

# KĪPAHULU MOKU

## Community-Based Subsistence Fishing Area *Proposal & Management Plan*

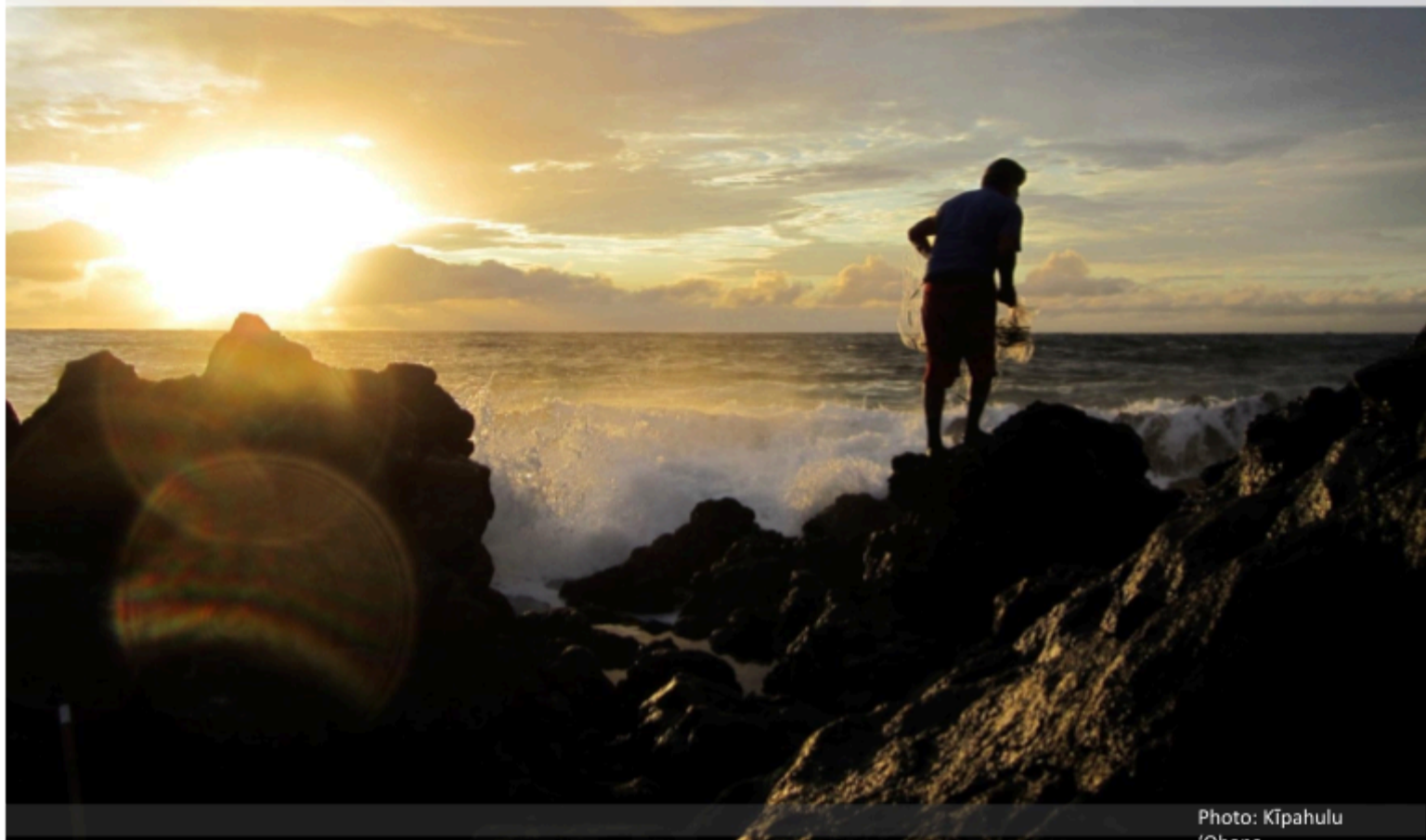


Photo: Kīpahulu  
'Ohana

Backed by years of careful observation, research, and feedback from those most intimately connected to these resources, the proposed Community-Based Subsistence Fishing Area (CBSFA) and its attendant management plan will proactively protect subsistence resources subject to a range of ever-growing pressures and threats, and reduce the potential for human conflict that may arise from differing perspectives on appropriate harvesting behavior.

The recommended regulations in the Kīpahulu Moku Proposal and Management Plan represent a positive step toward perpetuating critically important public trust resources, while recognizing the traditional and customary practices and subsistence lifestyles unique to Kīpahulu. The proposed rules formalize a “code of conduct” that can guide the harvesting practices of all who may seek to gather nearshore resources in the waters of Kīpahulu moku.

Submitted by Kīpahulu 'Ohana, Inc.  
to the State of Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources

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## Executive Summary

Kīpahulu Moku is a traditional fishing and gathering area, sustaining the local Hawaiian population for centuries. Its approximately 150 residents live off the grid, generating their own power, obtaining water through water catchment systems, streams, and wells, and processing food at Kalena Kitchen. The only public utility servicing Kīpahulu residents is telephone.

Yet, this remote moku annually attracts about one to two million visitors to the Haleakalā National Park. To help preserve its culture and customs, a small group of Native Hawaiians came together in 1995 to restore natural systems and share and perpetuate practices that support the subsistence lifestyle of families across the moku, leading to the formation of the nonprofit Kīpahulu 'Ohana, Inc. in 1997.

Local fishers have described abundant fishery resources present in Kīpahulu 30-40 years ago, noting that fish would “come up to smell your spear” and “pāpio would come when you snap under water.” Since then, fishery abundance and biomass has been observed to decline, suggesting room for improved management. “If fishing access increases without additional management in place, Kīpahulu could experience rapid and significant declines in fish abundance and biomass, similar to other more populated areas on Maui.” (Minton et al., 2014).

On behalf of the residents and traditional practitioners of Kīpahulu moku, this Proposal and Management seeks to ensure the perpetuation of customary practices and subsistence lifestyles by designating the marine waters and submerged lands of Kīpahulu moku from Kālepa to Pua'alu'u, and extending seaward to the 60 meter (180 feet) depth contour from the high-water mark of the shoreline, as a Community-Based Subsistence Fishing Area (CBSFA).

## Acknowledgements

The creation of the Kīpahulu Moku proposal and management plan was made possible through the work and dedication of many hands over several decades. Mahalo to the kūpuna, fishers, gatherers, Kīpahulu residents, east Maui community members, marine scientists, land stewards, teachers, students, scholars, community organizers, elected and appointed officials, and agencies who participated in this process. Mahalo to the community of subsistence fishers and gatherers who live and perpetuate the customs, beliefs, and practices of kūpuna that have sustained the fisheries and marine resources of the Kīpahulu moku for this generation and those to come. Mahalo to The Harold KL Castle Foundation, The Nature Conservancy, and NOAA's Coral reef Conservation Program for funding support. Mahalo to Mo'omomi, Hā'ena, Ka'upūlehu, Miloli'i, and other Hawai'i communities for taking bold actions and paving the way for others to manage their resources in a culturally mindful and effective way, in cooperation with the State, to improve the health and sustainability of resources for future generations.

With permission and to the extent applicable, this document uses information from both the Mo'omomi-North Coast of Moloka'i and Hā'ena CBSFA Proposals and Management Plans. This Proposal and Management Plan fulfills the requirements laid forth by the Designation Procedures Guide, 2014, developed by the Department of Land and Natural Resources, Division of Aquatic Resources (DLNR-DAR).

## Suggested Citation

Kīpahulu 'Ohana (2019). Kīpahulu Moku Community-Based Subsistence Fishing Area Proposal and Management Plan. Kīpahulu, Maui.



Photo: Kīpahulu 'Ohana

## KĪPAHULU MOKU CBSFA | 1. Organization Information

### Organization Name

Kīpahulu 'Ohana, Inc. (KOI)

### Date Group Established

1995

### Organization Membership

The constituency of the KOI includes traditional subsistence fishing practitioners and 'ohana with familial connections to Kīpahulu moku spanning multiple generations. Since KOI was founded in 1995, moku residents have been regularly consulted and play an integral role in the stewardship of Kīpahulu moku. KOI provides a voice for Kīpahulu moku residents on fisheries management issues at the state, national, and international levels. KOI is not a membership-based corporation as registered with the Department of Commerce and Consumer Affairs.

KOI is comprised of staff and a volunteer board of directors including the following community members:

#### Staff

- Project Director: John Lind, Kīpahulu resident, traditional konohiki, subsistence lawai'a, farmer
- Program Manager: Tweetie Lind, Kīpahulu resident, subsistence fishing and farming 'ohana
- Executive Director: Scott Crawford, Hāna resident, community-based nonprofit management
- Finance Manager: Cheyenne Kamalei Pico, Kīpahulu resident
- Equipment Manager and Outreach Specialist: Kane Lind, Kīpahulu resident, subsistence lawai'a
- Outreach Specialist: Pekelo Lind, Kīpahulu resident, subsistence lawai'a



Photo: Kīpahulu 'Ohana

#### Board of Directors

- President: Michael Minn
- Vice-president: Stephan Reeve
- Secretary/Treasurer: Glenna Ann Lind
- Board Members: Laura Campbell, Shawn Redo, Angela Tavares, Rich Von Wellsheim

#### **Organization Mission Statement**

KOI is dedicated to the cultural sustainability of the Kīpahulu moku on Maui, Hawai'i, through educational programs which incorporate local, national and international partnerships and projects. KOI envisions families working in harmony together to preserve and enhance the traditional cultural practices of the Hawaiian people. KOI conducts cultural demonstrations, restoration projects, self-sufficiency programs, and biological diversity projects.

See the **Administrative Record** for more on KOI's extensive outreach efforts, stewardship experience, networks, Mālama I Ke Kai Community Action Plan, and Letters of Support. Visit [https://www.kipahulu.org/pdf/KipahuluOhana\\_Bylaws.pdf](https://www.kipahulu.org/pdf/KipahuluOhana_Bylaws.pdf) for KOI Governance Protocols/By-Laws.





## KĪPAHULU MOKU CBSFA | 2. Nearshore Environment and Human Uses

### Place Names and Brief History

Hawaiian ancestors inscribed the landscape with names to acknowledge the sources of life, features, and activities of a particular area. The following list of place names indicate some of the many things that Kīpahulu moku is historically known for. There are eleven ahupua'a in Kīpahulu. From west to east they are Ka'āpahu, Kukui'ula, Kapuaikini, Maulili, Kiko'o, Kalena, Kakalehale, Halemano, 'Alaenui, 'Alaeiki, and Kaumakani (Figure 1). There are ten streams in Kīpahulu. From west to east they are Kālepa, 'Alelele, Lelekea, Ka'āpahu, Kukui'ula, Opelu, Ko'uko'uai, Kalena, 'Ohe'o, and Pua'alu'u.

Kīpahulu means “fetch (from) exhausted gardens.” Kīpahulu was once abundant with agricultural resources such as taro and other Polynesian introduced food plants. From 1883-1947, Kīpahulu Landing was one of the regular ports of call for the Inter-Island Steam Navigation Company, which provided services around Maui and between islands. Kīpahulu Landing allowed farmers and ranchers to ship their goods to markets. From 1899-1920, Kīpahulu was a sugar plantation town, bringing with it a diverse range of immigrants. When sugar farming ended, in the 1930s, the lands were used for cattle ranching. In 1969, Kīpahulu valley was added to Haleakalā National Park (HALE) drawing visitors to the remote area. Today, Kīpahulu moku has a residential population of about 150 people and about one to two million visitors annually, most of whom visit HALE's Kīpahulu District. The only public utility service to Kīpahulu is telephone. Residents live off the grid, generating their own power, obtaining water through water catchment systems, from streams, or through wells, and many utilize Kalena Kitchen to process and prepare foods.

