; requires human intervention. Left in this condition for an extended period will make restoration practically impossible		

Table 1: CAP targets and status. See Appendix D for details.

and *mikiawa* (sardine). Proper management of these fish species impacts the health and structure of the entire fishery food chain.

- **Akule** - The life cycle of *akule* is spent between two marine habitats, the nearshore coral reef and the open ocean. *Halalū*, the juvenile *akule*, spends its first 8-12 months of life nearshore within protected waters. *Akule* were last seen in Kahului Harbor in 2011. Further research is needed to understand more about these fish and how they use the Harbor.
- **Limu** - *Limu* is a primary component of the traditional Hawaiian diet, along with fish and *poi* (taro). It provides nutrients and minerals to create a balanced diet. In addition, *limu* beds provide juvenile fish with a refuge from predators. The edible *limu* varieties *wāwae'iole*, *manauea* and *māne'one'ō* need to be properly managed within the Harbor because of their importance as both a culturally significant food source and a refuge for juvenile fish.

¹ Koike, Hal, Jay Carpio, and Alan M Friedlander. "Final Creel Survey Report for Wailuku Community Management Area." (2014)

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- **Water Quality** - Good water quality is critical for *limu* production, a healthy fishery, and recreational activities. The mixing of clean and clear freshwater and ocean water flowing in and out with the tide provides the essential nutrients needed for a balanced estuarine system. Further research is needed to build upon the PacIOOS study and better understand water quality and movement within the Harbor.
- **Beaches and Dunes** - A healthy beach and dune system with native vegetation traps sand and provide coastal habitat and protection from high wave events. Designated access paths and signage, from Pier 2 to the Maui Beach Hotel, can help reduce damage to the sand beach and dune system. The *pōhaku* beach, from the Maui Beach Hotel to the West Break Wall, provides shoreline protection for Kahului Beach Road and important *limu* and juvenile fish habitat.

Healthy Harbor Community - A Healthy Harbor Community is where community members can come to enjoy various recreational activities in and around the Harbor in a safe setting. The proximity of the Harbor to Wailuku and Kahului makes it an ideal place for many people to visit on a daily basis.

- **Enhanced Recreation** - Kahului Harbor is a prime recreational area for the people of Maui because of its central location and the many different marine activities it offers.
- **Public Access** - Public access to the Harbor is important for its 26,236 annual recreational visitors.
- **Community Stewardship** - Because of its central location, the Harbor has a large number of visitors. Increased community engagement and stewardship is needed to properly manage sensitive areas and species and to improve recreational experiences.

ISSUES & CONCERNS

The following ten issues and concerns were identified as affecting the Healthy Harbor Fishery and/or the Healthy Harbor Community.

Illegal Fishing: Current FMA rules were put into place by public request in 2009; however, many violations still exist.



Figure 8: Break out groups were formed to brainstorm threats to the Harbor. Photo by Manuel Mejia (TNC)

The most common illegal fishing practice is exceeding the bag limit of 50 marine life per person per day relating to either *nehu* or sardines.¹ As forage fish are at the base of the food chain, overharvesting of *nehu* and sardines could cause an ecological disruption, affecting the entire fish population.

High Use/High Effort Fishery: For the relatively small area that the Harbor encompasses, the number of fishermen for the given area is high (e.g. the 2012-13 creel survey recorded 7,826 fishermen per year, most of whom fished on the West Break Wall or along the sand beach).¹ The high levels of effort can easily lead to overfishing and negative effects on the Harbors ecosystems.

Insufficient Public Facilities: There are currently no permanent public restrooms at the Harbor; portable toilets at Ho'aloa Park and the West Break Wall are insufficient. The lack of public restrooms can lead to people relieving themselves near or in the Harbor, leading to unsanitary conditions, reduced water quality, and increased disease transmission.

Potential Shoreline Hardening: The Department of Transportation (DOT) Highways Division plans to build a seawall to protect Kahului Beach Road between the Maui Beach Hotel and the West Break Wall. There is concern that the project, if built, may change the slope of the shoreline and/or degrade the health of the rock beach that provides habitat for juvenile fish that regularly school there. The hardening project may also disrupt the natural coastal protection of the beach system. It is unknown but possible that it may also have an effect on the freshwater springs and seeps.

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Figure 9: Homeless encampment on the pōhaku beach. Photo courtesy of Wailuku CMMA.

Safety: Homelessness and drug use lead to an unsanitary and unsafe environment that inhibits other community members from visiting the Harbor for recreational use. These uses can also lead to increased regulations and even the closure of areas to stop unwanted activity on state property.

Accidental Material Discharge: As a commercial Harbor, there is a large amount of potentially hazardous material being transported from vessels to shore and vice versa. With Maui's population increasing from 40,000 in 1970 to 150,000 in 2010, the Harbor's infrastructure has undergone a significant amount of use over the years. Although it has been updated, there is still potential for gas, oil, molasses, sewage, coal and other toxic chemicals to leak or spill into the Harbor. While events like this are rare, they have the potential to severely disrupt the Harbor fishery.

Quality of Subsurface Freshwater Flow: Subsurface freshwater flowing from springs and seeps could potentially carry excess nutrients into the Harbor. Phytoplankton and native *limu* in the Harbor need trace amount of nutrients, or "food" (i.e. nitrogen and phosphorus to grow), but too many nutrients can cause an imbalance where algal blooms could occur. These blooms block sunlight, deplete oxygen levels, and can suffocate fish and plant life by creating an anoxic environment.

Quality of Surface Water: Sediment, urban run-off, and increased nutrients flowing into the Harbor threaten marine

life. Sediment can reduce water visibility, block light for marine plants and coral, and smother them once it settles. Urban run-off during heavy rains carries bacteria, nutrients, toxins, and trash to the Harbor. Elevated levels of these land-based pollutants, due to the frequency of heavy rains and semi-enclosed nature of the Harbor, diminish water quality and increase health risks to both marine and human life.

Dune Degradation: The coastal dunes of Kahului Harbor are degraded in areas of heavy foot traffic. The dune system between Pier 2 and the Maui Beach Hotel provides a natural form of coastal protection during larger winter surf and storm events. Sand dunes also supply emergency sand to beaches when erosion occurs, which is part of a natural cycle that creates a berm or nearshore sand supply to reduce wave energy at the shoreline during these events. However, dune systems are very vulnerable to trampling, improper landscaping, and/or invasive species that can damage or encroach onto the native vegetation that captures wind-blown sand and stabilizes the dunes.

Dredging: The dredging of the turning basin, a deep draft section of the Harbor where commercial vessels maneuver, could disturb environmental pollutants in the sediment, like anti-fouling paint that has sloughed off commercial vessels and various other contaminants. The dredging may temporarily displace forage fish that enter the Harbor seasonally, and may have a long term effect on water flow patterns, water quality, and forage fish.



Figure 10: Mapping activity for human use areas and needs. Photo Manuel Mejia(TNC).

1 Koike, Hal, Jay Carpio, and Alan M Friedlander. "Final Creel Survey Report for Wailuku Community Management Area." (2014)

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Issues & Concerns Ranking Across Targets and Nested Targets									
Issues & Concerns	Healthy Harbor Fishery					Healthy Harbor Community			Summary Threat Rating
	Forage Fish	Akule	Limu	Water Quality	Beaches Dunes	Enhanced Recreation	Public Access	Community Stewardship	
Illegal Fishing	Very High	Very High	Medium				Medium	Medium	High
High Use/ High Effort Fishery	Very High	Very High	Medium				Medium	Low	High
Insufficient Public Facilities	Medium	Low	Medium	Medium	High	High	High	High	High
Potential Shoreline Hardening	High	Medium	Medium	Medium	High		Medium	Medium	High
Safety							High	High	High
Accidental Material Discharge	High	High	Low	Medium		Low	Low		Medium
Quality of Subsurface Freshwater	Medium	Medium	Medium	Medium	Medium				Medium
Quality of Surface Water	Medium	Medium	Medium	Medium		Medium			Medium
Dune Degradation	Medium	Low	Low		High		Low	Low	Medium
Dredging	Medium	Medium	High	Low	Low		Low	Low	Low
Summary Nested Target Ratings	High	High	Medium	Medium	Medium	Medium	Medium	Medium	

Table 2: Issues and concerns ranked by the scope and severity of stress they induce on targets and nested targets.

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OUR ACTIONS

We have developed *Objectives* and *Strategic Actions* for achieving our goals of a Healthy Harbor Fishery and a Healthy Harbor Community. As summarized below, each addresses the *Nested Targets* and *Issues and Concerns* identified in previous sections.

Our objectives to achieve a Healthy Harbor Fishery are to: 1) enhance the catch of predator fish by increasing the forage fish population within the Harbor and 2) improve and/or maintain water quality at or above EPA Standards.

Our objectives to achieve a Healthy Harbor Community are to: 1) restore the sand dunes and coastal zone between pier 2 and the Maui Beach Hotel, 2) maintain ecosystem services provided by the *pōhaku* beach and access to the shoreline along Kahului Beach Road and 3) enhance recreational Harbor users' experience, maintain access and increase facilities at the West Break Wall.

All of these goals and objectives require strategic actions in order to make progress and advance positive change. For each objective a table provides the framework needed to further that objective.

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GOAL 1: Healthy Harbor Fishery

Objective 1.1: Enhance catch of predator fish by at least doubling the size, number and duration of forage fish, especially nehu, halalū and mikiawa schools, entering the Harbor over five years.

Targets Affected:

- Forage Fish
- Akule



Issues & Concerns Addressed:

- Illegal Fishing
- High Use/High Effort Fishery

Strategic Actions:

Strategic Action 1.1.1:

Conduct research and literature review to gain a better understanding of the habitat use, food, life cycle and migration patterns of nehu, halalū and mikiawa entering the Harbor to determine if there are constraining factors in the Harbor, in addition to fishing.

Strategic Action 1.1.2:

Change rules to increase forage fish and strengthen FMA rules enforcement, with DAR supporting a community process to develop a draft rule change.

Strategic Action 1.1.3:

Increase FMA rules compliance through community education, outreach, and on-site presence.

Strategic Action 1.1.4:

Increase enforcement of existing and new rules.

Next Steps:

- Wailuku CMMA will conduct monthly visual assessments of school size, frequency and duration of both halalū and nehu within the Harbor.



