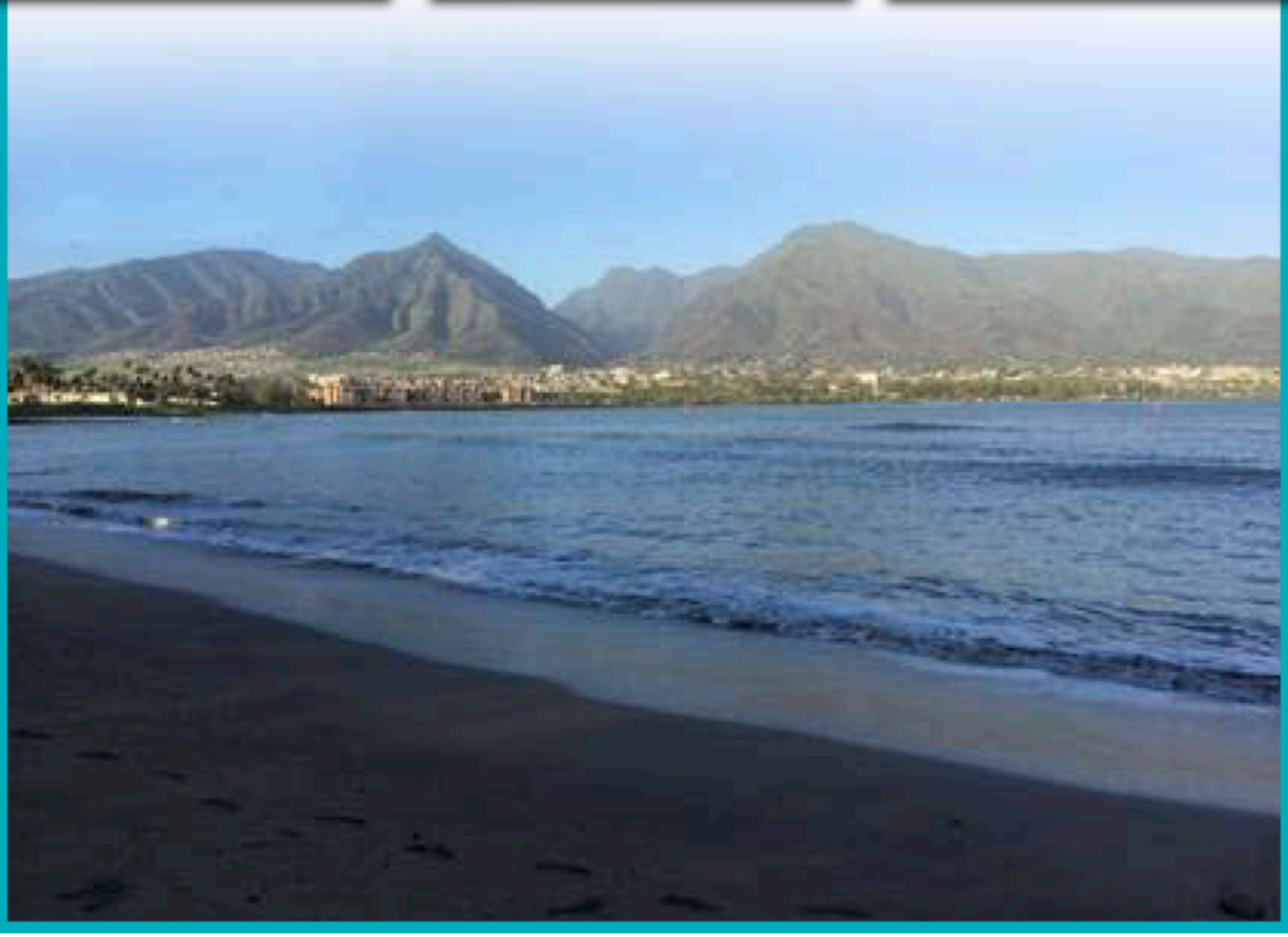
Kahului Harbor Community Action Plan

Wailuku Community Managed Makai Area
2016



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Cover photos courtesy of Wailuku CMMA.