### Kīpahulu Moku Nearshore Geography and Habitat

The moku of Kīpahulu is located on the west side of the exposed southeast side of Maui, south of Hāna and east of Kaupō, and is subject to rough sea conditions for much of the year. The moku is about 12,000 acres and

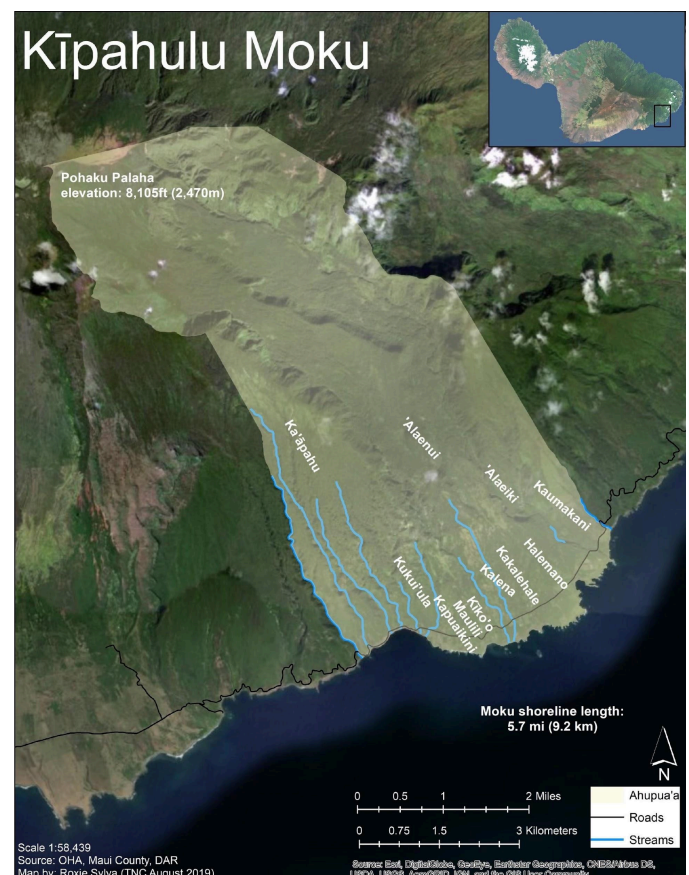


Figure 1. Map: Kīpahulu Moku Site Reference

begins at 8,105 feet elevation on mount Haleakalā and continues to the depths of the sea. The Kīpahulu shoreline and intertidal areas are made up of rocky lava cliffs, low shelves and tide pools, and boulder beaches. These areas provide important habitat for juvenile fish, near shore schooling fish, limu, and invertebrates.

The marine environment is characterized by high wave energy and high freshwater inputs from streams and

underwater seeps. 'Ohe'ō and Pua'alu'u streams have continuous water flow year-round, and eight other streams have water flow during the wet season. The largest of the streams is 'Ohe'ō. It crosses many different ecosystems from high elevations to the sea, and like many of the streams of Kīpahulu, hosts rare native aquatic species that depend on both the stream and marine ecosystems for their survival. The entire length of 'Ohe'ō stream is within the National Park and is one of very few completely natural riparian habitats in Hawai'i.

The nearshore marine environment varies over the 5.7 miles (9.2 km) of shoreline. For example Ka'āpahu Bay is fed by three streams and has a fine sediment and sandy bottom. In contrast, Kukui Bay's freshwater inputs are all subsurface and the ocean bottom consists of boulders, reef and dramatic underwater cliffs.

Much of the nearshore habitat is hard basaltic bottom colonized by corals and algae. The habitats here are well suited for the juvenile and adult fish species that utilize reef, estuarine areas, and sandy bottom bays (e.g. akule, moi, āholehole, moano, 'ō'io, and jacks). The streams deliver organic matter, algae, insects, and shrimp that are food sources for the juvenile and adult fish in the estuarine environments. Native Hawaiian stream life include five 'o'opu species, two 'ōpae species, and two snail species, hihiwai and hapawai. All of the adults live and breed in freshwater streams and estuaries, while their larvae drift out to sea and remain there for several months before returning to the freshwater streams once again. The lo'i of Kīpahulu also provide important habitat for 'o'opu and 'ōpae as they return upstream from the ocean. Some 'o'opu and 'ōpae climb waterfalls to enter the Kapahu Living Farms lo'i kalo and continue into the upper areas of 'Ohe'ō stream (Kīpahulu CAP, 2012).

### **Fishery and Non-Fishery Uses within the Kīpahulu Moku Nearshore Environment**

Generally, fishing and gathering in Kīpahulu moku is conducted for subsistence, sustenance, and recreational purposes, although commercial fishing has been observed. Fishing and gathering is greatly influenced by shoreline access, habitat type, and ocean conditions. Traditional and subsistence uses of this area include: hukilau, pound and palu fishing with pole, hook and line, throw net, akule fishing, fish sharing, intertidal gathering of limu, 'opihi, and other invertebrates, and family recreation. Recreational fishing effort typically consists of rod and reel fishing for ulua and other fish

and gathering for resources like 'opihi, pipipi, 'a'ama, wana, and limu from the intertidal zone.

Local residents also access the shoreline for other recreational activities, mainly swimming at points including stream mouths at Ko'uko'uai, Kālepa, 'Alalele, and Lelekea, Ma'ulili Bay, Wong's Landing (which has an access easement for community members held by the Kīpahulu Community Association), Ka'āpahu Bay, and areas where the road is close to the shoreline. The major area of access is through the HALE campground where users go for camping, diving, snorkeling, shoreline harvest, and swimming when conditions permit. Over the past 30 years, an increase in visitors and resource users has been observed, given improvements to Hāna and Pi'ilani Highways and the land additions to HALE. Intermittent boat traffic occurs, mostly from Hāna and south Maui, but no active launch sites are within the area. Shoreline access is generally restricted by landowners except in HALE: in the ahupua'a of Ka'āpahu from 'Alalele to Ka'āpahu streams and at the campground from 'Ohe'ō stream to Kukui Bay.

#### Ka'āpahu

This section of shoreline in the ahupua'a of Ka'āpahu is easily accessed, heavily visited, and lies within Haleakalā National Park. The Hanawi estuary, fed by 'Alalele stream, is accessed by both Kīpahulu subsistence fishers, locals from other parts of the island, and tourists to enjoy the beauty and freshwater. Subsistence practitioners pick 'opihi there and pole and line fishers and locals go there to fish, enjoy the freshwater, and surf in favorable conditions. In the winter, the muliwai opens to the ocean but otherwise is typically bounded by a rock berm and the water flows underground into the ocean to create a nearshore estuarine environment, which is an important nursery area for aquatic species. The beach is composed of boulders flanked on each side by a sloping boulder revetment wall to the east and pali to the west.

Lelekea Bay, one of the most heavily used area in this section of coastline, is fed by Lelekea and Ka'āpahu streams and has a small boulder and 'ili'ili beach with seasonal black sand. On either side of the beach are steep cliffs. Subsistence practitioners utilize this area as an akule lookout point to observe the spawning and other behaviors of akule ball (aggregation). For instance, they may see kāhala and other jacks school the akule ball over the black sandy bottom bay. When it is the proper time to harvest, practitioners will launch boats

directly from the bay, surround the akule ball with net (not bag) so smaller akule can escape, and then bring the catch in.

Traditionally, gatherers are only allowed to share their akule catch with 'ohana and kūpuna, not sell. Sometimes to preserve their catch they will salt and dry the akule. Subsistence fishers will also gather 'opihi and pole and line fish in this area, sometimes using long strong bamboo poles, a traditional fishing practice utilized in east Maui. This bay is also where most residents from elsewhere on Maui come to pole and line fish, depending on the time of year, moon, conditions, weekends, tournaments, and holidays. The shore can get crowded, with poles lined up end to end in the bay. Other uses of this area include body boarding, beach going, and camping, noting that there are no public facilities in the area.

#### Kukui'ula – Kakalehale

For the ahupua'a of Kukui'ula, Kapuaikini, Maulili, Kiko'o, Kalena, and Kakalehale, shoreline access to the papa and pali habitat is through private land. Subsistence fishers who know the landowners will request access and use discretion when fishing at these high and low cliffs and shelves that jut into the ocean. There is an important estuary and nursery for juvenile fish in this area at the mouth of Ko'uko'u'ai stream between Kiko'o and Kalena ahupua'a.

#### Halemano – 'Alaeiki (HALE)

The coastal area of the Kīpahulu section of HALE spans three ahupua'a - Halemano, 'Alaenui, and 'Alaeiki. The

Park receives a very high rate of traffic, admitting hundreds of thousands of visitors a month. For instance, in 2012, a whopping 2,106,481 visitors entered the Park's Kīpahulu section via personal vehicles, taxis, and tour buses (National Park Service, 2012). Tourists and locals are drawn to the freshwater pools at 'Ohe'o Gulch, the Park's Visitor Center, campsites, coastal trails, and the Pipiwai Trail hike to Waimoku Falls. Subsistence practitioners typically pole and line fish, gather limu, 'opihi, and other invertebrates, and throw net in this area. Fishermen from all over Maui like to come here to camp, pole and line fish, harvest 'opihi, and dive when conditions are favorable.

There are important muliwai at 'Ohe'o stream mouth and in Kukui Bay where streams and/or freshwater seeps enter the ocean to create an estuarine habitat and nursery area for many marine and freshwater species. This section of coastline also is great tidepool habitat which is easily accessible from the Park campground and parking lot. As a layer of protection for the 'opihi within the Park, KOI established a voluntary 'opihi rest area here, asking people not to pick 'opihi within HALE.

#### Kaumakani

Within the ahupua'a of Kaumakani is Pepeiaolepo Bay, another important estuarine habitat and nursery area for many marine and freshwater species. Access to the shoreline in this area is through private property and is made difficult due to the rugged sea cliff habitat and ocean conditions. This is an important subsistence fishing area for the Kīpahulu moku community.





Photo: Kīpahulu 'Ōhana

## KĪPAHULU MOKU CBSFA | 3. Traditional, Customary, and Subsistence Practices

### The Importance of Traditional, Customary, and Subsistence Fishing Practices in Kīpahulu

Kīpahulu moku is an essential and extensively used traditional fishing and gathering area, sustaining the local population for centuries. This section provides a description of fishing practices traditionally used in Kīpahulu moku and the importance of marine resources for the community's subsistence, culture, and religion.

“Kīpahulu was a place of permanent habitation by a large number of Hawaiians. Traditional subsistence was based on farming and fishing, and settlements were located in areas best suited for these activities. The Kīpahulu area offered fertile soil and abundant water, as well as coastal access – all within a relatively small geographic area. The richness of the Kīpahulu area resources supported a large population prior to European contact. Descriptions by early explorers and visitors, as well as archeological evidence, all describe Kīpahulu as a well populated and intensively cultivated land” (National Park Service, 2015).

In 2011, during a ka'apuni led by KOI, members of the Kīpahulu community identified the areas of Kīpahulu moku where fish spawning, nurseries and fish aggregations and ko'a are located. Uses of this area traditionally and/or currently include: hukilau, canoe building, pound and palu fishing, throw net, akule fishing, fish sharing, intertidal gathering, and family recreation. Akule fishing in particular is a traditional community-based event, where 20 to 30 people prepare and join the nets, surround the fish aggregation and use divers to secure the catch. Everyone who helps gets a share of the catch. Fishers go to traditional look-out points to watch for certain fish colors and behaviors to know when the akule are aggregating and spawning, to ensure harvest takes place after the fish spawn.

Rural communities throughout the Hawaiian Islands, like Kīpahulu, Ho'olehua, Hā'ena, and Miloli'i may be regarded as cultural kīpuka, or oases of diversity that remain after destruction, “from which native Hawaiian culture can be regenerated and revitalized in the contemporary setting” (McGregor 1995). A cultural kīpuka “reveals the strongest and most resilient aspects of the Hawaiian culture and way of life” that survived amidst the “onslaught of post-statehood (1959) development” (McGregor 1995). These kinds of communities rely on marine and land-based resources for a subsistence lifestyle, which is interwoven with all aspects of community life and the cultural identity of Native Hawaiians in Hawai'i.



Photo: Manuel Mejia

Residents of Kīpahulu place a high value on subsistence fishing and gathering activities, Hawaiian practices, and values. The collective identity of Kīpahulu is defined by a shared cultural heritage that is maintained by a system of interdependence and social reciprocity. This system is expressed in many ways, including the sharing of food gathered through subsistence. Subsistence fishing and gathering of marine resources is important for small,



rural communities to help supplement lower income residents, reduce dependence on purchased food, and to provide a healthy, traditional diet for Hawaiian families. Obtaining equivalent food items, such as fish, from stores, can be costly and families on fixed incomes are known to purchase cheaper, less healthy foods. Subsistence activities also require physical exertion and provide opportunities for relatively inexpensive recreation that contribute to better health. With subsistence providing the availability of a healthy food source, this gives residents a sense of self-sufficiency and freedom. Without subsistence as a major means of providing food and hereby supplementing income, the standard of living in these communities would be greatly reduced (The Kohala Center, 2016; Governor’s Moloka’i Subsistence Task Force Final Report, 1994).

Beyond the immediate economic and health advantages of subsistence fishing are other benefits that serve to enhance family identity and community cohesion to perpetuate traditional cultural values. Subsistence fishing and marine resource gathering reinforces relationships of ‘ohana and extended family by providing fish and marine resources for customary foods for pā’ina and lū’au to celebrate important life cycle events such as weddings, first year baby lū’au, graduations and funerals. The kūpuna are also supported by subsistence activities, as the younger fishermen in the ‘ohana regularly share their harvest with the kūpuna and family members who are not as able-bodied to engage directly in subsistence fishing and harvesting. Knowledge of fishing ko’a, both fishing aggregation areas in the ocean and the shrines on the land that serve as markers, is passed down from one generation to the next as multiple generations of family members engage together in subsistence fishing and gathering. Through the practice of fishing and ocean gathering, ancestral scientific and cultural knowledge and values are passed on and perpetuated.