Key Partners:

- Department of Land and Natural Resources:
 - Division of Aquatic Resources
 - Division of Conservation and Resource Enforcement
- Wailuku CMMA

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GOAL 1: Healthy Harbor Fishery

Objective 1.2: Improve and/or maintain water quality for healthy fishery habitat, native limu growth and human uses to meet applicable state and federal standards, over five years.

Targets Affected:

- Water Quality
- Public Access
- Forage Fish
- Enhanced Recreation
- Community Stewardship



Issues & Concerns Addressed:

- Quality of Subsurface Freshwater Flow
- Quality of Surface Water

Strategic Actions:

Strategic Action 1.2.1:

Identify research needs and assess water quality, nutrients, and pollutants to determine what is impaired, sources of impairment and solutions.

Strategic Action 1.2.1:

Conduct long term community-based coastal water quality monitoring in and around the Harbor with Hui O Ka Wai Ola and other partners.

Strategic Action 1.2.3:

Enhance and restore muliwai at Pier 2 to better intercept pollutants prior to entering the Harbor.

Strategic Action 1.2.4:

Further the understanding of storm drain inputs, surface run-off and other point source pollution into the Harbor to determine whether pollutants are an issue or if the volume of flow can be slowed or reduced.

Strategic Action 1.2.5:

Plan and implement a native edible limu restoration and repopulation area, for the benefit of the fishery and human use.

Next Steps:

- Reach out to PACIOOS and US Army Corps of Engineers (USACE) to see if more in detailed studies can be conducted within the harbor to understand water quality.
- Establish a community-based water quality monitoring effort.
- Map out and assess areas of storm drain inputs into the harbor.



Key Partners:

- Department of Land and Natural Resources, Division of Aquatic Resources
- State Department of Health, Clean Water Branch
- Department of Transportation, State Harbors Division
- Kahului Commercial Land Owners
- Maui County
- USACE

Photos courtesy of Wailuku CMMA

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GOAL 2. Healthy Harbor Community

Objective 2.1: Restore and maintain sand dunes and coastal strand ecosystem along the entire length of the Harbor, to maintain healthy beaches, ecosystems, and uses.

Targets Affected:

- Beaches & Dunes
- Enhanced Recreation
- Public Access
- Community Stewardship



Issues & Concerns Addressed:

- Heavy Foot Traffic
- Coastal Sand Erosion
- Insufficient Public Facilities

Strategic Actions:

Strategic Action 2.1.1:

Identify a partner to lead restoration and provide long-term stewardship for sand dunes within the Harbor. Develop a plan to complete sand dune restoration in the Harbor within five years, including budget, funding, and partnership with landowners, canoe clubs, and community groups.

Strategic Action 2.1.2:

Conduct beach topography surveys in collaboration with UH Sea Grant to understand monthly seasonal changes at eight sites.

Strategic Action 2.1.3:

Advocate for nighttime patrols of illegal activities and improved public restroom facilities in Ho'aloa Park

Next Steps:

- Identify organization and/or person that can be the leader of stewardship group.
- Contact South Maui Volunteers to learn about how they start and fund their dune restoration projects
- Reach out to the canoe clubs within Kahului Harbor to support the restoration effort.



Key Partners:

- South Maui Volunteers
- UH Sea Grant
- Maui County Parks & Recreation
- Harbor Users (Fisherman, Paddlers, Beachgoers etc.)
- Hawaiian Canoe Club
- Nā Kai Ewalu Canoe Club

Photos courtesy of Wailuku CMMA

Kahului Harbor Community Action Plan

GOAL 2. Healthy Harbor Community

Objective 2.2: Enhance and maintain coastal ecosystem services, access and safe recreational opportunities along Kahului Beach Road.

Targets Affected:

- Forage Fish
- Enhanced Recreation
- Public Access
- Community Stewardship



Issues & Concerns Addressed:

- Potential Shoreline Hardening
- Heavy Foot Traffic
- Insufficient Public Facilities

Strategic Actions:

Strategic Action 2.2.1:

Work with state DOT Highways, private landowners and decision-makers to develop alternatives to additional coastal armoring along Kahului Beach Road.

Strategic Action 2.2.2:

Proactively develop a plan to enhance and restore the pōhaku beach coastal ecosystem services, access and safe recreational opportunities over five years.

Next Steps:

- Research the current state of the plans in the armoring of Kahului Beach Road.
- Build community support and testimonies about the ecosystem services and recreational uses provided by the pōhaku beach and Kahului Beach Road.
- Communicate and share testimony with policy makers and state planners.
- Purpose alternatives to the armory along Kahului Beach Road.



Key Partners:

- Harbor Users (Fisherman, Paddlers, etc.)
- Department of Transportation: Highways Division Harbors Division

Photos by Karin Osuga (TNC)

Kahului Harbor Community Action Plan

GOAL 2. Healthy Harbor Community

Objective 2.3: Partner with community and state organizations to maintain current access and enhance user experience at the West Break Wall.

Targets Affected:

- Enhanced Recreation
- Public Access & Community



Issues & Concerns Addressed:

- Insufficient Public Facilities
- Safety
- Heavy Foot Traffic

Strategic Actions:

Strategic Action 2.3.1:

Work with the state to develop and implement a plan to increase and enhance recreation opportunities at the West Break Wall by improving public facilities and safety, and reducing crime, garbage and unsanitary conditions. Facilities include walkways, restrooms, showers, food trucks, and boat storage and dry dock vessel repair area for commercial and recreational boats. Consider a long term planning process for the West Break Wall area.

Strategic Action 2.3.2:

Advocate to both DOT Harbors and Division of Boating & Ocean Recreation for the placement of public restroom facilities at the West Break Wall.

Next Steps:

- Engage key partners and develop a working group to discuss and develop plans for the West Break Wall.
- Receive community testimonies about the recreational and economic benefits of improvements to the West Break Wall.



Key Partners:

- Harbor Users (Fisherman, Paddlers, Boaters etc.)
- Department of Transportation: Harbor Division
- Department of Land and Natural Resources: Division of Boating & Ocean Recreation
- Maui Boat Storage and Dry Dock LLC

Photos courtesy of Wailuku CMMA

Kahului Harbor Community Action Plan

MEASURES AND MONITORING

In order to assess the effects of our actions, we will measure and monitor how things change over time, asking ourselves two basic questions:

- 1) Are the conservation actions we are taking achieving their desired results?
- 2) How are key targets, threats and other factors within the Harbor changing with time?

We will continually measure and monitor our targets and nested targets. As an example, *akule* and *nehu* school sizes will be visually assessed and logged monthly for presence/absence and school size to establish a trend of how often these important forage fish visit Kahului Harbor. These activities will give us an understanding of how we may need to adapt our strategic actions and how to best use our resources to accomplish our goals in a timely manner within our budget. The tables below outline some of the measures and monitoring activities we will conduct.

Are Our Actions Having the Desired Effect?		
Objective	What we want to see	How we will measure
Build Community Stewardship	Multiple community supported Organisations working within the Harbor	Number of community groups and projects underway within the Harbor
Build and Maintain Facilities that Enhance Recreational Uses	All necessary areas have proper facilities & up-keep	The placement of restrooms and Ho'aloa Park and West Break Wall

Table 3

How is Resource Status Changing Over Time?		
Indicators	Current/Needed Monitoring	Frequency
Forage Fish		
Akule school size, frequency, duration	Visual assessment of school size, frequency & duration	Monthly
Nehu school size, frequency, duration		
Native limu presence/absence, biomass, diversity	Conduct in water survey	Baseline & Annual
Water Quality of Springs & Seeps		
Quantity of fresh water supplied by spring and seeps	Turbidity, nutrients, dissolved oxygen, salinity, and <i>Enterococcus</i>	Monthly
Levels of turbidity, nutrients & pollutants		
Beaches & Dunes		
Healthy coastal strand	Document and measure dune dimensions (width, elevation, and height) and vegetation types at 8 sites	Quarterly

Table 4

Kahului Harbor Community Action Plan

CONTACT INFORMATION

For further information, contact Jay Carpio, Wailuku CMMA: wailukucmma@gmail.com, mobile (808) 269-4006

OUR SUPPORTERS AND FRIENDS

Mahalo to the community members and partners who shared their *‘ike* (knowledge) in this planning process. We greatly appreciate the contributions of local residents and fisherman, non-profits and community organizations, and state and county agencies. *Mahalo nui* to:

- Department of Land and Natural Resources, Division of Aquatic Resources
- Department of Land and Natural Resources, Division of Conservation and Resource Enforcement
- Department of Transportation, Harbors Division
- Maui County
- University of Hawai‘i Sea Grant
- Conservation International
- Maui Boat Storage and Dry Dock LLC
- Hawaiian Canoe Club
- Nā Kai ‘Ewalu Canoe Club
- Hui o Nā Wai ‘Ehā
- The Nature Conservancy



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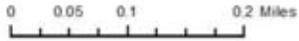
Kahului Harbor Community Action Plan

Appendix A

Map 1: Kahului Harbor Land Ownership and Jurisdiction



- A&B HAWAII INC.
- A&B HAWAII INC. /feal
- A&B PROPERTIES INC.
- ALEXANDER & BALDWIN, LLC
- COUNTY OF MAUI
- ELLEAIR HAWAII INC
- FHIB PROPERTIES INC
- HARRY & JEANNETTE WEINBERG FOUNDATION
- HRT REALTY LLC
- MATSON NAVIGATION CO.
- MAUI BEACH HOTEL INC
- MAUI ELECTRIC CO LTD
- STATE DEPT. OF TRANSPORTATION
- STATE OF HAWAII
- STATE OF HAWAII /feal
- STATE OF HAWAII-LAND & NATURAL RESOURCES /feal
- U.S.A.