EXECUTIVE SUMMARY

Before European contact, modern Kahului was low-lying wetlands comprised primarily of Hawaiian villages and *loʻi* (taro patches). Kanahā, just east of Kahului Bay, was part of an extensive fishpond complex. The area's rivers, streams, *loʻi*, 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.

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*	*Hōʻihi*	*Hoʻoponopono*	*Maʻa*	*Laulima*
Unity	Restoration	Honesty	Responsibility	Respect	Reconciliation	Understanding	Cooperation

UNDERSTANDING OUR PLACE

The Moku and Ahupuaʻa 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 *ahupuaʻa*, 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 Puʻu Kukui, the *moku* of Wailuku extends across West Maui's isthmus to its north and south shores, and includes *Nā Wai ʻEhā* (The Four Great Waters) of the Waikapu Stream, Wailuku ('Īao) River, Waiʻehu, and Waiheʻe Streams.

Wailuku *ahupuaʻa* 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 *loʻi* (taro patches) irrigated by the Wailuku River. The streams, *loʻi*, 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 Kapiiohookalani, a chief from Oʻahu and part of Molokaʻi 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.

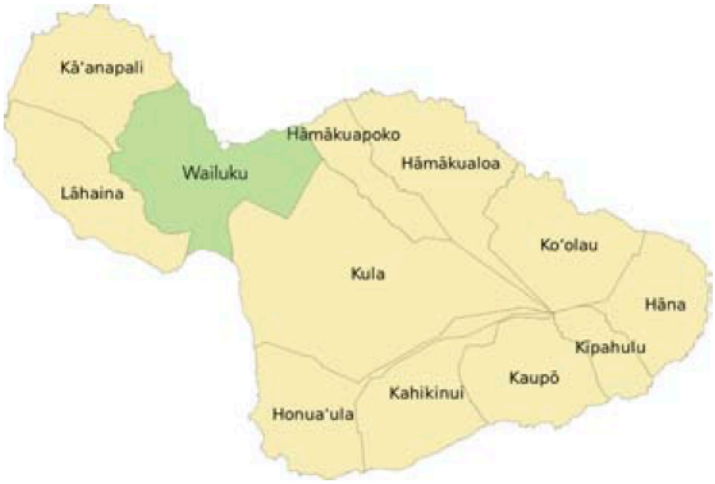

Figure 1: The moku of Maui.

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 arbor 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.

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 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:

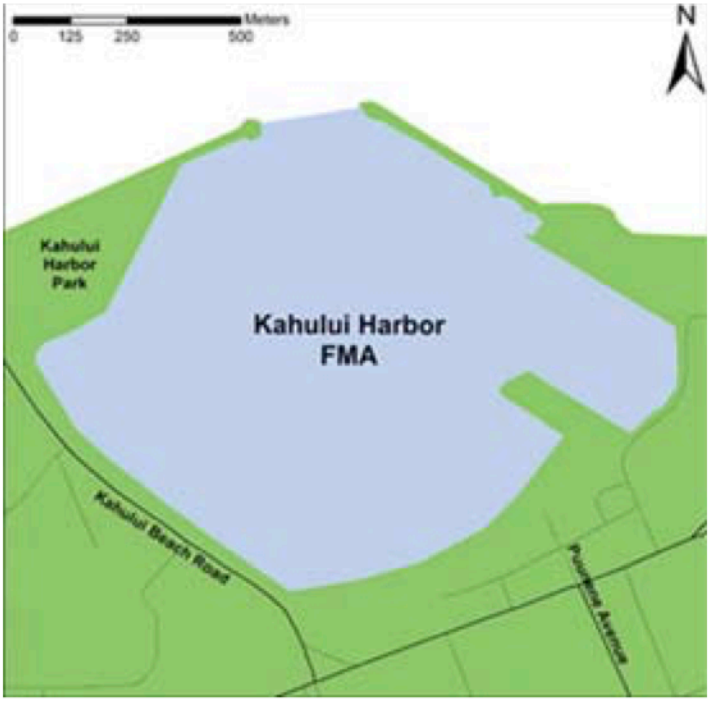

Figure 3: Kahului Harbor FMA. Image provided by DAR

- 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 CMMA 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

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 crumenophalmus)*, 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.