Additionally, subsistence fishing provides other benefits. Time spent subsistence fishing cultivates intimacy and harmony with the ocean and environment, reinforcing a strong sense of kinship with nature that is the foundation of Hawaiian spirituality and religion. While engaging in fishing and gathering activities, practitioners share experiences and gain knowledge that provides continuity between the past and the present, building trust and cooperation. These shared experiences reinforce beliefs and values that are critical for

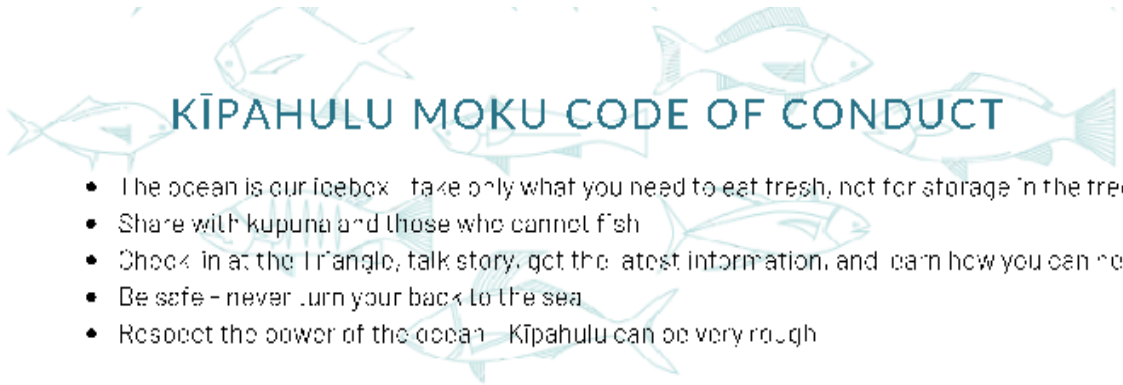
perpetuation of Hawaiian cultural identity. Subsistence fishing emphasizes group identity and relationships, rather than individual economic accomplishment. Food obtained through subsistence fishing is distributed within the community and is consumed at family and community gatherings, reinforcing community ties and social networks.



Overall, subsistence fishing and gathering reinforce ‘ohana cultural values of respect for kūpuna, aloha kekāhi i kekāhi or mutual support and caring for each other, a sense of connection, and responsibility to mālama or take care of the ocean and coastal area that has fed generations of family members (Governor’s Moloka’i Subsistence Task Force, 1994; McGregor, 2007).

#### **Fishing Codes of Conduct**

KOI has informally managed harvest practices within Kīpahulu moku guided by traditional subsistence ‘ohana values, customs and practices. For example, KOI, in collaboration with HALE, The Nature Conservancy (TNC), and University of Texas A&M-Corpus Christi (UTAMCC), has signs and posters displayed at HALE that inform visitors, including fishers, of the voluntary ‘opihi rest area in place and pono practices for harvesting ‘opihi outside of the rest area. KOI subsistence practitioners also lead by example by harvesting using an informal code of conduct that focuses on how pono fishing should be practiced to maintain healthy, regenerative, and sustainable populations of nearshore resources.



- The ocean is our icebox – take only what you need to eat fresh, not for storage in the freezer
- Share with kupuna and those who cannot fish
- Check in at the Triangle, talk story, get the latest information, and learn how you can help
- Be safe – never turn your back to the sea
- Respect the power of the ocean – Kīpahulu can be very rough

### When Gathering 'opihi

- Communicate with other families to coordinate so you don't pick in the same area
- Take a few for your family tonight (no more than half gallon, shell on)
- Pick them bigger than a half dollar coin (1 1/4"), but leave the really big ones (>2") which are prime spawners
- Don't pick the big ones below the waterline (kō'ele)
- Keep moving, don't take all from one area

### When pole fishing along the coast

- Only put out 1 or 2 lines
- Take only 1 per day of ōmilu, pāpio, and kahala – they are important to schooling the akule, a fish that our community depends on
- Pick up and pack out your rubbish
- If your line gets caught in the cliff or coral, clean up lead and line best you can so marine life doesn't get harassed
- Use circle and barbless hooks when can
- Bring bait, so you don't need to take tidepool animals

### When diving

- No diving at night
- Free dive only, no take on SCUBA
- Take a limited amount of fish – up to 10 – to ensure there will be fish for the future
- Leave blue unu, kōmū and other heavily fished species
- Catch ta'ape and to'au to give the native fish a break

### When fishing for akule

- Only use surround net, no bag net, so that some fish can escape
- Don't take the whole school
- Share with the village, don't sell

### When throwing net

- Aim for the edge of the school, so as to catch on y a few fish and let the rest go to reproduce and make more fish

### When gathering limu

- Clip the limu, never pull the roots so limu can re-grow
- Gather from here and there, never taking all of one patch

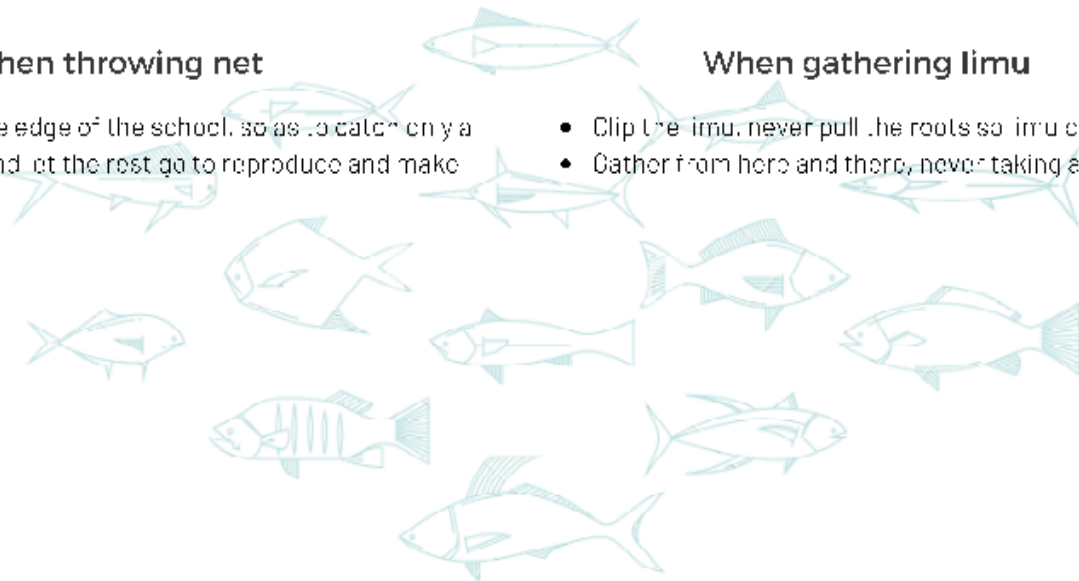




Photo: Kīpahulu 'Ohana

## KĪPAHULU MOKU CBSFA | 4. Proposed Boundaries and Regulations

### Proposed CBSFA Boundaries

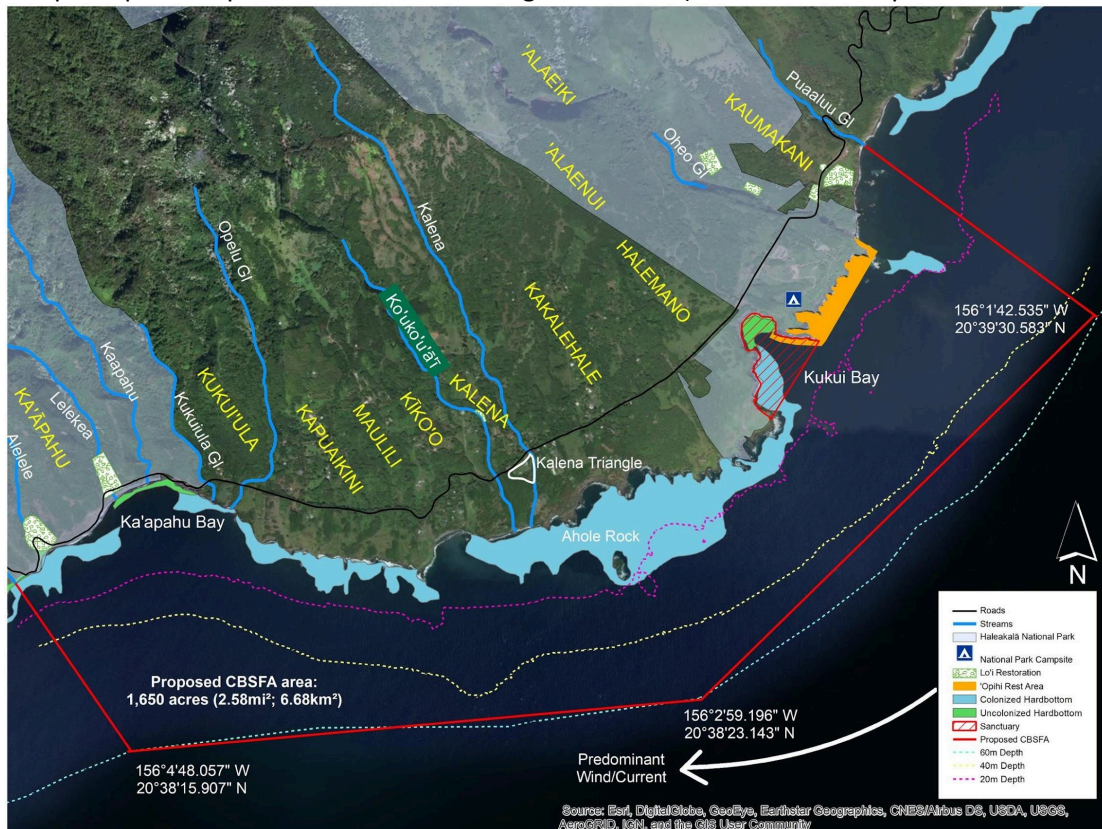
The area proposed for designation as the Kīpahulu Moku CBSFA encompasses the marine waters and submerged lands off of the southeast coast of Maui, extending seaward from the high-water mark on the shoreline to the 60-meter depth contour (roughly a ¼ to ½ mile from shore), from Kālepa Gulch in the west to Pua'alu'u Gulch in the east, spanning roughly 5.7 miles of coastline and 1,650 acres (2.58 m<sup>2</sup> or 6.68 km<sup>2</sup>) of submerged area (**Figure 2**). This area encompasses the entirety of the moku boundary, consistent with traditional Hawaiian management practice. Native Hawaiians who reside in Kīpahulu moku traditionally and customarily fish and gather marine resources here. Native Hawaiian uses within the moku span from one

end of the moku to the other, and traditional areas for fishing and gathering by the residents continue to be acknowledged and respected by the residents from other areas of Maui.

The area proposed for a Sanctuary (no-take replenishment area for marine species) extends from Maka'aikūloa Point to Puhilele Point and out to the 60-meter depth contour.

The area proposed for an 'Ōpihi Rest Area (no-take replenishment area for 'opihi species) extends from 'Ohe'o to Kukui Bay, and from the high-water mark to 9 feet (3 m) in depth.

**Figure 2.** Map: Proposed Kīpahulu Moku CBSFA Designation Area (20m and 40m depth lines are estimates)



Scale 1:24,000  
 Map by: Roxie Sylva (TNC August 2019)  
 Source: Maui County, DAR, DOFAW, NOAA, TNC

Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Proposed Regulatory Solutions**

Based on KOI’s observations, experiences, and consultation with fishers and scientists, the following proposed CBSFA regulations are put forth to preventatively address threats and protect target subsistence resources within Kīpahulu moku. By addressing the threats of unsustainable harvest, inappropriate harvest, and overly efficient gear through CBSFA regulatory solutions, Kīpahulu moku may serve as

an important example of traditional resource conservation to ensure future subsistence, economic, and cultural sustainability in Hawai‘i. Designating the area as a CBSFA would join Kīpahulu’s local knowledge and kuleana with the capabilities and charge of DLNR to protect Hawai‘i’s marine resources and traditional practices through co-management, “the only realistic solution for the majority of the world’s fisheries.” (Gutierrez et al., 2011; Levine & Richmond, 2011).