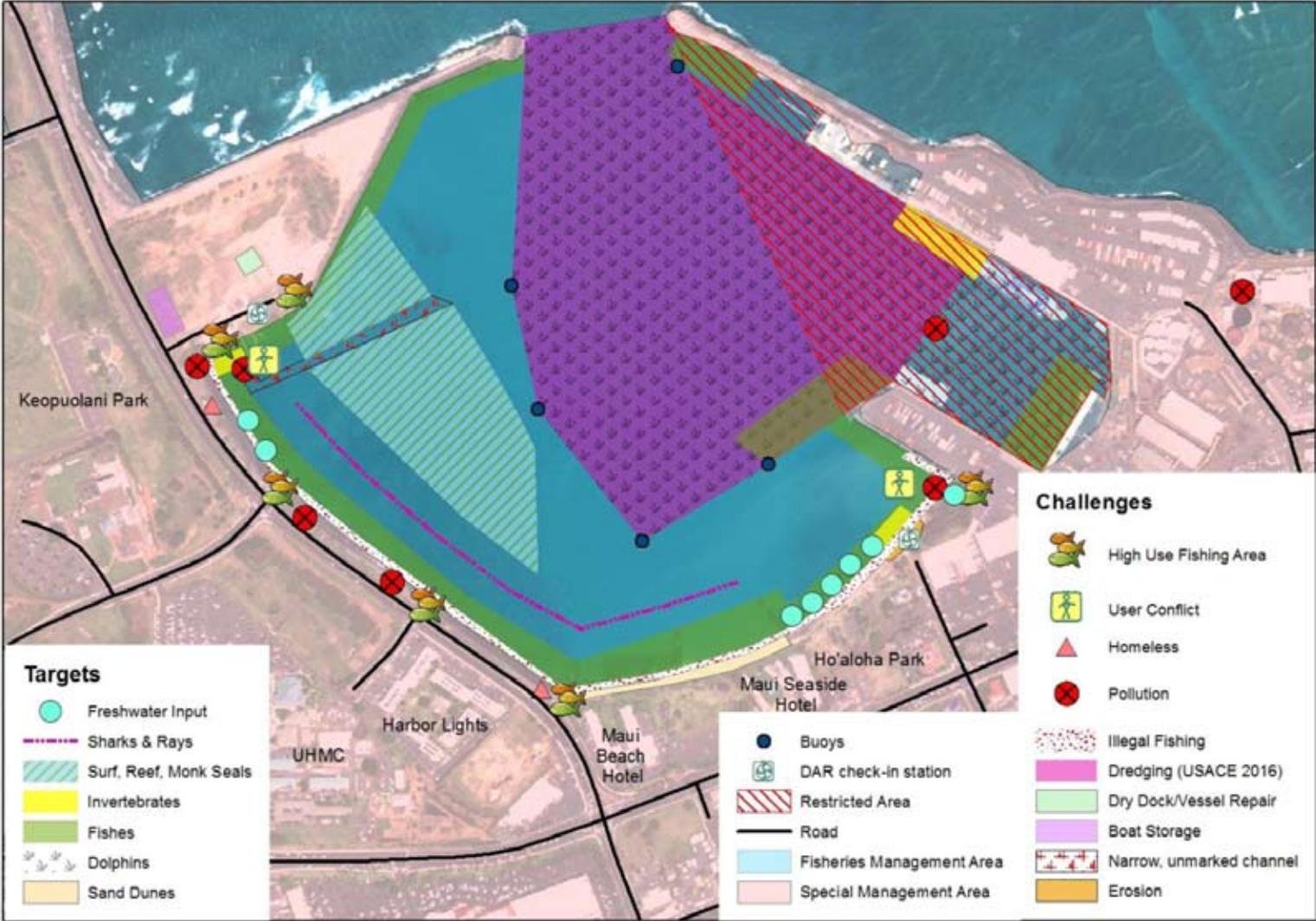


Prepared by: Roxie Sylva May 2015
 Source: Maui County

Kahului Harbor Community Action Plan

Appendix B

Map 2: Kahului Harbor Targets & Challenges



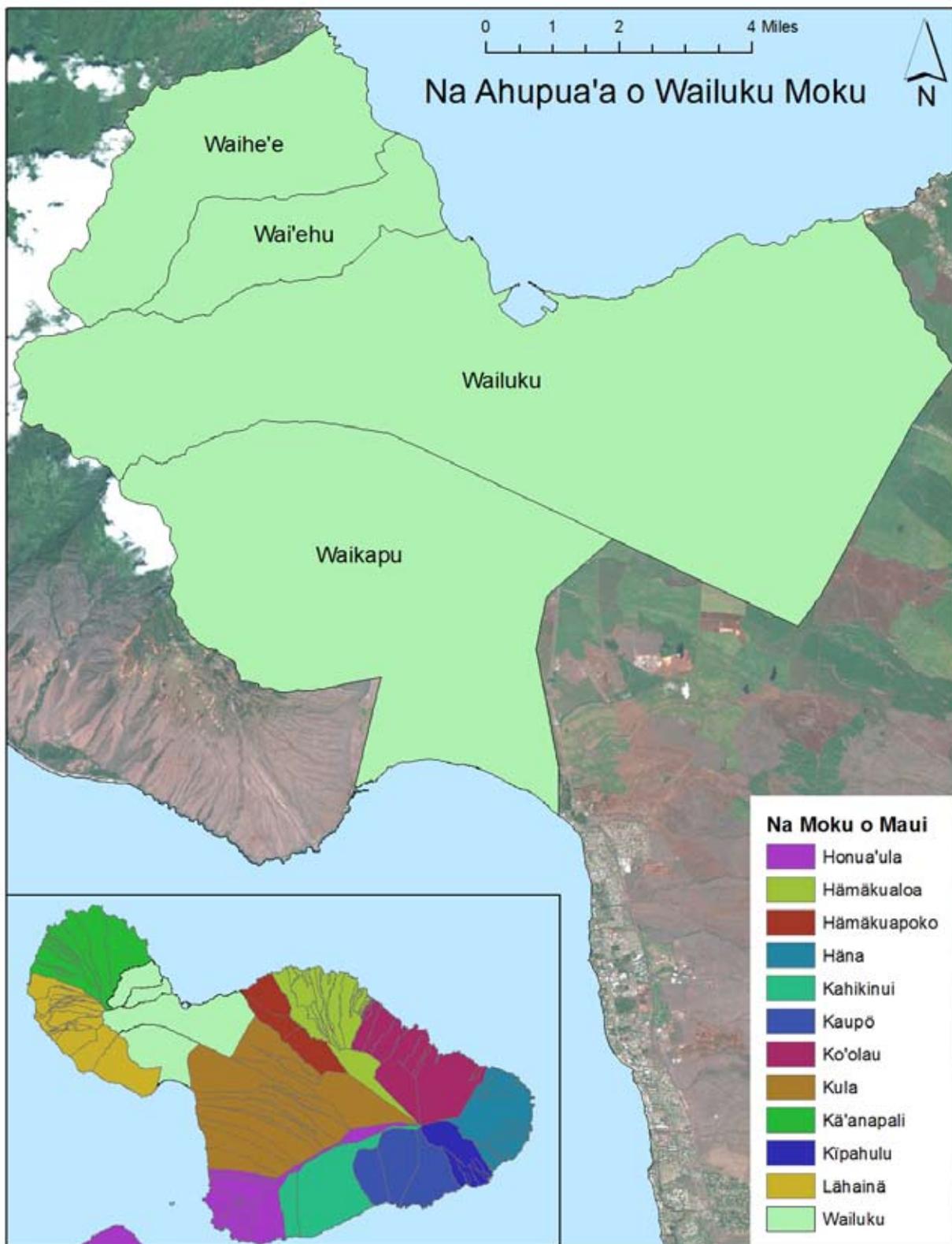
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Prepared by: Roxie Sylva 2015
 Source: NOAA Raster Nautical Charts, Maui County, County Planning Dept



Kahului Harbor Community Action Plan

Appendix C



Source: Office of Hawaiian Affairs

Prepared by Roxie Sylva 02/2016

Kahului Harbor Community Action Plan

Appendix D

Target Viability Ranking by Indicators					
Targets & Nested Targets by Indicators	Status	Poor	Fair	Good	Very Good
Healthy Harbor Fishery					
Forage Fish	Fair				
▲ Nehu school size, frequency, duration	Fair	No schools	Nehu Schools observed School 1-3 times per year, at 1,000 lbs.	Nehu schools observed 4-6 times per year at 5000 lbs. Some occurrence in winter season Duration: 4-8 weeks	Nehu schools observed more than 6 times/per year at 5000 lbs. Greater occurrence in winter season Duration: greater than 8 weeks
▲ Mikiawa brings in pelagic fish	Fair	C.P.U.E. 3 Fish /hr. Duration: spawning period only. Ind: Catch/presence of pelagic predator fish: Stripped Bonito, Kawakawa	C.P.U.E. 18 Fish /hr. Duration: spawning period only Ind: Catch/presence of pelagic predator fish: Stripped Bonito, Kawakawa	C.P.U.E. 36 Fish/hr. Duration: year round Ind: Catch/presence of pelagic predator fish: Stripped Bonito, Kawakawa	C.P.U.E. 60 Fish/hr. Duration: year round Ind: Catch/presence of pelagic predator fish: Stripped Bonito, Kawakawa
▲ Mullet size/class structure & movement	Fair	Presence of only one size class	Presence of two size classes: Pua & anae	Presence of all size class: Pua, amaama, anae	Presence of all size class: Pua, amaama, anae movement/migration: in/out of harbor
▲ Jacks size & quantity of jacks harvested	Poor	No jacks 16 inches or larger caught; Only jacks less than 12 inches being caught	C.P.U.E.: 1 jack/4 hrs. Few jacks 16 inches or larger caught	C.P.U.E.: 1 jack/2hr. 16 in or larger caught	C.P.U.E.: 1 jack/hr. 16 in or larger caught

Kahului Harbor Community Action Plan

Target Viability Ranking by Indicators

Targets & Nested Targets by Indicators	Status	Poor	Fair	Good	Very Good
Akule	Poor				
△ Akule school size, frequency, duration	Poor	No schools	Akule School Observed 1-2 times/year at 20,000 lbs. halalū summer balls observed 1-2 times/year	Akule School Observed 3-5 times/year at 20,000 lbs. halalū summer balls observed 3-5 times/year	Akule Schools observed 6 and above times/year 20,000 lbs.: Consistent halalū summer balls observed
Limu	Fair				
△ Native limu presence/absence, biomass, diversity	Fair	No edible native limu observe and/or Invasive limu observed in high density	Presence of either Limu wāwae'iole, Limu manauaea or Limu māne'one'o Diveristy:1-2 native macro species	Presence of Limu wāwae'iole, Limu manauaea and Limu māne'one'o Abundance: Limu manauaea observed from canoe club to Seaside jetty. Diversity: 3-5 native macro species	Presence 5 or more edible native limu species. Abundance: 2 or more or observed from canoe club to Seaside jetty. Diversity: greater than 5 native macro species
△ Complex benthic structure & coral diversity	Fair	Flat reef structure, filled ledges and holes	Current reef structure; less than 5% living coral with reef ledges and holes hosting marine life	Greater than 5% living coral with reef ledges and holes hosting marine life	Living coral cover 10% and reef rugosity increasing