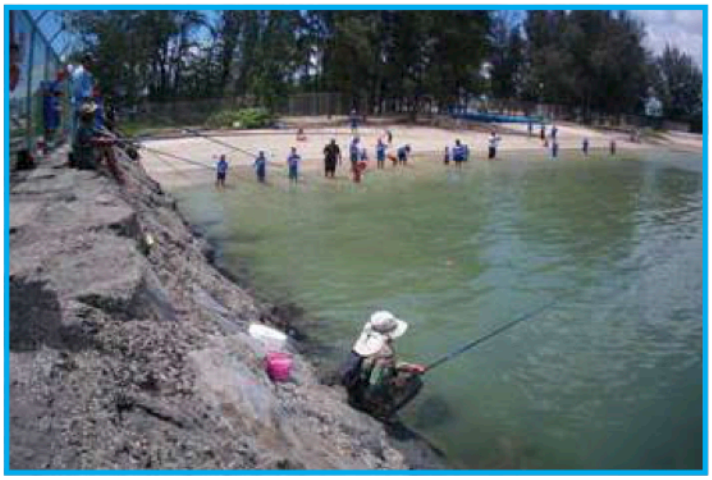

Figure 6: Fishermen at Pier 2. Photo Courtesy of the Wailuku CMMA

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 Hawaiʻi 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)

estimates from the creel data for ʻōpae 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 *ʻŌlelo Noʻeau* (Hawaiian Proverb), "*Pākāhi ka nehu a Kapiʻioho*," (the nehu of Kapiʻioho 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 wāwaeʻiole* (*Codium edule)* and *limu manauea* (*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 Hawaiʻi's Division of Aquatic Resources (DAR), *limu wāwaeʻiole* 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.

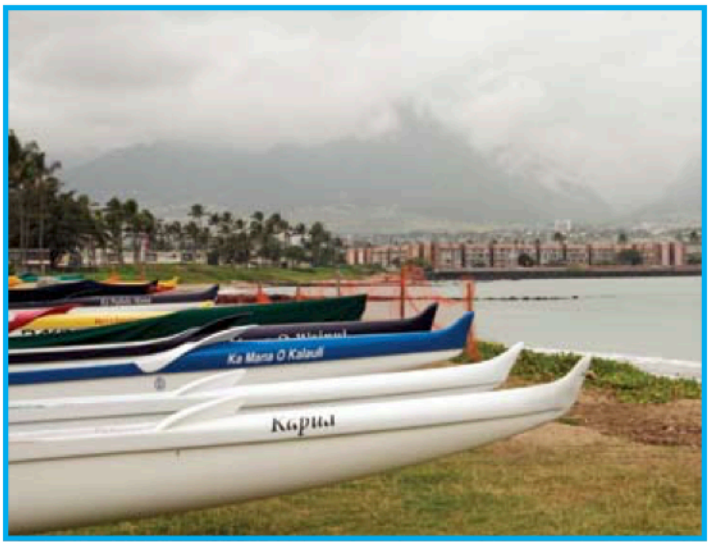

Figure 7: Kahului Harbor looking west toward ʻĪao Valley. Photo by Manuel Mejia (TNC).

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 shrunken 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). ʻŌlelo Noʻeau: 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, Hawaiʻi: UGS Scientific Investigations Report 2008-5236, 95 p.

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), 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'o* 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.

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.

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

- **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, effecting 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 Hoʻaloha 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.

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)