**Table 1.** Proposed Regulatory Solutions

<b>RECOMMENDED KĪPAHUKU MOKU COMMUNITY-BASED SUBSISTENCE FISHING AREA (CBSFA) REGULATIONS</b> <i>Per person per day within the Kīpahulu Moku CBSFA</i>	
<p><b>BAG/POSSESSION LIMITS:</b></p> <ul style="list-style-type: none"> <li>● <b>All finfish: 10 combined (except roi, ta‘ape, to‘au, and akule)</b> <i>This rule cannot be less restrictive than existing statewide and/or Maui island rules; additionally:</i></li> <li>● <b>Kala, ‘Ōmilu: 2 each</b> <i>No State bag limit for kala; State bag limit of 20 ‘Ōmilu</i></li> <li>● <b>Ula: 2 each</b> <i>No State bag limit ula</i></li> <li>● <b>‘Opihi: ½ gallon (shell on); approximately 40-50 ‘opihī</b> <i>No State bag limit for ‘opihī</i></li> </ul> <p><b>SIZE/SLOT LIMITS:</b></p> <ul style="list-style-type: none"> <li>● <b>Kole: 5” minimum</b> <i>No State minimum for kole</i></li> <li>● <b>Moi: 11” minimum – 18” maximum</b> <i>State minimum is 11”, no max</i></li> <li>● <b>‘Ōmilu: 10” minimum – 24” maximum</b> <i>State minimum is 10”, no max</i></li> <li>● <b>‘Opihī: 1 ¼” minimum – 2” maximum</b> <i>State minimum is 1 ¼”, no max</i></li> </ul> <p><b>SEASONS:</b></p> <ul style="list-style-type: none"> <li>● <b>Moi, ula: Closed season May-September</b> <i>State closed season for moi is June-August, ula is closed from May-August</i></li> </ul>	<p><b>GEAR RESTRICTIONS:</b></p> <ul style="list-style-type: none"> <li>● <b>Surround Gill net: Minimum mesh size 2 ¾”;</b> no surround gill net except for akule and ta‘ape (bag net prohibited) <i>Current State standard is 2”</i></li> <li>● <b>Throw net: Minimum mesh size 3” (akule exception)</b> <i>Current State standard is 2”</i></li> <li>● <b>Hook-and-line: Max 2 lines deployed with max 2 hook per line</b> <i>No State standard for hook-and-line</i></li> <li>● <b>SCUBA/underwater breathing apparatus: No take/possession of marine life while using gear (except for ta‘ape and akule using net)</b></li> <li>● <b>Freediving: No take ‘opihī while freediving</b></li> <li>● <b>Night diving: No take or possession of marine life while night diving from 6pm to 6am</b></li> </ul> <p><b>OTHER:</b></p> <ul style="list-style-type: none"> <li>● <b>Akule: Non-commercial take only</b></li> <li>● <b>‘Opihī: No take within a rest area (from ‘Ohe‘o to Kukui Bay)</b></li> <li>● <b>Limu: No taking native limu (līpoa, kala, kohu) with holdfast/roots attached</b></li> </ul> <p><b>KUKUI BAY SANCTUARY:</b></p> <ul style="list-style-type: none"> <li>● <b>From Maka‘aikūloa Point to Puhilele Point</b></li> <li>● <b>No take within Sanctuary</b></li> <li>● <b>No vessels (except in an emergency)</b></li> </ul>
(updated October 25, 2019)	



### Threats to Subsistence Resources Targeted for Management

There are three direct priority threats to the target species and therefore the traditional fishing practices within KĪpahulu moku, reducing the diversity and abundance of living organisms and/or altering or disrupting ecological patterns and processes. These are unsustainable harvest, inappropriate harvest, and overly efficient gear and methods. The proposed CBSFA is designed to protect vulnerable marine resources within the area from these negative impacts.

#### Unsustainable Harvest

Evidence from both resource users and researchers indicate that over the past 20 years, marine resources within the Main Hawaiian Islands (MHI) have generally declined (Friedlander et al., 2008). Overharvest is considered to be one of the largest threats to nearshore marine ecosystems, while land-based pollution and coastal development also pose significant harm (Harman & Katekaru, 1988; Grigg & Birkland, 1997; Tissot et al., 2009). Hawai'i's marine resources are especially susceptible to the threat of overharvest owing to the state's "relative isolation, limited recruitment, and high species endemism." (NOAA Fisheries, 2016). Size, density, and biomass of nearshore reef fish are drastically lower in the MHI than the Northwestern Hawaiian Islands (NWHI) (Friedlander & DeMartini, 2002). "Coastal fisheries are facing severe depletion and over-exploitation on a global scale and Hawai'i is no exception. This decline in abundance, particularly around the more populated areas of the state, is likely the cumulative result of years of chronic overfishing" (Shomura, 1987).

In 2010 and 2013, fish and benthic surveys within KĪpahulu moku found that reef fish, including target fish and prime spawners, had high total biomass (total weight of all fish) compared to other sites throughout the state open to fishing, but lower than areas closed to fishing (The Nature Conservancy, 2016).

"The region's abundance is likely due to its small population, relative isolation from Maui's main population centers, and rough ocean conditions much of the year. Fishing at KĪpahulu appears to be limited (no quantitative information on fishing pressure is available), and at its current level may be sustainable. However, this report makes comparisons with sites elsewhere around the state and does not examine the

historical abundance of fish at KĪpahulu. Unlike at the state level where quantitative information has documented significant declines through time in important fishery species, similar information is not readily available at KĪpahulu, except through the observations of community members." (Minton et al., 2014).

"Enacting additional fishery management may not result in a significant increase in fish abundance or biomass, but it would be important in maintaining fish populations if access to the KĪpahulu reef, and thus fishing pressure, were to increase in the future. If fishing access increases without additional management in place, KĪpahulu could experience rapid and significant declines in fish abundance and biomass, similar to other more populated and open areas on Maui." (Minton et al., 2014).

The community has also measured the decline of 'opihi 'makaiauli abundance from 2010 to 2014 in and around the HALE. This decline is likely due to the high rate of harvest in the summer months, as well as the harvest of the large reproducers and the small 'opihi before they reproduce (KĪpahulu CAP, 2012). These findings prompted KĪpahulu 'Ohana to create a voluntary rest area where 'opihi harvesting would not be allowed. Since 2014, surveyors have conducted 'opihi surveys within and around the rest area, finding that after only three years, 'opihi rest areas have been successful in increasing the population of 'opihi within rest areas and down current in areas open for harvest (Bennett, 2018).

To address the issue of overharvest, KOI is proposing a bag and possession limit of ten finfish combined per person per day, except for roi (Peacock Grouper, *Cephalopholis argus*), ta'ape (Bluestripe Snapper, *Lutjanus kasmira*), to'au (Blacktail Snapper, *Lutjanus fulvus*), and akule, noting that this rule cannot be less restrictive than any existing Maui island or statewide rules. Additional bag limits are proposed for four species observed being unsustainably harvested and/or to prevent being overharvested: kala (2 max), 'ōmilu (2 max), ula (2 max), and 'opihi (½ gallon shell on). There is also a proposed no-commercial take of akule, no-take of 'opihi within the designated rest area, and no-take of marine species from within the designated Sanctuary.

#### Inappropriate Harvest

Coral reef fishers may target undersized, immature (juvenile) individuals that haven't yet reached

reproductive age or size and should be protected from harvest (Vasilakopoulos et al., 2001). Catching immature reef fish hurts a population’s ability to regenerate by removing potential recruits that would otherwise “spawn-at-least-once” and contribute to recruitment (Myers & Mertz, 1998).

There is the additional issue of fishing for larger, long-lived, slow-growing prized species at the onset, and then shifting to smaller, less desirable species as populations decline over time (Russ & Alcala, 1996; Pitcher, 2001; Friedlander & DeMartini, 2002). “The preference for larger and older fish has disproportionately higher impact on the growth and replenishment of fish populations, since these fish produce more eggs and healthier offspring. If the abundance of a species drops too low, a fish population may lose its ability to rebuild itself. As large, predatory fish species are targeted and depleted, fishers will ‘fish down marine food webs,’ moving on to remaining smaller species which are then, in turn, depleted.” (NOAA Fisheries, 2016).

Fishermen can also improperly harvest species during their spawning season, which reduces the offspring that would help regenerate the population. However, at Kīpahulu, members of KOI have observed local spawning behaviors and fish by their own informal calendar. By identifying these peak spawning periods for important food fish, expansion of the closed season for vulnerable species is proposed to be expanded so as not to disrupt spawning behavior and other natural processes.

Other examples of inappropriate harvest within Kīpahulu moku include certain methods of limu gathering and night diving. Traditionally when limu was gathered, one would avoid pulling out the holdfast or roots still attached to the rocks, to ensure limu regrowth. Harvesting while night diving is one of the single, most inappropriate modes of fishing since so many species are vulnerable at that time. By regulating the hours of spearfishing to daylight, many species can have a chance to recover.

To address the issue of inappropriately harvesting undersized and large brood stock individuals, the proposed CBSFA regulatory solutions create a minimum size limit of 5 inches for kole, maximum size limit of 18 inches for moi (in addition to the existing statewide 11 inch minimum size restriction for moi), maximum size limit of 24-inches for ‘ōmilu (in addition to the existing statewide 10-inch minimum for ‘ōmilu), and maximum size limit of 2 inches for ‘opihi (in addition to the existing

statewide 1¼-inch minimum size restriction for ‘opihi). The new proposed regulatory solutions minimize the threat of inappropriately harvesting species during spawning seasons by extending closed seasons for moi and ula from May to September (in addition to the existing statewide closure for ula from May to August). To address the improper harvesting techniques of limu, the proposed CBSFA regulatory solutions ban the take of native limu species (līpoa, kala, kohu) with holdfast/roots attached. The improper and sometimes illegal harvest of juvenile, large, and spawning individuals strays from customary values and is directly averse to traditional practices and the sharing of valid information amongst fishermen.

#### Overly Efficient Gear

A growing number of people are using sophisticated fishing gear and technology to increase yields. This kind of fishing gear is often overly efficient, allowing humans to harvest marine resources at a rate that exceeds natural growth and reproduction. “The modern development of boat engines, depth finders, GPS units, diving gear, underwater lights, and other modern fishing gear in conjunction with the emergence of a market economy have greatly changed the nature of fishing and the ability of fishers to impact the resource. Natural marine refuges no longer exist due to modern technological ability to extract fish and other resources.” (Jokiel et al., 2010). Jokiel et al. also noted that over time, “technology provided refrigeration and more efficient fishing gear, further accelerating the shift from subsistence to profit-based economies.”

To address the issue of overly efficient gear and methods, the proposed regulatory solutions include general gear restrictions, including a gill net mesh size of 2 ¾ inches (larger than the existing statewide 2 inch minimum), no surround gill net except for akule and ta’ape, the prohibition of bag nets, a minimum throw net mesh size of 3 inches (larger than the existing statewide 2 inch minimum), maximum 2 fishing lines deployed at a time with a maximum of 2 hooks per line, no take of marine life while using SCUBA gear (except for ta’ape and akule while using surround net), no harvest of ‘opihi while freediving, and no take or possession of marine life while diving from 6pm and 6am.

#### **Using Sanctuary Areas to Address Threats**

Within the Kīpahulu Moku CBSFA, a no-take Sanctuary is proposed to provide species protection within the healthy habitats that they need to eat, live, grow, and

reproduce. Successful reproduction provides an abundance of marine resources. An abundance of resources in one area encourages both adults and larvae to “spillover” from the Sanctuary to areas where community members can fish and continue to gain sustainable benefits. This Sanctuary is connected to the rest of the moku through wind, currents, and the movement patterns of species, therefore, the health of one system ensures the health and abundance of nearby and connected systems.

Creating no-take Sactuary areas (also called rest, kapu or pu’uhonua areas) is a traditional practice. Combining traditional and customary management techniques with other fisheries management methods can be very effective, given the prevalence of overly efficient modern fishing methods, growing populations, increasing demands on resources, and pollution and siltation. The combination of area, gear, and species-specific rules with a Sanctuary provides the best chance for achieving a thriving and abundant ecosystem, which in turn improves the community’s overall well-being.

As the Hawaiian proverb goes, E Ola Ke Kai, E Ola Kakou (As the ocean thrives, so do we).

#### **Degraded Watershed**

An additional threat to marine resources in Kīpahulu moku that would not necessarily be managed by a CBSFA but can cause great harm to the marine

environment is a degraded watershed. Kīpahulu’s lower watershed in many areas is degraded by feral ungulates (i.e. cattle, pigs, deer, and goats) and alien invasive plant species (i.e. strawberry guava, clidemia, bamboo, ginger, African tulip, and miconia). These species create conditions that expose soil to run off, increase transpiration of water to the atmosphere, and decrease freshwater infiltration into groundwater. With disturbance of native vegetation and soils, more fresh water moves across the surface instead of being absorbed, and therefore carries more sediment to the ocean, especially during large rainfall events.

The excess sediment from the degraded watersheds impact intertidal areas, coral reefs, and nearshore waters that are frequently unable to recover from excessive and repeated episodes of sedimentation. Sediment blocks the sunlight that corals need to survive and can coat and smother corals and other organisms and habitats, thereby disrupting their feeding and reproduction patterns. The decrease in surface water flow from the degraded watershed has a negative effect on lo’i kalo (taro patch) production. Less water means fewer lo’i can be opened and maintained, resulting in less food, less income for the community, and fewer ‘ōpae that can utilize the lo’i.

With the understanding that what happens on land impacts the ocean, this threat helps to paint a fuller picture of the stressors Kīpahulu’s marine resources face in addition to those addressed by rulemaking.



Photo: Kīpahulu 'Ohana

## KĪPAHULU MOKU CBSFA | 5. Subsistence Resources Targeted for Management

### Subsistence Resources Targeted for Management

Kīpahulu’s nearshore fisheries include a high diversity of shallow-water reef fish, invertebrates and limu, as well as coastal pelagic species. The primary subsistence resources targeted for management are listed in **Table 2** based on the proposed regulatory solutions in **Table 1**. The target species identified are not only integral to the subsistence lifestyle and cultural practice of Kīpahulu

moku practitioners, they are experiencing selective harvesting pressure and an intervention is needed to ensure sustainable populations and ecosystems. Each species has an important habitat and function which helps to maintain the overall success of interrelated reef relationships. It is critical to address the threats to these targeted nearshore species because of their unique role in the ecosystem which in turn helps all life to thrive.