Kahului Harbor Community Action Plan

Target Viability Ranking by Indicators					
Targets & Nested Targets by Indicators	Status	Poor	Fair	Good	Very Good
Water Quality	Fair				
△ Quantity of fresh water supplied by spring and seeps	Fair	No flow	Current Flow	Increased flow Minimum 25 MGD from Nā Wai 'Ehā	Natural flow Pre Sugar Cane and Pineapple Diversions
△ Levels of turbidity, nutrients & pollutants	Fair	Does not meet appropriate state water quality standard and there is declining trend in water quality	Does not meet appropriate state quality standards (no trend data)	Meets appropriate state water quality standards (no trend data)	Meets appropriate state water quality standards and conditions are either stable or improving
Beaches & Dunes	Fair				
△ Healthy coastal strand	Poor	Coastal dunes have been leveled, filled, or landscaped inappropriately	Degraded coastal dunes with some recovering areas	Mostly healthy coastal dunes with native vegetation and designated access paths to mitigate further human impacts	Native vegetated coastal dunes, with designated access paths and signage, that trap sand and provide habitat and hazard mitigation; long-term stewardship group in place
△ Pōhaku (rock beach) From the Maui Beach Hotel to the West Break Wall	Fair	Coastal hardening loss of pōhaku beach	Current pōhaku beach	Pōhaku beach provides road protection marine habitat being restored	Pōhaku beach provides proper road protection and marine habitat

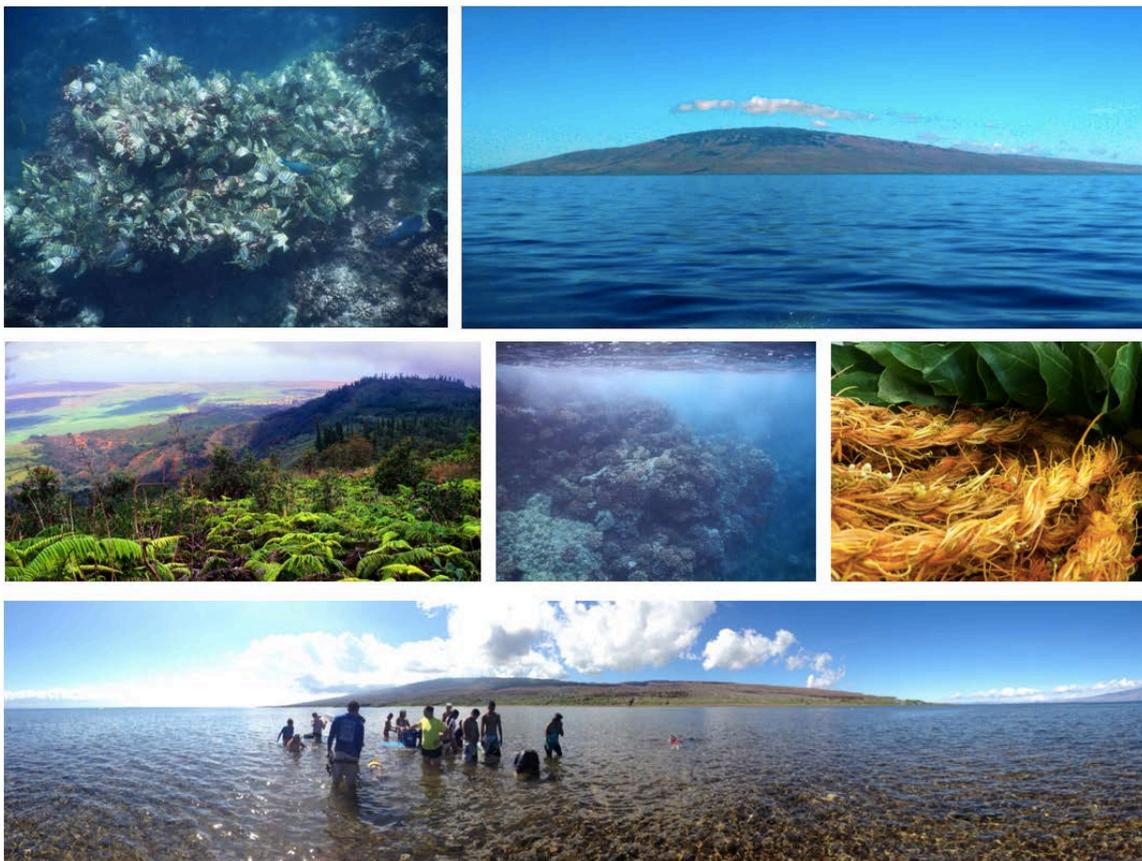
Kahului Harbor Community Action Plan

Target Viability Ranking by Indicators					
Targets & Nested Targets by Indicators	Status	Poor	Fair	Good	Very Good
Healthy Harbor Community	Fair				
Enhanced Recreation	Fair				
△ Facilities that enhance recreational uses	Poor	No facilities, prevent recreational use	Minimal facilities inhibit use	Most necessary areas have proper facilities & up-keep	All necessary areas have proper facilities; Restrooms located at West Break Wall and Ho'aloa Park
△ Public safety	Fair	Harbor unsafe: Low presence of law enforcement, undeterred illegal activities	Harbor sometimes unsafe: More presence of law enforcement	More presence of law enforcement at times when illegal activity is highest; illegal incidents reduced by 50% from 2015 levels	Little illegal activities or incidents; illegal incidents reduced by 75% from 2015 levels
△ Preventative maintenance program	Fair	Man made infrastructure is not maintained: dangerous for people, negatively effects on marine ecosystem	Man made infrastructure is poorly maintained: in the future will have negative effects on people and marine ecosystem	Man made infrastructure is maintained: neutral effects for human use and marine ecosystem	Man made infrastructure is improved with time: positive effects on human use and marine ecosystem
Public Access	Fair				
△ Defined access & pathways	Poor	No defined pathways or access	Few routes defined	All major paths defined	All paths and sensitive habitat defined (scenic pathways connect the entire harbor and the West Break Wall)
△ Accessibility maintained at West Break Wall	Fair	No Access	Current open access; landscaped unimproved	Open access with landscape improvements	Open access with recreational pathways, landscaping lighting
Community Stewardship	Fair				
△ Community stewardship	Fair	No community stewardship within the Harbor	A community stewardship organization no regularly scheduled events	A community stewardship organization has a monthly Harbor event	Multiple community supported organizations working within the Harbor

Lāna‘i Island

≈ Makai ≈

Draft Community Action Plan



2016



Born was Lāna‘i, an island

Lāna‘i is recognized in this *mele ko‘ihonua* (genealogical chant) as the fourth of the Hawaiian Islands. According to Hawaiian tradition, the islands were born from the unions of Wākea, often referred to in other cultures as Sky Father, and Papahānaumoku, Earth Mother (need citation).

‘O Wākea noho ia Papahānaumoku,
 Hānau ‘o Hawai‘i, he moku,
 Hānau ‘o Maui, he moku.
 Ho‘i hou ‘o Wākea noho iā
 Ho‘ohōkūkalani.
 Hānau ‘o Moloka‘i, he moku,
 Hānau ‘o Lāna‘i ka ‘ula, he moku.
 Lili ‘ōpū punalua ‘o Papa iā
 Ho‘ohōkūkalani.
 Ho‘i hou ‘o Papa noho iā Wākea.
 Hānau ‘o O‘ahu, he moku,
 Hānau ‘o Kaua‘i, he moku,
 Hānau ‘o Ni‘ihau, he moku,
 He ‘ula a ‘o Kaho‘olawe.

Wākea lived with Papa, begetter of islands,
 Born was Hawai‘i, an island,
 Born was Maui, an island.
 Wākea made a new departure and lived
 Ho‘ohōkūkalani.
 Born was Moloka‘i, an island,
 Born was red Lāna‘i, an island.
 The womb of Papa became jealous at its
 partnership with Ho‘ohōkūkalani.
 Papa returned and lived with Wākea.
 Born was O‘ahu, an island,
 Born was Kaua‘i, an island,
 Born was Ni‘ihau, an island,
 A red rock was Kaho‘olawe.

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This page: Sol Kaho‘ohalahala

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Executive Summary

Lānaʻi's natural resources have sustained Native Hawaiian and local resident families for generations. Despite their importance, Lānaʻi's marine life is endangered by a number of unmanaged human and land-based threats. By creating and committing to this Community Action Plan, (CAP) the Lānaʻi community joins a wave of conservation-minded groups around the world working to buffer its natural resources against climate change and other global and local threats. This plan aims to protect not only natural resources, but also ancestral knowledge and values that live *through* these resources and teach the community to take better care of the environment and one another.

This CAP was written by, and for, the residents of Lānaʻi and those who care for the island. We, the community, believe Native Hawaiian wisdom and practices are essential to the sustainable management of the natural resources and our way of life, and also invite collaboration among groups with a stake in the resources to be a part of this management conversation.

This CAP targets marine and coastal resources along the entire coastline of Lānaʻi that are vulnerable to threats existing *mauka* to *makai*. The six priority targets that we would like to see return to health and abundance include coral reef and reef fish assemblages, jacks and nearshore pelagic fish, shoreline habitat and fisheries, rocky intertidal fisheries, cultural landscapes, and the Lānaʻi way of life. The threats that challenge these resources include erosion and sedimentation, climate change, unsustainable harvest, ocean user conflict, marine debris and coastal waste, coastal development, and changing culture and lifestyle of Lānaʻi.

Our goals are for healthy coastal and marine ecosystems, community involvement in perpetuating the Lānaʻi way of life, and the establishment of a Lānaʻi-specific ocean management framework. These goals embody our island culture and address needs that resonate across Maui Nui. Our aim is to restore and maintain the vital components of our island environment and community. This is an opportunity to create an ocean management framework that recognizes and values local subsistence fishing, tourism, economic growth, Hawaiian culture, and Lānaʻi's marine ecosystem.