**Table 2.** Approximate Status of Subsistence Resources Targeted for Management (Kīpahulu CAP, 2012)

Targets	Habitat	Role on the reef	Current Status	Desired Status
<b>NEARSHORE PELAGIC FISH</b>				
<b>Akule</b> (Bigeye Scad, <i>Selar crumenophthalmus</i> )	Nearshore pelagic	Eats zooplankton	Fair	Good
<b>‘Ōmilu</b> (Bluefin Trevally, <i>Caranx melampygus</i> )	Nearshore	Eats fish	Fair	Good
<b>REEF AND SHORELINE FISH</b>				
<b>Kala</b> (Bluespine Unicornfish, <i>Naso unicornis</i> ) <b>Kole</b> (Goldring surgeonfish, <i>Ctenochaetus strigosus</i> )	Nearshore	Eats algae	Fair	Good
<b>Moi</b> (Pacific Threadfin, <i>Polydactylus sexfilis</i> )	Nearshore	Eats small invertebrates and debris	Fair	Good
<b>Uhu</b> (Parrotfishes, <i>Scaridae</i> )	Nearshore	Eats algae and coral	Fair	Good
<b>INVERTEBRATES AND LIMU</b>				
<b>‘Opihi</b> (Limpet, <i>Cellana</i> spp.)	Intertidal	Eats algae	Fair	Good
<b>Ula</b> (Banded Spiny Lobster, <i>Panulirus marginatus</i> ; Green Spiny Lobster, <i>Panulirus penicillatus</i> )	Nearshore	Eats small invertebrates and debris	Fair	Good



<p><b>Limu</b> – Varieties of seaweeds (<i>Līpoa</i>, <i>Dictyopteris plagiogramma</i>; <i>Kala</i>, <i>Sargassum echinocarpum</i>; <i>Kohu</i>, <i>Asparagopsis taxiformis</i>)</p>	<p>Intertidal</p>	<p>Food for algae eaters</p>	<p>Good</p>	<p>Very Good</p>
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**Ecological Life History Characteristics and Current Conditions of the Marine Resources Targeted for Management**

(Species Photos: DLNR, Keoki Stender, University of Hawai‘i, and Kohala Center)

*I. Nearshore Pelagic Fish*

Akule (Bigeye Scad, *Selar crumenophthalmus*)

KOI currently ranks the status of akule as “fair” and strives for a status of “good.” The proposed regulations seek to protect akule by perpetuating “non-commercial take” of akule from within the CBSFA. This would help prevent the unsustainable harvest of akule and reduce the likelihood of conflict between commercial and subsistence fishermen. This also affirms the traditional practice of harvesting and sharing akule as a community. The rules recommend prohibiting the use of bag nets when fishing for akule, as bag nets can catch the entire school and do not let smaller fish escape.

Akule is a valued fisheries resource in Hawai‘i. This small coastal pelagic fish is found seasonally in large schools in the mid- and surface level zones of the water column along the coast, or on shallow banks near shore (DAR, 2006). They are nocturnal and feed on zooplankton made up of small fish and crustaceans. In Hawai‘i, akule aggregate in shallow waters and spawn approximately every three days between March and October. Akule become sexually mature at 9.8 inches and can reach up to 15 inches in length and weight up to 2 pounds (Clarke & Privitera, 1995; DAR, 2006).



Statewide, the net fishery for akule is the major coastal commercial fishery, with landings from commercial and subsistence fisheries ranging from 100 to 600 tons valued at >1 million US dollars annually (Work et al., 2008). In 2001, akule represented 61% of commercial catch in Hawai‘i’s coral reef fishery (DeMello, 2004). Their schooling behavior in shallow water makes them easy to exploit by means of seine or gill nets (Miyasaka & Ikehara, 2001). Thus, concerns over overharvesting of akule and competition between

recreational/subsistence and commercial fishermen have existed since the 1970s. This triggered a comprehensive analysis of the status of the akule fishery in the MHI and implementation of regulations to reduce user conflicts by DAR: unlawful to take akule under 8.5 inches with net July through October or possess or sell more than 200 pounds of akule under 8.5 inches per day from July through October. Results of the study suggests the akule fishery is healthy, however user conflicts continue to be an issue (Weng & Sibert, 2000; Miyasaka & Ikehara, 2001).

In addition to being an important commercial species, akule have cultural and recreational value. Catching halalū (juvenile akule) by hook and line is popular among recreational shoreline fisherman. In Kīpahulu, stories passed down from kūpuna suggest akule were once very abundant in the area (Kīpahulu CAP, 2012).

‘Ōmilu (Bluefin Trevally, *Caranx melampygus*)

KOI currently ranks the status of ‘ōmilu as “fair” and strives for a status of “good.” The proposed regulation to harvest only 2 ‘ōmilu per day and to harvest ‘ōmilu only within the slot limit of 10 to 24 inches will reduce the likelihood of unsustainably and improperly harvesting ‘ōmilu in Kīpahulu moku.

‘Ōmilu, or the bluefin trevally, is a common jack species in Hawai‘i. Juveniles frequent clear shallow bays and estuaries while medium sized fish and adults are found over nearshore reefs (DAR, 2006). ‘Ōmilu can be found in small groups or as solitary individuals. Their diet mainly consists of reef fish (e.g. wrasse, parrotfish, blennies, goatfishes) and feeding is primarily done individually, in pairs, or small schools during the daytime, peaking at dawn and dusk (Honebrink, 2000; Friedlander & Dalzell, 2004; DAR, 2006). Tagging studies by Holland et al. (1996) suggests ‘ōmilu are not highly mobile and instead have a limited range of dispersal (Holland et al., 1996; Friedlander & Dalzell, 2004), Targeted harvest of ‘ōmilu in one area can result in overharvest.

‘Ōmilu can reach up to a maximum length of 31.5 inches, weight up to ~22 lbs, and live up to 8 years of

age (Sudekum et al., 1991; Honebrink, 2000; Friedlander & Dalzell, 2004). Individuals become sexually mature at approximately 2 years of age and 14 inches. Peak spawning is also between May and August (Sudekum et al., 1991; Friedlander & Dalzell, 2004).

‘Ōmilu are primarily caught via trolling, spear, net, handline, pole and line, and with surfcasting gear (DAR, 2006). Catch per unit effort has decreased since the 1990s. Limited commercial data also suggests ‘ōmilu size has increased, however, it is most likely due to an increase in small boats, advancements in fishing technology, and exploitation of new fishing populations (Friedlander & Dalzell, 2004).

‘Ōmilu are part of a group of large, fast-swimming predatory fish referred to as ulua that inhabit coral reefs throughout Hawai‘i. Ulua, in addition to sharks, are the primary nearshore predators on Hawaiian reefs. The giant trevally (*Caranx ignobilis*), known in Hawai‘i as ulua aukea, are significant in Hawaiian culture for their role as a sport fish among chiefs of ancient Hawai‘i (Friedlander & Dalzell, 2004). Popularity of ulua as a food and game fish has continued into present day.



The popularity of recreational fishing for ulua has resulted in significant declines in their abundance and average size (Friedlander & Dalzell, 2004; Meyer et al., 2007). Since the early 1900’s, commercial landings of coastal jacks (excluding akule and ‘Ōpelu) have gradually declined by 84% and average size of ulua aukea and ‘ōmilu caught recreationally has decreased (Friedlander & Dalzell, 2004). Where jacks make up 72% of the apex predator biomass in the NWHI, they only make up <1% in the MHI.

The current and relatively new DAR rules for ulua, state an individual fish must be a minimum of 10 inches forklength (FL) for take and 16 inches FL for sale, with a bag limit of 20 individuals per day (total, non-commercial) (DAR, 2006). Despite the new larger minimum size regulations, the high effort expended in catching larger individuals require continued monitoring of the recreational fishery, with a special focus on large reproducing females (Friedlander & Dalzell, 2004).

In Kīpahulu, ulua are considered an important target species. In the Mālama I Ke Kai Community Action Plan, KOI ranked the current status of the ulua fishery as “fair” with a desired status of “good” (Kīpahulu CAP,

2012). Baseline surveys conducted by TNC at 26 sites in 2010 and 2013 reported jacks made up a very small proportion of total fish biomass and abundance (Minton et al., 2014).

While the regulatory solutions do not directly target ulua, the proposed regulation to harvest only 10 combined finfish per person per day and to use two poles per person per day with a maximum of two hooks per line are indirect yet effective ways to reduce the likelihood of unsustainably harvesting ulua in Kīpahulu moku.

*II. Reef and Shoreline Fish*

Kala (Bluespine Unicornfish, *Naso unicornis*)

KOI currently ranks the status of kala as “fair” and strives for a status of “good.” The proposed regulation to harvest only 2 kala per day will reduce the likelihood of unsustainably harvesting kala in Kīpahulu moku.

Kala has increasingly become a local food fish favorite in Hawai‘i (DAR, 2013). This diurnal species is found along inshore reefs and in rocky shoreline habitats, and frequently moves into shallow water to graze on macroalgae (DAR, 2006; Andrews et al., 2016). Through herbivory, they help regulate excessive algae growth on coral reefs, making them a key species in maintaining the coral reef community structure in Hawai‘i (Andrews et al., 2016). They are a schooling fish species with large solitary adults occasionally found at the reef’s edge (DAR, 2006).

Males and females mature at 4.5 years (~12 inches) and 7.5 years (~14 inches) and may live up to 50 years or more (Eble et al., 2009; DeMartini et al., 2014). In Hawai‘i, kala can reach up to 2 feet in length and weight up to 8 pounds (DAR, 2006). Spawning is highly seasonal, with a single short spawning period from May to June (DeMartini et al., 2014). Kala in Hawai‘i were found to spawn earlier, mature at a larger size, reach a larger maximum size, and live longer than those found at lower latitudes of their distribution (Andrews et al., 2016).

In Hawai‘i, recent increases in fishing pressure have raised concern and prompted studies on stock evaluations which suggest kala may be overfished (Nadon et al., 2015). The current legal-size limit for kala is 14 inches, meaning most females and two-thirds of males enter the fishery shortly after they mature. This, their longevity, and well-supported research on positive correlations between fish size and net fecundity

suggests there is a need for both a minimum and maximum size limit to ensure a long-term sustainable fishery (Eble et al., 2009).

In Kīpahulu, kala populations appear to be relatively healthy, with fish abundance similar to that of an area closed to fishing (Minton et al., 2014). Despite indications of low fishing impacts, fish abundance and biomass have actually steadily decreased in the area since the 1960s. Given the ecological and economic importance of kala, it is important regulations are put in place to prevent further decline (Minton et al., 2014).

Kole (Goldenring surgeonfish, *Ctenochaetus strigosus*)

KOI currently ranks the status of kole as “fair” and strives for a status of “good.” The proposed regulation to harvest only 10 combined finfish per person per day and harvest kole at a minimum size limit of 5 inches will reduce the likelihood of unsustainably and improperly harvesting kala in Kīpahulu moku.

Kole is one of the most numerous reef fishes in Hawai‘i and is targeted as a favored food and aquarium fish. It is found over coral, rock, and rubble, and is most common in shallow sub-surge zones where it feeds on algae and decaying plant matter (DAR, 2006; Longenecker & Langston, 2008). Individuals are usually solitary, and favor certain areas based on food availability. They do not stray far from their home boundaries, and are easily exploited due to this territorial behavior.



Size at 50% sexual maturity is estimated at 3.3 inches FL for females and 3.9 inches FL for males (Langston et al., 2009). Males and females mature by 15 months and 9 months, respectively, and may live up to 18 years or more (Langston et al., 2009). Spawning is mostly group spawning with some pair spawning (Sancho et al., 2000). Accounts of the spawning season range from March to June, to February to May (Longenecker & Langston, 2008; Langston et al., 2009).

In Kīpahulu, kole is a key subsistence fishery species, yet sightings were relatively rare in comparison to other east Maui sites surveyed, with only 18 individuals recorded at 3 of 26 sites over a 2-year study (Minton et al., 2014). Fishing pressure on kole in Kīpahulu is unknown and while low abundance is potentially due to habitat type more data is needed to draw conclusions. Individuals surveyed averaged ~4 inches in length and

larger individuals were observed during 5-minute timed swims. Despite these observations, the proportion of the population larger than the size at maturity could not be calculated due to a small sample size (Minton et al., 2014).

Moi (Pacific Threadfin, *Polydactylus sexfilis*)

KOI currently ranks the status of moi as “fair” and strives for a status of “good.” The proposed regulation to harvest only 10 combined finfish per person per day, harvest moi between a slot limit of 11-18 inches, use a throw net with a minimum mesh size of 3 inches, and harvest moi outside of the closed season from May to September will reduce the likelihood of unsustainably and improperly harvesting moi in Kīpahulu moku, especially while using overly efficient gear. The Kukui Bay Sanctuary also protects an important moi nursery area.