Acknowledgements

This CAP acknowledges how the people of Lānaʻi care for and envision our island future. It represents our involvement, respect, and responsibility for place, and in turn, our hope that Lānaʻi will be rejuvenated to provide for us. This CAP is dedicated to unite all partners.

Why We Need This Plan

Lāna‘i’s natural resources have sustained Native Hawaiian and local resident families for generations. Today, marine resources, including coral reefs and near-shore fisheries, remain central to island life. Despite their importance, Lāna‘i’s marine life is endangered by a number of unmanaged human and land-based threats, including sedimentation, climate change, and overharvest.

By creating and committing to this Community Action Plan (CAP) the Lāna‘i community joins a wave of conservation-minded groups around the world working to buffer its natural resources against climate change and other global and local threats. In order to restore and maintain resource abundance, this plan identifies species and ecosystems that need special *mālama* (care), threats that are cause for concern, and a sustainable way forward to manage Lāna‘i’s future.

It is important to note that this plan aims to protect not only natural resources, but also ancestral knowledge and values that live *through* these resources. In Hawai‘i, the environment is the foundation for traditions and cultural identity. The *mo‘olelo* (history) of Lāna‘i describes the resourcefulness, patience, and ingenuity of our Hawaiian ancestors and reminds us of the values that instill meaning and connection to the environment. For example, this intimate knowledge of Lāna‘i enabled the Hawaiian people to survive in the most extreme drought conditions by sourcing water from droplets found on blades of grass and *‘ilima* blossoms. Perpetuating the island’s oral traditions by continuing to share these types of stories and values teaches our community to take better care of ourselves, our environment, and each other.

Who We Are

This document was written by, and for, the residents of Lāna‘i and those who care for our island. We are a group of parents, grandparents, fishers, hunters, farmers, Native Hawaiians, students, conservation professionals and scientists who came together with a shared goal: To develop a CAP to restore the health and abundance of Lāna‘i’s coral reefs, near-shore fisheries, and coastal ecosystems.

We believe Native Hawaiian wisdom and practices are essential to the sustainable management of natural resources and our way of life. We believe that success will be achieved through collaboration among groups with a stake in the resources, and that the community of Lāna‘i should be at the center of this process since we and our descendants have the biggest stake in actively caring for our home.

Our vision: We accept our *kuleana* (privilege and responsibility) as stewards of Lāna‘i, from *mauka* (toward the mountains) to *makai* (toward the sea), to perpetuate the knowledge of *nā kūpuna* (our elders) as the foundation to restore the marine resources and to build a self-sustaining island ecosystem through an empowered and unified community.

We are inspired by and embody traditional values:

- **Pono** - *Do what is right*
- **Kuleana** - *Responsibility to people and place*
- **Laulima** - *Work together*
- **Kōkua** - *Commitment to helping others*
- **Ho‘omana‘o** - *Remember the past*



Attendees at the February, 2015 Lāna‘i CAP Meeting.
Photo: The Nature Conservancy

Context

Lānaʻi is a single, gently sloping volcano that formed between 1.2 and 1.46 million years ago. The island has 47 miles (76 km) of coastline that are protected from the north and northeast swells by the islands of Maui and Molokaʻi. The climate is typically dry with stream activity only during large rain events. Rainfall at the summit averages around 26-34 inches (66-84 cm) per year plus moisture attained through fog-drip, while the coasts receive 15 inches (38 cm) per year based on averaged weather station data from 1924-2016 (Giambelluca et al., 2013).

Until the last ice age (about 12,000 years ago) Lānaʻi was part of a larger island called Maui Nui, now the islands of Maui, Lānaʻi, Molokaʻi and Kahoʻolawe. Today they are connected by proximity, shallow waters, and currents. Coral reefs and fish populations are linked by larval dispersal. Larvae from one island are transported to other neighboring island by currents, seeding one another (Kobayashi, 2008; U.S.G.S., 2003).



Sunrise at Maunalei, Lānaʻi. Photo: Manuel Mejia

Lānaʻi is comprised of thirteen *ahupuaʻa*, three of which are unique in that they extend across the island from the *kona* to *koʻolau* regions. This speaks to the connectivity between the two sides of the island and how its inhabitants traveled to different parts of the island in order to harvest different resources.

Lānaʻi Koʻolau

The *koʻolau* or windward side of the island is exposed to the trade winds and is characterized by sandy beaches and coral reefs. Along the northern coast, windy conditions have formed a series of beaches and low sand dunes, buffered by a narrow fringing reef. The ocean here receives sediment from both the island's windswept northeastern mountains and from shallow gulches during severe rainstorms. Polihua, the longest beach on Lānaʻi, extends across 1.5 mi (2.4 km) of the northwest corner of the island. At Maunalei and Hauola, deltas form at the base of large erosional gulches along this coast, where flowing streams deposit sediment during massive rain events. Near Kahalepalaoa, the coast turns to face northeast and is out of direct exposure to Kona storm waves, allowing the fringing reef to widen. Along the southeastern coast near Naha and Lōpā is a thin, low-lying coastal terrace fronted by a narrow and continuous fringing reef (Fletcher, 2013).

Lānaʻi Kona

The *kona* or leeward side of the island is protected from the trade winds and the coastline is largely basalt rock. Between Polihua and Nānāhoa, the coast is rocky and wave eroded with small offshore coral patches and no sand. Offshore of Nānāhoa lies a beautiful assembly of sea stacks isolated by the retreating coast. Between Nānāhoa and Kaumalapau Harbor the sea cliffs reach heights of 344 ft (105 m). South of Kaumālapaʻu Harbor the sea cliffs rise up to 984 ft (300 m) above the ocean along the Kaholo Pali, extending to Mokunaio at the southwest corner of the island near Palaoa Pt. The sea cliffs reduce to 98 ft (30 m) in height as they approach the southwest corner of Lānaʻi at Kaunolū Bay. The Mānele-Hulopoʻe Marine Life Conservation District lies along the central south shore where the low-lying bays at Hulapōeo (traditional name for Hulopoʻe) and Mānele interrupt a sea cliff coast (Fletcher, 2013).

One of the earliest traditional accounts of Lāna‘i is the story of Kaululā‘au, a young chief from Lāhaina who is said to have freed the island from evil spirits in the 1400s, making Lāna‘i habitable. Once the island was settled, fish, mollusks, and *limu* (algae) formed a major part of the diet for Lāna‘i inhabitants.

In modern times, the land and people of Lāna‘i have experienced multiple economic and land-use changes, evolving from a village lifestyle to a ranching livelihood (with the introduction of several species of ungulates), then to pineapple production, and now to a resort economy. See **Appendix 4** for a timeline of Lāna‘i’s ungulate and land-use history.

Kaululā‘au was a mischievous boy known to pull up breadfruit trees. This was done so often that the trees became scarce in Lele, a district in Lāhaina. After much consideration, his father and chief of Maui, Kaka‘alaneo, banished Kaululā‘au to Lāna‘i, where ghosts were plentiful. Kaululā‘au is famed for defeating the numerous ghosts on Lāna‘i with his wit and skill, and made it a place fit to be inhabited by people as it is now.

The cave in which Kaululā‘au found shelter was at Ka Lae Hi, which lies close to Makalau, meaning ‘four-hundred eyes’. This is a *wahi pana* (storied place) that has reference to the eyes of the multitude of searching ghosts who intended to devour Kaululā‘au. However, Kaululā‘au entrapped the ghosts and sealed their eyes with breadfruit gum upon the mountain, Lāna‘i Hale (As told by Abraham Kauila and Nami Ka‘ōpū‘iki Makahanaloa).

Targets	Nested Targets
Coral Reef & Reef Fish Assemblage	Reef Flat
	Fore Reef
	Estuaries
	Limu
	He‘e
	Moi
	Eneue
	Uhu
	Surgeonfish
	Ulua
Jacks & Nearshore Pelagic Fish	Ulua
	Pelagic Fish
Shoreline Habitat & Fisheries	Sand Dunes & Beaches
	Native Coastal Vegetation
	Kūpe‘e
	‘Ōhiki
Rocky Intertidal Fisheries	‘Opihi
	‘A‘ama
	Limu
Cultural Landscape	Storied Places
	Cultural Sites
	Fishponds
	Respect
	Access
Lāna‘i Way of Life	Subsistence Fishing
	Slow Driving

Table 1: CAP Targets

What We Care About

Lāna‘i Targets and Definitions

There are six priority targets that we would like to see return to health and abundance. We care deeply about these species, ecosystems, and cultural landscapes and want to ensure they remain for future generations to enjoy.

Coral Reef and Reef Fish Assemblage

This assemblage includes corals, algae, fish, and invertebrates that comprise a healthy nearshore reef ecosystem. Coral reef ecosystems provide valuable habitat for resource fish and *limu* harvested for sustenance. Northeast Lāna‘i is home to one of the largest coral reefs (2.8 mi², 1801 acres) in Maui County and in the state (Field, 2011). In the same area, from Maunalei to Kahalepalaoa, there are also extensive shallow reef flats, favored habitat for species like *he‘e* (day octopus). Here, close to shore, subsurface fresh water flow creates estuarine habitat for juvenile reef fish species and edible *limu* species.

Jacks & Nearshore Pelagic Fish

This target includes all species of jacks (*Carangidae*) and other highly mobile fish species associated with deep nearshore waters, like *ono*, *ahi* and *mahimahi*. These fish are prized by shoreline fishers and trollers. Fishing grounds and habitats include naturally occurring fish aggregation areas, such as certain currents and rocky drops offs, and artificial aggregation devices like FADs.



Reef fish and corals at Mānele-Hulapōeo MLCD.
Photo: Karin Osuga.



Lithified sand dunes at Ka Lae Hi on Lāna‘i’s northeast shore. Photo: Sol Kaho‘ohalahala



Kauno‘a is often gathered for use in lei making.
Photo: Sol Kaho‘ohalahala

Kauno‘a and *pōhuehue* grow together on coastal stretches of sand, *pōhuehue* being the first to develop. *Kauno‘a*, known as *kaunao‘a* elsewhere in Hawai‘i, then grows over the *pōhuehue* and uses it for nutrients. Due to overgrazing by ungulates, their interaction has been scarce witnessed for the past 30 years on Lāna‘i, and *kauno‘a*, the “flower” of Lāna‘i, has been more difficult to collect for lei making. Their scarcity is a call for community *mālama*.