Moi are protandric hermaphrodites, meaning they initially mature as males after a year at about 7.8 - 9.8 inches FL and then undergo a sex change, passing through a hermaphroditic stage and becoming functional females between 11.8 - 15.7 inches FL at about three years of age (Santerre et al., 1979). Spawning occurs inshore and eggs are dispersed and hatch offshore (Lowell, 1971). Larvae and juveniles are pelagic until juveniles attain a FL of about 2.4 inches, whereupon they enter inshore habitats including sandy bays, shoreline surf zones, reefs, and stream entrances (Santerre & May, 1977; Santerre et al., 1979). Newly settled young moi, called moi li‘i, appear in shallow waters in summer and fall where they are the dominant member of the nearshore surf zone fish assemblage. Moi feed primarily on crustaceans and can be found in schools (DAR, 2006).

Moi is a popular and much sought-after sport and food fish in Hawai‘i (Friedlander & Ziemann, 2003). In ancient Hawaiian culture, moi were reserved for the ruling chiefs and prohibited for consumption by commoners (Titcomb, 1972). Hawaiians developed a number of traditional strategies to manage moi for sustainable use. Kapu, or closures, were placed on moi during the spawning season (typically from May to August), so as not to disrupt spawning behavior (DAR, 2006).

Members of the Kīpahulu community recall a time when moi li‘i could be found in every tide pool throughout the year (Kīpahulu CAP, 2012). However, no current information specific to moi abundance or biomass in Kīpahulu is available (Minton et al., 2014).

Uhu (Parrotfishes, *Scaridae*)

KOI currently ranks the status of uhu as “fair” and strives for a status of “good.” DAR



Maui rules (adopted in 2014) cap the number of parrotfish and goatfish caught in Maui's waters. They include a limit of no more than two parrotfish per person per day and prohibit the take of both species of large male parrotfish (*Chlorurus perspicillatus* and *Scarus rubroviolaceus*). There are also limits to the number of certain goatfish species that can be harvested per day. Thus, maui-wide rules are more restrictive than and would take precedence over the proposed regulation to harvest only 10 combined finfish per person per day. The additional restriction to not take or possess marine life while night diving from 6pm to 6am further reduces the likelihood of unsustainably harvesting uhu in Kīpahulu moku.

Uhu are herbivorous, feeding primarily on algae, using their strong beak-like teeth to scrape and gouge food from the coral substrate (Hoover, 2008). Parrotfish are also corallivorous, as they feed on coral and zooxanthellae, microscopic algae residing in corals (Gulko, 1998). Recent findings also uncovered that, for the five major species of parrotfishes of Hawai'i, it initially takes three years for females and two years for males to reach sexually maturity. Parrotfish appear to be reproductively active throughout the year, with peak spawning estimated to be April to July, with some species having a second, smaller peak around November (DeMartini & Howard, 2016).

Statewide, in addition to being a prized and sought after species, larger parrotfish have great biological and ecological importance on the reef in terms of reproduction, algal grazing, and bioerosion rates (Birkeland & Dayton, 2005; Bellwood et al., 2011). *S. rubroviolaceus* and *C. perspicillatus* both play a fairly significant role in bioerosion on reefs in Hawai'i (Pardee, 2014) due to the significant effect of their feeding behaviors, with larger parrotfish producing as much as 800 pounds of sand per year (Ong & Holland, 2010).

Parrotfish are sequential hermaphrodites, with the largest females changing sex into males, defending territories, and creating a harem of females with which they breed. Territories of larger males contain more females, and male size could be a factor in reproductive success, with greater reproductive output from large males with large harems (Hawkins & Callum, 2003).

Decreases in the proportion of these large males could cause females to have difficulties finding high-quality mates with whom to spawn (Hawkins & Callum, 2003; Clua & Legendre, 2008) and decrease the reproductive output of the population. If fishing prevents females from growing large enough to change sex, it could also result in a lower reproductive output (due to a limitation of males) unless the species can compensate by changing sex at a smaller size (Hawkins & Callum, 2003).

Parrotfish are most commonly caught by spear fishing and most efficiently caught at night while asleep on the reef (Lindfield et al., 2014). Commercial fishers have been observed to use surround nets, taking tons of uhu at one time. Large males are targeted over the smaller, initial phase males and females (Clua & Legendre, 2008). In MHI, a decrease in the average weight of landed uhu has been observed between 1977 and 2012 by catch reports and fish dealers (Pardee, 2014).

In Kīpahulu, baseline surveys revealed four species of parrotfish were present, with redlip or ember (*Scarus rubroviolaceus*) and palenose (*Scarus psittacus*) parrotfishes accounting for most of the observations and parrotfish biomass (Minton et al., 2014). Other parrotfish species observed were the spectacled (*Chlorurus perspicillatus*) and stareye (*Calotomus carolinus*) parrotfishes. Similar to other east Maui sites, the normally common and ecologically important bullethead parrotfish (*Chlorurus spilurus*) was not observed in Kīpahulu.

In 2013, fewer parrotfish were observed than in fish surveys conducted in 2010, but surveys again suggested a wide distribution across the Kīpahulu reef. Average size and the proportion of sexually mature individuals varied across species and is discussed separately below. Overall, the abundance of parrotfish in Kīpahulu is greater than that of other more accessible areas supporting larger human populations. (Minton et al., 2014).

### III. *Invertebrates and Limu*

#### 'Opihi (Limpets, *Cellana* spp.)

KOI currently ranks the status of 'opihī as “fair” and strives for a status of “good.” The proposed regulations to harvest only a ½ gallon of 'opihī between 1 ¼ - 2 inches, not while freediving, and only outside of the 'opihī rest area reduces the likelihood of unsustainably and improperly harvesting 'opihī in Kīpahulu moku, especially while using overly efficient gear.



There are three species of ‘opihi, all of which are endemic to the Hawaiian Islands. They inhabit basaltic boulder and cliff shorelines with high wave energy, and each species is found in a distinct zone along the shore. ‘Opihi makaiauli (Blackfoot ‘pihi, *Cellana exarata*) lives highest on the shoreline, and can be found on rocks around the high tide line. ‘Opihi ‘ālinalina (Yellowfoot ‘Opihi, *Cellana sandwicensis*) inhabits the area between the high tide and low tide lines. ‘Opihi kō‘ele (Giant ‘Opihi, *Cellana talcosa*) is generally found below the water line.

‘Opihi have planktonic larvae, and must successfully settle in suitable habitat within 2 to 14 days of spawning. Once the larvae settle, ‘opihi grow rapidly and reach reproductive maturity within seven to eight months (size at maturity varies by species, with makaiauli and ‘ālinalina maturing at 1.25 inches). This rapid growth rate suggests that ‘opihi are a species that should be able to sustain local subsistence harvest pressure and recover quickly if managed appropriately, while sustainable levels cannot be maintained under commercial or over-harvest conditions. ‘Opihi also face threats from climate change, sea level rise, and ocean acidification, which can affect dispersal and survival rates, making it very important to manage populations locally. ‘Opihi have high cultural value as a food species often served at celebrations. The most desired species is ‘opihi ‘ālinalina. As a result of commercial demand and market price, many accessible shorelines across Hawai‘i are overharvested.

In Kīpahulu, overharvest of legal-size adults, unsustainable harvest of large reproducing ‘opihi and undersized individuals (before they can spawn), especially during a peak spawning period in summer months, are the primary concerns (Kīpahulu CAP, 2012). In 2014, Kīpahulu ‘Ohana and another east Maui community organization, Nā Mamo O Mu‘olea, revived the traditional practice of voluntarily resting an area from harvest, to allow populations to grow and replenish. Since then, rapid ‘opihi surveys where ‘opihi makaiauli are counted and measured have been conducted to monitor changes in abundance within and adjacent to rest areas (‘Opihi, 2014-2017). Results showed populations increased within and down-current from rest areas, suggesting rest areas are successful and ‘opihi populations will bounce back if left alone for a period of time after harvesting.

In east Maui, the traditional and customary practice is to not gather ‘opihi below the low tide mark to protect the larger spawners and the kō‘ele. ‘Opihi that grow below the low tide mark are in many cases the spawners, providing the opportunity for the ‘opihi to reproduce and have a healthy population. The low tide mark refers to the low tide on the day of the lowest tide in a calendar year. If ‘opihi gatherers resort to gathering below the low tide mark, this is an indication that there are not enough ‘opihi above the low tide mark and that the resource has diminished to the point where it should not be harvested at all and a kapu should be observed to allow the ‘opihi to recover.



#### Ula (Banded Spiny Lobster, *Panulirus marginatus*; Green Spiny Lobster, *Panulirus penicillatus*)

KOI currently ranks the status of ula as “fair” and strives for a status of “good.” The proposed regulations to harvest 2 ula per person per day outside of the closed season from May to September will reduce the likelihood of unsustainably and improperly harvesting ula in Kīpahulu moku.

Ula are two species of spiny lobster in Hawai‘i that inhabit crevices and caves, occurring from depths of a few feet to a maximum of 600ft (Hoover, 2008). They are nocturnal feeders and can forage from the reef to adjacent sandy habitats. In Hawai‘i, ula have a small home range and move relatively short distances as adults (Prescott, 1988; O’Malley & Walsh, 2013). Ula generally spawn year-round, with a peak from May through August. Early tagging studies indicate females spawn at least twice a year, but may spawn more frequently (McGinness 1972). Fecundity is positively correlated with size of carapace length. In Hawai‘i, larger females can produce up to 500,000 eggs at once and approximately 40% of females have eggs at any given time (Hoover, 2008). *P. penicillatus* lobsters with a carapace measuring 2.75 inches (70 mm) can lay up to 150,000 eggs whereas a lobster with a carapace measuring 4.3 inches (110 mm) can lay up to 575,000 eggs - 4 times as many (McGinnis, 1972). *Panulirus spp.* mature at around 3 to 4 years of age and can live up to 14 years (Cockcroft et al., 2013).

The spatial scale of populations is determined by how far juvenile larvae disperse during the long (6 months – 1 year) pelagic larval period (Iacchei & Poepoe, 2015; Iacchei & Toonen 2013). For both species, Iacchei et al. (2014) found regional genetic differentiation between MHI and NWHI, indicating that Papahānaumokuākea

Marine National Monument, which is closed to all fishing activities, does not serve as a source for re-populating ula in the MHI. This suggests that ula populations in the MHI may rely on local stocks to maintain future populations of ula in the area (Iacchei & Poepoe, 2015).

Ula can easily be caught with tangle nets or traps, making them vulnerable to overharvesting. This is demonstrated by the NWHI lobster industry collapse in the 1990's, where a total of 11 million lobsters were harvested (Schultz et al., 2011), but landings (DiNardo et al., 2001) and catch per unit effort (O'Malley, 2009) declined by 87% within a decade (1983–1999) (Butler et al., 2013). There was also a significant shift towards decreasing carapace length in the same period (Parrish & Polovina, 1994). The National Marine Fisheries Service shut down the fishery in 2000 because of the decline and uncertainty associated with population and stock assessment models.

Overharvesting also led to current DAR rules; a seasonal closure from May through August, a minimum harvest size of 3 ¼ inches in carapace length, no taking or killing of females, and no spearing (DAR, 2019). These regulations are consequently leaving a larger number of males of greater size up for harvest (Iacchei & Toonen, 2013). This skews the sex ratio in populations and results in less and smaller sized males being available for mating, possibly leaving females sperm-limited. This could potentially limit overall egg production and hinder stock recovery in the MHI (Iacchei & Toonen, 2013).

In Kīpahulu, ula are a valued resource where shallow water *P. penicillatus* comprises most of the harvested catch. Their homing (territorial) behavior and shallow water habitat make them more vulnerable to overharvest and subsequently they make up a larger amount (88%) of total spiny lobster catch in the MHI. However, observations and informal data suggest they do not readily enter baited traps (Iacchei & Toonen, 2013).

Limu - Varieties of seaweeds (Līpoa, *Dictyopterus plagiogramma*; Kala, *Sargassum echinocarpum*; Kohu, *Asparaqopsis taxiformis*)

KOI currently ranks the status of limu as “good” and strives for a status of “very good.” The proposed regulations to harvest limu without the holdfast/roots attached will reduce the likelihood of unsustainably and improperly harvesting limu in Kīpahulu moku.

Native limu are valued in Hawai'i through traditional subsistence practices and for their cultural significance. Limu has long been a staple of the Hawaiian diet and one of three basic components of every meal, often paired with poi or fish (raw or cooked), functioning as a vegetable, relish or spice (Abbot, 1996; Aiona, 2003; McDermid & Stuercke, 2003). Nutritionally, limu provides vitamins, minerals, protein, and fiber to its consumers, elements different from those provided from other staple foods like fish and poi. The nutritious nature of limu was particularly important for women who were prohibited from eating many other nutritious foods under the era of the kapu system (Abbot, 1996; McDermid & Stuercke, 2003). Limu are also utilized culturally in ceremonies, medicines, stories and legends, and in commerce as a trade item between families (McDermid & Stuercke, 2003). In adays gone by, chiefs would transplant the treasured limu species, bringing limu covered rocks when travelling to different islands (Aiona, 2003). Hawaiians cultivated limu and understood the importance of leaving the holdfast rooted to the substrate and considered uprooting to be careless (Aiona, 2003).

Limu are also vital for healthy marine ecosystems by providing food, protection, and shelter. Seaweed such as limu kala illustrate its role as a food source for herbivorous surgeon fish (kala), among many other marine animals (Abbot, 1996). Limu is also an important habitat for invertebrates (Longenecker et al., 2011).

Limu can also be detrimental to marine ecosystems when out of balance. Excess nutrient input and declining abundances of herbivorous fish due to overharvesting have contributed to phase shifts from coral dominated reefs to macroalgae dominated (Stimpson et al., 2001).

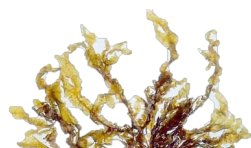
Edible native limu are an important component of the Hawaiian diet in Kīpahulu. Intertidal regions in the area are the areas where valued limu species (kohu, kala, līpoa) are abundant, but not as abundant as they once were. The loss of traditional and sustainable harvest techniques, such as trimming the top of the plant instead of pulling out the entire root, has led to a decline in limu abundance (Kīpahulu CAP, 2012).

#### **Additional Subsistence Resources**

‘A‘ama crab (Rock Crabs, *Grapsus tenuicrustatus*, *Pachygrapsus plicatus*)

Āholehole (Flagtails, *Kuhlia sandvicensis*, *Kuhlia xenura*)

‘Ama‘ama (Striped Mullet, *Mugil cephalus*)



Awa (Milkfish, *Chanos chanos*)

Awa 'āua (Hawaiian Ladyfish, *Elops hawaiiensis*)

Ha'ue'ue (Ten-lined Urchin, *Eucidaris metularia*)

Hā'uke'uke kaupali (Helmet Urchin, *Colobocentrotus atratus*)

He'e maui (Day Octopus, *Octopus cyanea*)

He'e (Octopuses, *Octopoda* spp.)

Hīnālea lauili (Saddle Wrasse, *Thalassoma duperrey*)

Hou (Surge Wrasse, *Thalassoma purpurum*)

Kūmū (Whitesaddle Goatfish, *Parupeneus porphyreus*)

Kūpe'e (Polished Nerite, *Nerita polita*)

Kūpīpī (Blackspot Sergeant, *Abudefduf sordidus*)

Loli (Sea Cucumbers, *Aspidochirotida* spp.)

Mamo (Hawaiian Sergeant, *Abudefduf abdominalis*)

Moano (Manybar Goatfish, *Parupeneus multifasciatus*)

'Ō'io (Bonefish, *Albula* spp.)

O'opu Alamo'o (Hawaiian Freshwater Goby, *Lentipes concolor*)

'Ōpae (Shrimps, *Malacostraca* spp.)

Pipipi (Black Nerite, *Nerita picea*)

Po'opa'a (Hawkfish, *Cirrhitis pinnulatus*)

Uku (Blue-Green Snapper, *Aprion virescens*)

Uouoa (Sharptnose Mullet, *Neomyxus leuciscus*)

'U'u (Soldierfishes, *Holocentridae* spp.)

Wana (Sea Urchins, *Echinoidea* spp.)



Photo: Kīpahulu 'Ōhana

## KĪPAHULU MOKU CBSFA | 6. Management Objectives, Actions, and Work Plan

### Objectives and Actions

**Biophysical - Objective 1:** Improve biodiversity and increase focal species abundance by 50% over 5 years as evidenced by regular monitoring.

*Action 1a.* Establish clearly defined and socially acceptable area-based rules that limit fishing and gathering effort for focal species in order to increase their size and abundance.

#### i. Adopt Regulatory Solutions (1a.i)

The regulatory solutions proposed by KOI are informed by traditional knowledge and customary practices and based upon observations and direct experience. Finalizing the management plan and rule package, conducting and completing the Chapter 91 Administrative Procedures process to adopt rules to establish a CBSFA for the Kīpahulu moku and protect the marine resources of the area is integral to protecting the marine resources and the customs and practices that they sustain. KOI will work with DLNR to reach out to the east Maui and larger Maui Nui communities to gather feedback and share information to increase the public's understanding and support of the proposal, the State's administrative rule-making process, the community's role, the issues, and how they can get involved. By reaching out and seeking participation, KOI can address people's questions, and generate better understanding and more support. This increased understanding and public support will have a positive effect on the area once it is designated as a CBSFA.

#### ii. Enforcement of Administrative Rules Within the CBSFA (1a.ii)

The Hawai'i Division of Conservation and Resources Enforcement (DOCARE) is responsible for enforcing CBSFA rules, and is integrally involved in both voluntary compliance efforts and enforcement. KOI will support DOCARE in the efforts. Explore establishment of a DOCARE officer position in east

Maui so that DOCARE presence and response time will be improved in this remote area.

#### iii. Ongoing Subsistence Fishing and Gathering (1a.iii)

Engaging in fishing and gathering of marine resources, in accordance with the conservation guidelines of Native Hawaiian kūpuna is a traditional and customary practice. It is important for the community to be able to secure what they need for their day-to-day subsistence needs as well as be able to harvest and gather what is needed for larger 'ohana gatherings that are integral to the cultural practice of celebrating important life cycle events – birthdays, weddings, graduations, etc.

*Action 1b.* Assess biological parameters of reef and reef fish through standardized in-water monitoring every five years to track the status of ecosystem and target species over time (conducted by DAR or other science-based organization or agency) and share these findings to increase understanding of the effect of the CBSFA.

#### i. DAR, TNC, & Partners Conduct Assessments (1b.i)

DAR, TNC, and/or other partners with relevant technical expertise conduct fish and habitat utilization assessments to characterize the marine resources and habitat within the CBSFA as an initial assessment. The initial assessment to be conducted will help establish a baseline for evaluations to be conducted every five years.

#### ii. Community Observations and Monitoring (1b.ii)

Hawai'i Revised Statute (HRS) § 188-22.6, "Designation of Community Based Subsistence Fishing Area," states that the purpose of designating a CBSFA and carrying out fishery management strategies for such areas is to reaffirm and protect "fishing practices customarily and traditionally exercised for purposes of Native Hawaiian subsistence, culture, and religion." The science, art and skill of traditional and customary observation and monitoring were and continue to be integral to the fishing practices customarily and traditionally



exercised by Native Hawaiians, which HRS § 188-22.6 seeks to reaffirm and protect. Such observation and monitoring activities will be the principal activities to reaffirm and protect “fishing practices customarily and traditionally exercised,” in the CBSFA. In addition, the monitoring methods that will be practiced are essential for the sustainable management of a robust ecosystem where diverse marine resources flourish.

*Action 1c.* Assess biological status of the intertidal ecosystem and ‘opihi (inside and outside the rest area) through standardized shoreline monitoring to understand population trends (conducted periodically) and share these findings to increase understanding of the effect of the CBSFA.

i. Community and Partner Monitoring (1c.i)

Since 2009, KOI and partners have monitored ‘opihi inside and outside the rest area located at HALE. This monitoring will continue to assess the impacts of the rest area and also the designation of a CBSFA in Kīpahulu moku.

*Action 1d.* Conduct a pakini/human use and creel survey to gather fisher catch/extraction data to understand what is being harvested.

i. Community and Partner Monitoring (1d.1)

Community will work with DLNR and other partners like the University of Hawai‘i (UH) to conduct a human use and creel survey to monitor changes over time in human behavior and extraction.

**Governance - Objective 2.** Establish and maintain effective voluntary, legal, and governance structures and assess stakeholder participation within the first three years is positive as evidenced by a perceptions survey.

*Action 2a.* Ensure representativeness, equity and efficacy of collaborative management system through an open and transparent process.

i. Kīpahulu Konohiki Advisory ‘Ohana (KKAO) (2a.i)

Form a Kīpahulu Konohiki Advisory ‘Ohana (KKAO) comprised of fisher families from the area and convene on a regular basis (at least once every year or two years). The KKAO will serve as a liaison between KOI, the Kāko‘o Management Team (KMT), and the community by providing feedback to KOI and by reporting and providing outreach to their ‘ohana, neighbors, friends and the broader community.

ii. Kāko‘o Management Team (KMT) (2a.ii)

Form a Kāko‘o (support) Management Team (KMT) comprised of KOI’s partners, Kīpahulu landowners Aha Moku, and government agencies (with around 10 representatives, one each from DAR, DOCARE, HALE, KOI, Kīpahulu Community Association (KCA), Aha Moku, Native Hawaiian practitioners, fishers, conservationists, and neighboring moku). The KMT will convene on a regular basis (at least once every year or two years), and will consult with and assist in the implementation of the management plan, review of observation and monitoring information and address concerns identified by the KKAO.

iii. 5-Year Evaluation (2a.iii)

Using information received from KOI observations and monitoring programs and from DAR and partners, KKAO and KMT will help conduct an evaluation of the management plan after the first five years and every five years thereafter.

*Action 2b.* Cooperate and coordinate with DOCARE as the enforcement agency for DLNR, and participate in their Makai Watch Program for both voluntary compliance and enforcement.

i. Makai Watch (2b.i)

Participate in the Makai Watch - ‘Ike Kai program, based on the idea that people who use, deal with, or live closest to the natural resources are in the best position to help in understanding the nature of the area. Through Makai Watch, the Kīpahulu community will better observe and report useful data for DOCARE when officers cannot be onsite during an infraction.

*Action 2c.* Establish an outreach and communications program with various stakeholders to build support and compliance for the Kīpahulu Moku CBSFA.

i. Kīpahulu Moku Resident Outreach (2c.i)

KOI and DLNR will hold at least one informational meeting in east Maui after the rules are approved, allowing for questions from the community and preparing for clarifications and answers. KOI and DAR will develop and disseminate educational materials and information regarding the new rules and the vision and goals for the CBSFA. DLNR and DAR will update their websites and update the fishing regulation book with the new rules. KOI will update their website [www.kipahulu.org/cbsfa](http://www.kipahulu.org/cbsfa) to highlight rules, codes of conduct and other outreach materials, which can be promoted in other outreach opportunities. Other community outreach (e.g. t-shirts, calendars, printed rules and code of conduct), a talk-story (information) station, and

one-on-one educational outreach efforts will help promote understanding the reasons behind the rules and promote voluntary compliance and support by fishers and community. These efforts reaffirm that Kīpahulu moku residents can continue subsistence fishing and gathering in the CBSFA and to inform them of the important regulations and guidelines to ensure that the marine resources will continue to be available for them and future generations.

ii. Haleakalā National Park and Kīpahulu Campground Outreach (2c.ii)

Because the primary point of access for non-resident users of Kīpahulu shoreline for fishing and gathering resources is through the Park and the Kīpahulu campground, and this is also the region of the ‘opihi rest area, this will be a focus of educational outreach efforts. KOI and DAR will conduct joint trainings with HALE staff so that they can assist with outreach and education for visitors to the Park. Educational materials designed in Activity 2c.i will be provided at the HALE entry gate, visitor center, or campground.

iii. Signage (2c.iii)

DAR will, with support from DOCARE, HALE, and KOI, create and install regulatory signage throughout the CBSFA within one year of the CBSFA designation. Signage with information on the CBSFA and rules should be posted along with the Kīpahulu moku signage that is already located at/near the boundaries of the moku, and at key access points including in the HALE campground and Ka‘āpahu Bay.

iv. Media Coverage (2c.iv)

It is important to generate media coverage and messaging about the protection of resources and ongoing subsistence practices at newsworthy points in local and statewide media outlets including the Maui News, the Star Advertiser, Hānaside News, MauiTime Magazine, etc. KOI and the management team can anticipate and issue a joint press release.

**Socioeconomic - Objective 3.** Enhance food security for coastal residents and the continuation of traditional and customary fishing and gathering practices, while maintaining the cultural, recreational, and ecological values of Kīpahulu to society.

*Action 3a.* Enhance respect for and understanding of local and Native Hawaiian knowledge and practices, and place names in Kīpahulu, as well as understanding of

environmental and social sustainability, through culturally rich outreach efforts.

i. Pono Fishing Calendar (3a.i)

Build appreciation and respect for the traditional ecological knowledge for Kīpahulu moku by developing a pono fishing calendar that shares CBSFA information alongside moku-specific spawning observations, similar to the pono fishing calendar created by Hui Mālama O Mo‘omomi.