Shoreline Habitats & Fisheries

On the *kona* side of Lāna‘i, the shoreline is primarily basalt boulder beach, shelves, and cliffs, with species like *limu*, ‘*opihi*, ‘*a‘ama*, *pūpū*, and *hā‘uke‘uke* living between the high and low tide marks. Intertidal zones provide a unique habitat for many invertebrate species, valuable nursery areas for many fish species, and important local harvesting areas.

On the *ko‘olau* side, the shoreline is primarily sand beach and lithified sand dunes where species like sand crabs thrive. There are also coastal wetlands of varying salinity with subsurface connections to the ocean. Most, if not all, of the native coastal vegetation like *poehuehue*, *kauno‘a* (also known as *kaunao‘a*), and *naupaka* has been replaced by *kiawe* and non-native plant species.

Rocky Intertidal Fisheries

This fishery includes species harvested from the rocky shoreline area between high and low tide marks, primarily *limu* and invertebrate species including *a‘ama* crabs, ‘*opihi* and urchins.

Cultural Landscape

This component includes the stories and names of places, traditions, values and resources that are the foundation of the Hawaiian cultural landscape and identity. For instance, the symbiotic relationship between native plant species *kauno‘a* and *pōhuehue* represent a great lesson of comradery that teaches the people of Lāna‘i to work together – a lesson that can only be taught if these organisms and their story live on. This irreplaceable ‘*ike* (knowledge) enriches all the people and landscapes of Lāna‘i and Hawai‘i.

Lāna‘i Way of Life

This component is focused on perpetuating culture unique to Lāna‘i as a result of many important place-based values, landscapes and traditions. For instance, only one road on Lāna‘i is paved, so when driving on the many dirt roads, it is common courtesy to kindly share the road with oncoming cars and to slow down so as not to kick up dust. Subsistence practices such as fishing and hunting are important supplements to local income and diet.

What The Challenges Are

Lāna‘i Threats and Definitions

These are the seven priority threats that we would like to address in order to restore our target resources.

Erosion & Sedimentation

The primary driver behind changes in vegetation and soil profile has been the introduction of ungulates (hooved animals). Hawai‘i’s isolated native ecosystems evolved without the need to protect themselves against grazing and browsing ungulates, which were introduced to Lāna‘i in the early 1800s. At various points in time, goats, axis deer, pigs, pronghorn antelope, and mouflon sheep have reduced native plant and animal populations, contributing to staggering statistics: only 2% of the dryland forest and 30% of the cloud forest on the island remain due to years of land degradation (U.S. Fish and Wildlife Service, 2012). See **Appendix 5** for a timeline of ungulate presence and land-use history for Lāna‘i. In addition to overgrazing by ungulates (currently from axis deer (*Cervus axis*) and mouflon sheep (*Ovis orientalis*)), widespread deforestation on Lāna‘i has led to a decline in native habitat that has never fully recovered (Macdonald et al., 1986; Fletcher, 2013).

The extensive loss of vegetation on Lāna‘i has drastically diminished soil stability, exposing loose, denuded soils that wash down gulches into nearshore waters following heavy rains. This leads to brown water events on both the *kona* and *ko‘olau* sides of the island, reducing water visibility and light available to coral reefs and algae, inhibiting photosynthesis. Once soil settles on the bottom of the ocean, it is considered sediment, which smothers and erodes nearshore habitats, including sand beaches and coral reefs that house invertebrates, algae, and fish, rendering them inhospitable to their usual constituents. Sediment resuspension during tidal changes and strong winds perpetuates this cycle over the long-term. The *Status of Coral Reefs of the World* (2004 and 2008) highlight sediment run-off as one of the most serious stressors affecting coral reefs in the Hawaiian Islands (Wilkinson, 2004; Wilkinson, 2008; Waddell & Clarke, 2008).

Climate Change Impacts

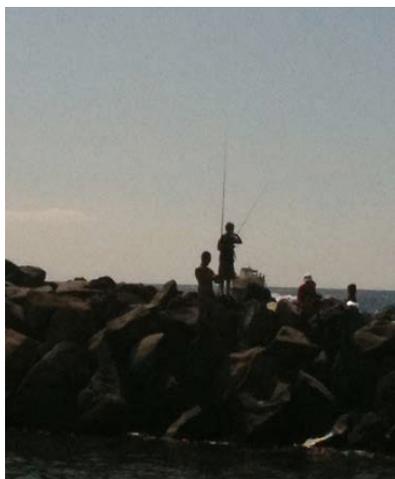
Climate change is one of the most significant long-term threats facing Lāna‘i’s nearshore reefs. Presently, the most noticeable effects of climate change are increased intensity of storms, along with altered seasonal variations – the consequential effects being the sedimentation and alteration of coastal, nearshore, nursery, and coral reef habitats, and coral bleaching due to increasing sea surface temperatures. Other potential effects include seawater intrusion into coastal areas from a rising sea level, and increased and prolonged thermal and pH stress on corals, algae and other susceptible organisms. Management actions that reduce sediment erosion and ensure fisheries are sustainably managed would increase the resilience and recovery of Lāna‘i’s reefs and reduce the susceptibility to the effects of climate change.



*Lack of vegetation leads to exposed soils and sedimentation in the nearshore marine environment.
Photo: Sol Kaho‘ohalahala*



*A brown water event at Maunalei after a big rain.
Photo: Sol Kaho‘ohalahala*



Fishing is an important subsistence, practice. Photo: Sol Kaho'ohalahala

Unsustainable Harvest

Statewide decreases in nearshore fisheries have been recorded for more than 100 years, in part due to harvesting marine species faster than they can reproduce (Boehlert, 1993; Jokiel et al., 2011). On Lānaʻi, there is recreational, subsistence and commercial fishing for species that inhabit the shoreline, coral reef and nearshore deep water habitats. Fishers include full-time and part-time Lānaʻi residents and people from neighbor islands who access fishing grounds from shore and by boat. Recently, fishing effort has increased alongside a boom in contracted construction work on Lānaʻi, and after new strict bag and size limits for parrotfish and goatfish were implemented on Maui. There is also the concern that Native Hawaiian customary practices would be extinguished if resources within subsistence areas are overharvested. Island population growth is projected to double in the future, thus foreseeably exacerbating the issue of unsustainable harvest if no preventative management action is taken.

Ocean User Conflicts

There are several user conflict hotspots on Lānaʻi, primarily between on-island divers, pole fishers, and ocean operators. In 2011, off of Kaumalapau Harbor, a whale watching zodiac tour operator out of Lāhaina Harbor tragically killed a Lānaʻi resident diving off shore. At Kaʻena point, a local diver with flag and float was nearly hit by an ocean operator that was driving fast close to shore. At Kaunolū, local shoreline fishers compete with snorkel operators for space and use. With projected population and visitor growth on Lānaʻi and Maui, there will be more potential users and conflicts.

Marine Debris & Coastal Waste

With prevailing trade winds and currents, Lānaʻi's north shore is perfectly oriented to intercept large amounts of marine debris (see **Appendix 2** for a map of marine debris distribution around Lānaʻi). Marine debris consists of plastics and microplastics from human consumption that deliberately or accidentally enters the ocean often from far across the Pacific Ocean. Marine debris is unsightly for people, and harmful to marine organisms such as sea turtles and monk seals. Coastal waste is trash including human excrement and toilet paper due to the lack of public facilities, occurring at frequented coastal areas. This is both an eyesore and a health risk that can inhibit tourists and other community members from visiting the area.

Coastal Development

Potential coastal development on Lānaʻi at multiple locations including Kahalepalaoa will likely disrupt cultural practices such as local subsistence and recreational fishing practices, way of life and use patterns. Additionally, development would have negative effects on the nearshore environment by increasing nutrient pollution and compounding the existing sedimentation issue.

Changing Culture & Lifestyle of Lānaʻi

Lānaʻi is no stranger to change, however the current pace of change is rapid, with an increasing number of visitors and shifting demographics within the community. The local culture that distinguishes Lānaʻi from other islands and is a draw to visitors is vulnerable to off-island influences and needs attention. With just over 3,000 residents, the local economy, once rooted in agriculture, is now based in tourism. In 2014 alone, visitor revenue totaled \$74.8 million (KHON2, 2015). Thus a challenge remains to maintain the positive and cherished aspects of Lānaʻi culture while sharing *aloha* and embracing visitors and new residents.

Towards Solutions

Lāna‘i Coastal and Marine Strategies

There are three overarching goals in this plan. Each goal has several objectives and strategic actions, providing a starting point for our community to take action. These goals represent a coming together of many experts, initiating formal discussions about Lāna‘i’s coastal and marine resource future, and encouraging more collaboration and conversation.

Effective management of our coastal resources needs to address multiple issues and objectives in order to achieve sustainability, conservation and resilience against climate change and other threats. The strategies in this plan aim to protect a range of habitats used by many different marine species in both prescriptive and preventative ways. Addressing current issues of overharvest and sedimentation repair damage already done, while building ecosystem resilience to climate change reduces future negative impacts.



A view of the ocean from mauka Lāna‘i.
Photo: Sol Kaho‘ohalahala

Goal 1: Healthy Coastal and Marine Ecosystems

Create a healthy and resilient nearshore reef environment that supports an abundance of fish.

Goal 2: Community of Practice

Build and expand upon community involvement and *kuleana* to perpetuate, safeguard, embrace, accept, and promote Lāna‘i’s self-sufficient and independent way of life.

Goal 3: Ocean Management Framework

Develop a Lāna‘i-specific ocean management framework and gain broad-based support for it.

Ocean Management Framework

Island-Based Fisheries Rules (Hawai‘i Administrative Rule 33-95.1) allow for rules to be developed island by island, considering the specific needs of the people and place. This CAP proposes a four-part, proactive framework to return nearshore fisheries and coral reefs to abundance, and address ocean safety concerns by creating:

- 1) Island-wide fishing rules
- 2) Fishery replenishment areas (refugia or no-take areas) from the shore to beyond the reef
- 3) Special Management Areas: Kaunolu Ocean Management Area, Polihua Turtle Nesting Management Area, Maunalei Limu Restoration Area
- 4) A Lāna‘i Regional Fisheries and Ocean Use Management Council

GOAL 1: HEALTHY COASTAL AND MARINE ECOSYSTEMS		
Create a healthy and resilient nearshore reef environment that supports an abundance of fish.		
Objective 1.1		
Reduce sediment inputs to the reef by 50% at the top 2 priority watersheds, Maunalei and Hauola, by 2018.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Communicate, collaborate and create partnerships with all stakeholders about the sense of urgency and the need to proactively reduce sedimentation to restore coastal and marine health. b. Develop a plan that actively engages community in <i>mauka-makai</i> management, including replanting native plants, fencing, management of ungulates, implementing appropriate sediment control, restoring and maintaining <i>kahawai</i> (streams) and creating water capture areas to increase filtration.	Coral Reef & Reef Fish Assemblage	Erosion & Sedimentation
	Jacks & Nearshore Pelagic Fish	
	Shoreline Habitats & Fisheries	
	Cultural Landscape	
	Lāna'i Way of Life	
Objective 1.2		
Double the biomass of target reef fish island-wide in 5 years.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Seek out and incorporate community input and existing data to inform, evaluate and strategically design a management framework for sustainable fishing in nearshore waters island-wide. b. To implement framework, seek appropriate designations and propose island-based fishery rules with DLNR DAR. c. Seek enhanced enforcement capacity for existing and new proposed DAR fishing rules on Lāna'i.	Coral Reef & Reef Fish Assemblage	Unsustainable Harvest
	Jacks & Nearshore Pelagic Fish	
	Shoreline Habitats & Fisheries	
	Cultural Landscape	
	Lāna'i Way of Life	
Objective 1.3		
Double the 'opihi and 'a'ama at Kaunolū in 5 years.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Develop and conduct community-based 'a'ama and 'opihi monitoring programs at Kaunolū, which include data collection and sustainable harvest protocols. b. Using baseline data, establish a management and restoration plan as a demonstration project.	Shoreline Habitats & Fisheries	Unsustainable Harvest
	Cultural Landscape	Ocean User Conflicts
	Lāna'i Way of Life	

Table 2: Goal 1.



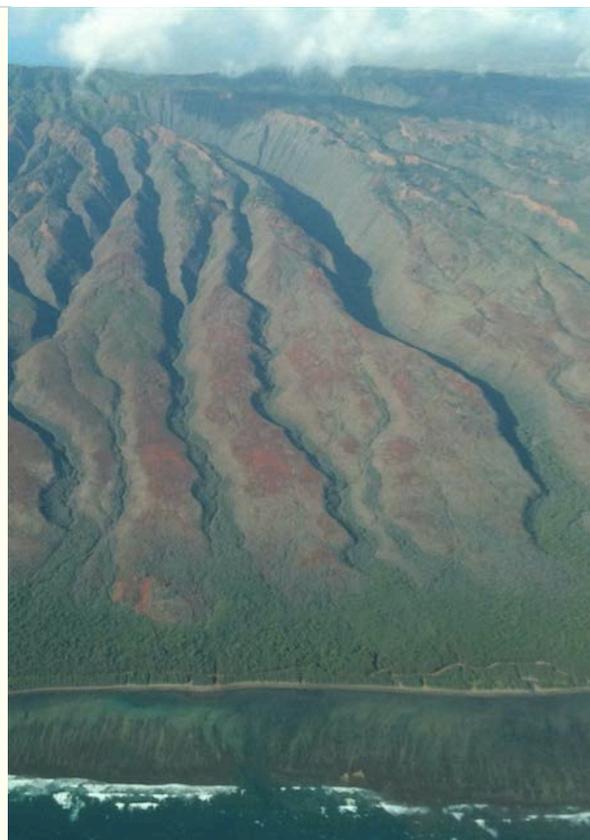
The Lāna'i community surveying shallow-water habitat. Photo: Sol Kaho'ohalahala

Why Maunalei & Hauola?

Maunalei and Hauola are the largest of the major gulches on the *ko'olau* side of Lāna'i and were identified as priority watersheds for this plan. Compared to other watersheds, these gulches contribute the most sediment and have the greatest effect on nearshore ecosystems and local fishing, which continues to be a very important livelihood for practitioners in this area.

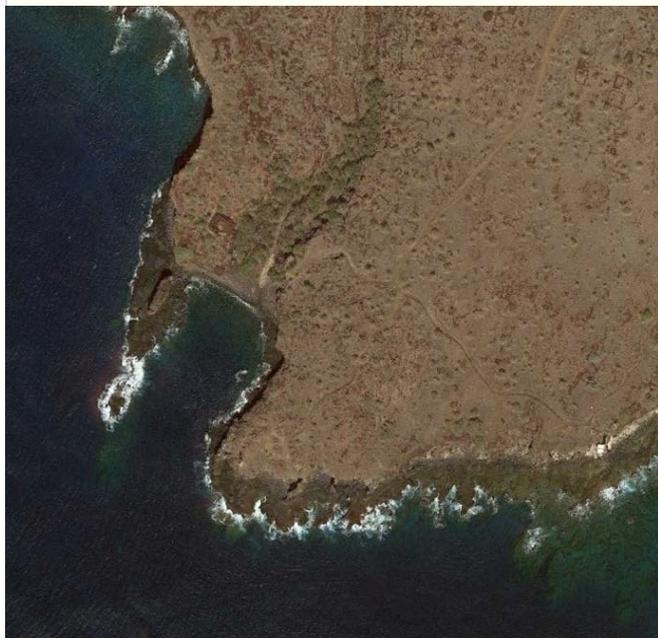
Today, during massive rain events large amounts of sediment get washed down the gulch and out onto the reef where it turns the ocean brown and smothers the corals and *limu*. Efforts by local community group Maunalei Ahupua'a CMMA supported by Conservation International to build gabions (small dams of *kiawe* branches) on *kuleana* lands at the base of the watershed have demonstrated that it is possible to slow the water during these flood events. During the 2014 rainy season, nearly 40,000 lbs (20 tons) or the equivalent of 2.5 dump trucks of sediment were kept off the reef by this project (Teneva, 2015).

Another ongoing community effort is the Maunalei Limu Restoration Project, which is working to cultivate native *limu* that was once plentiful here ("What's Happening at Maunalei?" 2013; Maunalei, Keomoku and the Kahalepalaoa Vicinity, 2016).



Why Kaunolū?

Kaunolū is the site of an ancient fishing village and Halulu Heiau. Kaunolū Village is the largest surviving ruin of a Hawaiian village in the islands, sitting high on the southern sea cliffs overlooking Kaunolū Bay, which provided a sheltered landing spot for fishing canoes. The area is very arid and the stream in the gulch is seasonal and prone to flash floods. However, the offshore waters are extremely rich fishing grounds and have been fished for centuries.



Halulu Heiau was rebuilt by Kamehameha I after he captured the Island of Lāna'i in the early 1800's. It also had an associated *pu'uhonua* (place of refuge), the only one on the island of Lāna'i. At the top of the hill behind the heiau is Kahekili's Leap, a 63-foot cliff edge where *lele kawa* (cliff jumping) was practiced by Kahekili, Chief of Maui (mid-1700s) and his warriors. Today, Kaunolū is listed as a National Historic Landmark and attracts many visitors and snorkel tours. This causes a conflict with the subsistence fishermen as they get pushed out of their fishing grounds by commercial tours and visitors. It is also a popular location for off-island fishers, leading to concerns of overharvest. Kaunolū has been proposed as a demonstration project location for intertidal fisheries in this CAP (*'opihi* and *a'ama* crabs) because of its cultural and historical importance and because it is accessible and visible to resource users ("Kaunolū Village Site, Island of Lanai, Hawaii," n.d.).

GOAL 2: COMMUNITY OF PRACTICE		
Build and expand upon community involvement and responsibility to perpetuate, safeguard, embrace, accept and promote Lāna'i's self-sufficient and independent way of life.		
Objective 2.1		
Reinvigorate sustainable subsistence fishing practices, and increase sustainability of fishing.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Develop a pono fishing and harvesting code of conduct for on- and off-island fishers, including trash clean-ups. b. Maintain and protect traditional fishing trails and access to fishing grounds. c. Conduct <i>lawai'a</i> camps to educate youth, engage families and elders in passing on <i>pono</i> fishing knowledge, and develop a Lāna'i moon and fishing calendar. d. Work with DLNR DOCARE and DOBOR to uphold current laws and to change or modify them to ensure the safety of fishers and other ocean users.	Reef & Reef Fish Assemblages	Unsustainable Harvest
	Jacks & Nearshore Pelagic Fish	Marine Debris & Coastal Waste
	Shoreline Habitats & Fisheries	Ocean User Conflicts
	Rocky Intertidal Fisheries	
	Cultural Landscape	Changing Culture & Lifestyle of Lāna'i
	Lāna'i Way of Life	
Objective 2.2		
Increase community and youth involvement in place-based restoration.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Establish community engagement projects at Kaunolū and Maunalei. b. Increase awareness of the situation of Lāna'i reefs and the proposed solutions. c. Develop partnerships with Lāna'i Elementary and High School to integrate place-based restoration projects into curriculum. d. Conduct marine debris clean-ups. e. At Polihua, address vehicle use on the beach by working with stakeholders and government agencies to ensure safe habitat for sea turtles to nest and for other beach inhabitants such as 'ōhiki, kūpe'e, drill shells, sand turtles. f. Work with DLNR DAR to include community participation in the development of a management plan for Manele-Hulapōeo MLCD.	Reef & Reef Fish Assemblages	Unsustainable Harvest
	Jacks & Nearshore Pelagic Fish	
	Shoreline Habitats & Fisheries	Ocean User Conflicts
	Rocky Intertidal Fisheries	
	Cultural Landscape	Changing Culture & Lifestyle of Lāna'i
	Lāna'i Way of Life	
Objective 2.3		
Provide learning opportunities for visitors, workers and new residents about the Lāna'i way of life.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Develop collaborative partnerships and strategic communication materials to promote the unique Lāna'i way of life. b. Establish a beach ranger-type program located on Keomoku Road (e.g. Makai Watch, Ho'okō ā kai) to manage ocean use.	Lāna'i Way of Life	Unsustainable Harvest
		Ocean User Conflicts
		Marine Debris & Coastal Waste
		Changing Culture & Lifestyle of Lāna'i

Table 3: Goal 2.



Lāna'i community meeting. Photo: Sol Kaho'ohalahala

Goal 3: Ocean Management Framework Develop a Lānaʻi-specific ocean management framework and gain broad-based support for it.		
Objective 3.1 Effectively communicate the process to develop the plan and the outcomes.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Conduct outreach to island stakeholders and hold community meetings to explain the CAP process and intended outcomes and to seek input and support. b. Modify the CAP according to community feedback and engage agencies to further develop and implement a Lānaʻi specific ocean management framework. c. Seek broad-based support on Lānaʻi, across the state, and from agencies for an ocean management framework.	Reef & Reef Fish Assemblages	Unsustainable Harvest
	Jacks & Nearshore Pelagic Fish	Ocean User Conflicts
	Shoreline Habitats & Fisheries	Marine Debris & Coastal Waste
	Rocky Intertidal Fisheries	Changing Culture & Lifestyle of Lānaʻi
	Cultural Landscape	Increase in Ocean & Coastal Users
	Lānaʻi Way of Life	
Objective 3.2 Develop a Lānaʻi-specific ocean management framework.		
Strategic Actions	Targets Addressed	Threats Addressed
a. Develop island-wide fishing rules. b. Design fishery replenishment areas (refugia or no-take areas). c. Establish Special Management Areas (e.g. Kaunolū Ocean Management Area, Polihua Turtle Nesting Management Area, Maunalei Limu Restoration Area). d. Propose a Lānaʻi Island-Based Fisheries and Ocean Use Management Council.	Reef & Reef Fish Assemblages	Unsustainable Harvest
	Jacks & Nearshore Pelagic Fish	Ocean User Conflicts
	Shoreline Habitats & Fisheries	Marine Debris & Coastal Waste
	Rocky Intertidal Fisheries	Changing Culture & Lifestyle of Lānaʻi
	Cultural Landscape	Increase in Ocean & Coastal Users
	Lānaʻi Way of Life	

Table 4: Goal 3. See *Appendix 3* for Reef Resilience Principles that guided the creation of Goal 3.



Lānaʻi's coral reef seascape. Photo: Karin Osuga



Here are some area-based designations for marine management that are in use across the state that may help us achieve and inform our goals:

1. Island-based fishing rules – Division of Aquatic Resources (DAR)
Specific fishing rules, like bag and size limits, can be instituted on an island scale to address the needs and issues of that island.
2. Fishery Replenishment Area (FRA)/Fishery Management Area (FMA) – DAR
Designed to manage, preserve, protect, conserve or propagate fisheries and marine life.
3. Marine Life Conservation District (MLCD) – DAR
Designed to conserve and replenish marine resources. Allow only limited fishing and other consumptive uses, or prohibit such uses entirely. They provide fish and other aquatic life with a protected area in which to grow and reproduce.
4. Ocean Management Area – Division of Boating and Ocean Recreation (DOBOR)
Designed to reduce conflicts among ocean water users, especially in areas of high activity.

Next Steps

A lot of effort has gone into developing this CAP as a first step to creating a foundation for stakeholders to contribute planning ideas to Lāna‘i’s resource future. Next steps include communicating and collaborating on these management goals on Lāna‘i. This is an opportunity to create an ocean framework that recognizes and values local subsistence fishing, tourism, economic growth, Hawaiian culture, and Lāna‘i’s marine ecosystem.

Contact Information

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– Hawaiian Islands Humpback Whale National Marine Sanctuary
– Pacific Services Center
- Office of Hawaiian Affairs
- State of Hawai‘i Department of Land and Natural Resources
– Division of Aquatic Resources
- The Nature Conservancy
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Definitions

'A'ama: Saltwater shore crab

Ahi: Tuna

Ahupua'a: Land division usually extending from the uplands to the sea

Aloha: Greetings, farewell, and an expression of love

Enenue: Rudderfish/chub

Hā'uke'uke: Armored/shingles urchin

He'e: Day octopus

'Ike: Understand, knowledge, recognize

'Ilima: Native Hawaiian flowering shrub

Kahawai: River, stream

Kauno'a/Kauna'oa: Native beach plant, Hawaiian dodder

Kiawe: Mesquite tree

Kona: Leeward side

Ko'olau: Windward side

Kuleana: Responsibility, right, privilege

Kūpe'e: Sand crab

Kūpuna: Elders

Lawai'a: Fisherman

Lele kawa: Cliff jumping

Limu: Algae

Makai: Seaward, toward the sea

Mālama: To take care of; tend, preserve, protect, maintain

Mahalo nui: Many thanks

Mahimahi: Dolphinfish

Mauka: Inland, upland, towards the mountain

Moi: Pacific threadfin

Mo'olelo: Story, tale, tradition, legend

Nā kūpuna: Our grandparents, ancestors, elders

Naupaka: Native flowering beach shrub

'Ōhiki: Marine snail

'Ōpelu: Pacific mackerel scad

'Opihi: Saltwater limpet

Ono: Wahoo

Pōhuehue: Native flowering vine, beach morning glory

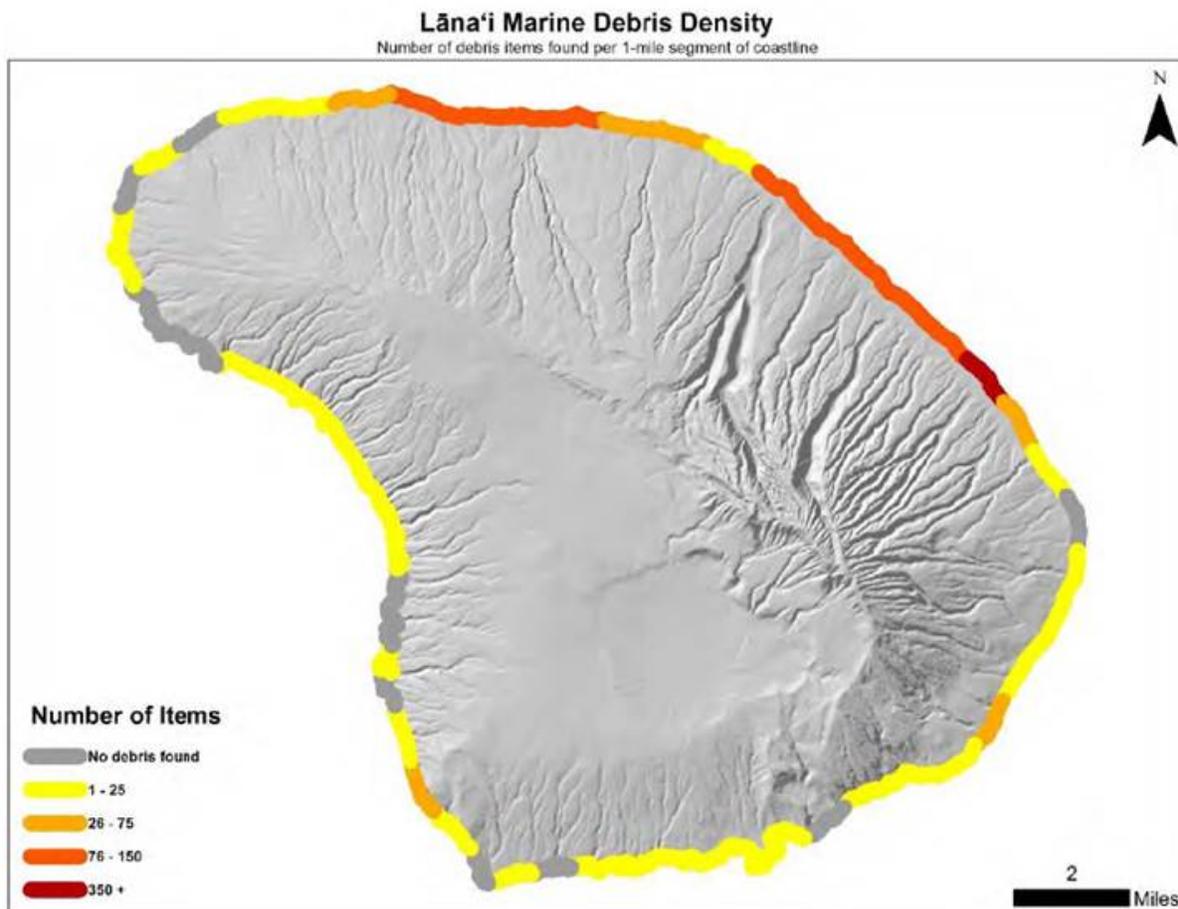
Pūpū: Sea snail

Pu'uhonua: Place of refuge

Uhu: Parrotfish

Ulua: Giant trevally

Wahi pana: Legendary place; significant place to those that live there



Analysis produced from aerial surveys conducted by Resource Mapping from August - November, 2015, with funding from the Ministry of the Environment of Japan through Hawaii Department of Land and Natural Resources (DLNR) and the North Pacific Marine Science Organization (PICES). GIS analysis performed by the University of Hawaii, Social Science Research Institute, Hawaii Coral Reef Initiative, with funding from Japanese Gift Funds through DLNR.

The following Reef Resilience Principles and State of Hawaii management tools were utilized in developing the Lāna‘i CAP strategies:

Reef Resilience Principles

Principle 1: Representation and Replication of resilient species and habitats that are well represented and replicated throughout a marine reserve network can decrease risk of catastrophic events, like bleaching, from destroying entire reef ecosystems.

- Represent 20-40% of each habitat within marine reserves
- Replicate protection of habitats within marine reserves
- Ensure marine reserves are in place for the long-term, preferable permanently
- Create a multiple use marine protected areas that is as large as possible
- Include resilient sites in marine reserves

Principle 2: Critical Areas are vital to survival and sustainability of marine habitats. These are areas that provide secure and essential sources of larvae, spawning aggregations and nursery habitats, and protect endangered species.

- Ensure marine reserves include critical habitats
- Include an additional 15% of key habitats in shorter-term marine reserves
- Have marine reserves in more square and circular shapes
- Include special or unique sites in marine reserves

Principle 3: Connectivity influences the design of marine protected area networks. Preserving connectivity among reefs ensures replenishment of fish stocks from nearby healthy reefs.

- Apply minimum and variable sizes to marine reserves
- Locate MPA boundaries both within habitats and at habitat edges
- Locate more protection upcurrent

Principle 4: Effective Management is essential to meeting goals and objectives, and ultimately keeping reefs vibrant and healthy. Reducing threats is the foundation for successful conservation along with investments in measuring the effects of actions, human capacity and long-term financing. Actions include:

- Prohibit destructive activities throughout the management area.
- Minimize existing and prevent new local threats

Lānaʻi Land-use Timeline 900-2012