*Action 3b.* Perpetuate traditional practices and relationships and ensure traditional knowledge is passed down to future generations within families and is shared in outreach and exchange opportunities.

i. Youth Education Programs (3b.i)

KOI and others will continue youth engagement opportunities, including Kīpahulu Makai Exploration Days through the Hāna School 21st Century Community Learning Centers Program, and integration of a makai component from the ahupua‘a perspective in educational programs at Kapahu Living Farm. The focus of such activities is to link and continue Hawaiian customs and traditions for future generations, highlighting the historical levels of abundance (re-setting the baseline for today’s youth), traditional fishing uses, place names, mo‘olelo, traditional practices for caring for marine resources, and the importance of acquiring, using and transmitting ancestral knowledge. Voluntary compliance will best be achieved through users, especially youth, understanding the reasons behind the rules and the code of conduct, and the importance of maintaining and passing down traditional and customary practices. One of the primary audiences for initiation in sustainable fishing methods and values is children, who are the next generation of fishers and caretakers. KOI will explore working with Hāna School and other educators to provide learning opportunities for youth.

ii. Networking (3b.ii)

KOI will continue to provide learning exchanges and opportunities related to traditional fisheries management and codes of conduct with educators, students, scientists, government agencies, and other community groups. In the past, these exchanges have enriched both KOI and those who have shared experiences. This is an important aspect of gaining acknowledgement and respect for traditional and customary fisheries’ management.

Action 3c. Assess community perceptions of CBSFA through survey techniques.

i. Social Survey (3c.i)

KOI and DAR will conduct a survey (e.g. key informant interviews, household surveys, etc.) of

the Kīpahulu community within five years of the CBSFA being implemented to measure societal perceptions of the CBSFA and to measure impacts to the community.

**Draft Work Plan**

**Table 3.** Kīpahulu Moku CBSFA Draft Work Plan

<b>Biophysical - Objective 1:</b> Improve biodiversity and increase focal species abundance by 50% over 5 and 10 years as evidenced by regular monitoring.					
<i>Action 1a.</i> Establish clearly defined and socially acceptable area-based rules that limit fishing and gathering effort for focal species in order to increase their size and abundance.					
Action Items	What we want to see	How we will measure	Who & What	When	Cost/Budget
(1a.i) Adopt Regulatory Solutions	State adopt rules to establish Kīpahulu Moku CBSFA to protect marine resources and customs/practices they sustain	Rules adopted through the Chapter 91 process	KOI PT staff time, admin, travel	Year 1	~\$40,000
(1a.ii) Enforcement of Administrative Rules Within the CBSFA	DOCARE creates a new position in east Maui	Local resident of east Maui hired to fill DOCARE position	DLNR DOCARE (annual salary, fringe, operations)	Year 2	~\$100,000
(1a.iii) Ongoing Subsistence Fishing and Gathering	Community is able to secure day-to-day subsistence needs and conduct cultural practices as well as harvest and gather what is needed for larger ‘ohana gatherings	(1d.1) Community and Partner Monitoring; (3c.i) Social Survey; Feedback during (2a.i) KKAO and (2a.11) KMT meetings.	KOI/Fishermen	Years 1-5	--
<i>Action 1b.</i> Assess biological parameters of reef and reef fish through standardized in-water monitoring every five years to track the status of ecosystem and target species over time (conducted by DAR or other science-based organization or agency) and share these findings to increase understanding of the effect of the CBSFA.					
(1b.i) DAR, TNC, & Partners Conduct Assessments	Reef fish surveys	Dive surveys conducted according to established protocols at randomized points	KOI/NOAA/TNC	Pre-designation and Year 4	~\$80,000 (x 2)
(1b.ii) Community Observations and Monitoring	Fishermen recording data about catch, species, size, abundance, gonads, seasonality, etc.	Journals kept by fisherman, compiled periodically	KOI/Participating fishermen/DAR (portion of salary of DAR scientist for analysis)	Years 1-5	~\$5,000
<i>Action 1c.</i> Assess biological status of intertidal ecosystem and ‘opihi (inside and outside the rest area) through standardized shoreline monitoring to understand population trends (conducted periodically by community with science partners) and share these findings to increase understanding of the effect of the CBSFA.					
(1c.i) Community and Partner Monitoring	‘Opihi population surveys	Annual surveys conducted according to established protocols in rest area and	KOI/UTAMCC/TNC (salaries, travel)	Years 1-5	~\$25,000

		designated locations outside of rest area			
<i>Action 1d.</i> Conduct a pakini/human use and creel survey to gather fisher catch/extraction data to understand what is being harvested.					
(1d.1) Community and Partner Monitoring	Fisher catch/extraction data	Creel/pakini survey including CPUE	KOI/UH/TNC (NGO, scientist, community)	Year 3	~\$100,000
<b>Governance - Objective 2.</b> Establish and maintain effective voluntary, legal, and governance structures and assess stakeholder participation within the first three years is positive as evidenced by a perceptions survey.					
<i>Action 2a.</i> Ensure representativeness, equity and efficacy of collaborative management system through an open and transparent process.					
(2a.i) Kīpahulu Konohiki Advisory 'Ohana (KKAO)	Council of users to oversee implementation of CBSFA	Assess effectiveness of rules and outreach, make recommendations to KMT	KOI (salary, refreshments, travel)	Meet at least every 1-2 years	~\$500 (x 5)
(2a.ii) Kāko'o Management Team (KMT)	Collaboration of stakeholders to oversee implementation of CBSFA	Assess effectiveness of rules and outreach, consider recommendations of KKAO, adjust as necessary	KOI/DAR/DOCARE/HALE (salaries, travel \$500 each)	Meet at least every 1-2 years	~\$2,000 (x 5)
(2a.iii) 5-Year Evaluation	Review of CBSFA rules and outreach effectiveness	Rules or management plan amended based on feedback and experience if needed	Contract	Year 5	~\$20,000
<i>Action 2b.</i> Cooperate and coordinate with DOCARE as the enforcement agency for DLNR, and participate in their Makai Watch Program for both voluntary compliance and enforcement.					
(2b.i) Makai Watch	Community participation in outreach, compliance monitoring	Community members trained, able to support DOCARE in enforcement actions when needed	DOCARE officer time and travel	Years 1-5	~\$500 (x 5)
<i>Action 2c.</i> Establish an outreach and communications program with various stakeholders to build support and compliance for the Kīpahulu Moku CBSFA.					
(2c.i) Kīpahulu Moku Resident Outreach	Community presentations, promotional materials, flyers, kiosk at Triangle, email list distribution, website and social media posts	Signs, posters and handouts designed and posted/distributed	KOI/DAR	Years 1-5	~\$6,000
(2c.ii) Haleakalā National Park Outreach	Educational materials at the Kīpahulu entry gate, visitor center, campground and HALE website	HALE staff trained and updated annually	DAR staff conducted training \$500/day	Years 1-5	~\$500 (x 5)
(2c.iii) Signage	Educational signage at key locations (moku boundaries, key access points)	Effective signage designed and posted	DAR cost of 10 signs, posts, and concrete	Year 1	~\$1,500



(2c.iv) Media Coverage	Articles in local newspapers	Number of articles and publications	KOI (staff time)	Years 1-5	~\$2,500
<b>Socioeconomic - Objective 3.</b> Enhance food security for coastal residents and the continuation of traditional and customary fishing and gathering practices, while maintaining the cultural, recreational and ecological values of Kīpahulu to society.					
<i>Action 3a.</i> Enhance respect for and understanding of local and Native Hawaiian knowledge and practices and place names in Kīpahulu, as well as understanding of environmental and social sustainability, through culturally-rich outreach efforts.					
(3a.i) Pono Fishing Calendar	Seasonal calendar with rules and pono fishing guidelines	Calendar produced	KOI contract for design and printing	Year 4	~\$6,000
<i>Action 3b.</i> Perpetuate traditional practices and relationships to ensure traditional knowledge is passed down to future generations within families and is shared in outreach and exchange opportunities					
(3b.i) Youth Education Programs	Youth involved in hands-on activities	Number of programs held and youth participating	KOI (staff time, travel \$500/day)	Years 1-5	~\$1,000 (x 5)
(3b.ii) Networking	Connections and collaborations with supportive entities to enhance effectiveness of CBSFA rules, outreach, management plan and monitoring	Number and effectiveness of partnerships	KOI/ UTAMCC/ KMT/Maui Nui Makai Network/ Etc.	Years 1-5	--
<i>Action 3c.</i> Assess community perceptions of CBSFA through survey techniques.					
(3c.i) Social Survey	Survey of awareness, understanding and attitudes about CBSFA rules and management	Social survey conducted and results evaluated, shared, and incorporated into recommendations for outreach and if necessary management plan and rules amendment	Contract or University	Year 1, Year 4	~\$15,000 (x 2)
<b>Estimated five year budget</b>	Estimated cost is \$103,700 per year over multiple agencies and organizations	--	--	5 years	<b>~\$518,500 total</b>

### Abbreviations

BLNR – Board of Land and Natural Resources  
 CBSFA – Community-Based Subsistence Fishing Area  
 DAR – Division of Aquatic Resources  
 DLNR – Department of Land and Natural Resources  
 DOCARE – Division of Conservation and Resources Enforcement  
 FL – Forklength  
 HALE – Haleakalā National Park  
 KCA – Kīpahulu Community Association  
 KKAO – Kīpahulu Konohiki Advisory ‘Ohana  
 KMT – Kāko’o Management Team  
 KOI – Kīpahulu ‘Ohana, Inc.  
 MHI – Main Hawaiian Islands  
 NOAA – National Oceanic and Atmospheric Administration  
 NWHI – Northwestern Hawaiian Islands  
 TNC – The Nature Conservancy  
 UTAMCC – University of Texas A&M-Corpus Christi

### Definitions

‘A’a – Jagged lava  
 Ahupua‘a – Land division  
 Aloha kekāhi i kekāhi – Mutual support, caring for each other  
 Halalū – Juvenile akule  
 Hukilau – Harvest with a seine  
 ‘Ili‘ili – Pebble  
 Ka‘apuni – Coastal community surveying exercise  
 Kāko’o – Support  
 Kapu – Prohibited or forbidden  
 Kīpuka – Oases of diversity that remain after destruction  
 Ko‘a – Fish aggregations  
 Konohiki – Resource manager  
 Kuleana – Responsibility  
 Kūpuna – Ancestors/elders  
 Laka – A god worshipped by canoe makers  
 Lawai‘a – Fisher  
 Limu – Algae, varieties of seaweeds  
 Lo‘i – Irrigated terraces  
 Lo‘i kalo – Taro wetland farm  
 Lū‘au – Hawaiian feast or young taro top  
 Mālama – Take care of  
 Mālama i ke kai – Take care of the sea  
 Mauka to makai – Mountain to the sea  
 Moi li‘i – Newly settled young moi  
 Muliwai – River mouth or estuary  
 Moku – District  
 ‘Ohana – Family  
 Pā‘ina – Small party with dinner  
 Pali – Cliff  
 Palu fishing – Fish bait made of fish head or guts  
 Papa – Flat surface  
 Pono – Moral qualities

Po‘o – Head

### Species

Akule (Bigeye Scad, *Selar crumenophthalmus*)  
 ‘A‘ama crab (Rock Crabs, *Grapsus tenuicrustatus*, *Pachygrapsus plicatus*)  
 Āholehole (Flagtails, *Kuhlia sandvicensis*, *Kuhlia xenura*)  
 ‘Ama‘ama (Striped Mullet, *Mugil cephalus*)  
 Awa (Milkfish, *Chanos chanos*)  
 Awa ‘aua (Hawaiian Ladyfish, *Elops hawaiiensis*)  
 Hapawai (*Neritina vespertina*)  
 Ha‘ue‘ue (Ten-lined Urchin, *Eucidaris metularia*)  
 Hā‘uke‘uke kaupali (Helmet Urchin, *Colobocentrotus atratus*)  
 He‘e maui (Day Octopus, *Octopus cyanea*)  
 He‘e (Octopuses, *Octopoda* spp.)  
 Hihiwai (*Neritina granosa*)  
 Hīnālea lauwiili (Saddle Wrasse, *Thalassoma duperrey*)  
 Hou (Surge Wrasse, *Thalassoma purpurum*)  
 Kala (Bluespine Unicornfish, *Naso unicornis*)  
 Kāhala (Greater Amberjack, *Seriola dumerili*)  
 Kole (Goldenring surgeonfish, *Ctenochaetus strigosus*)  
 Kūmū (Whitesaddle Goatfish, *Parupeneus porphyreus*)  
 Kūpe‘e (Polished Nerite, *Nerita polita*)  
 Kūpīpī (Blackspot Sergeant, *Abudefduf sordidus*)  
 Limu Kala (*Sargassum echinocarpum*)  
 Limu Kohu (*Asparagopsis taxiformis*)  
 Limu Līpoa (*Dictyopteria plagiogramma*)  
 Loli (Sea Cucumbers, *Aspidocheirotida* spp.)  
 Mamo (Hawaiian Sergeant, *Abudefduf abdominalis*)  
 Moi (Pacific Threadfin, *Polydactylus sexfilis*)  
 Moano (Manybar Goatfish, *Parupeneus multifasciatus*)  
 ‘Ō‘io (Bonefish, *Albula* spp.)  
 ‘Ōmilu (Bluefin Trevally, *Caranx melampygus*)  
 ‘O‘opu Alamo‘o (Hawaiian Freshwater Goby, *Lentipes concolor*)  
 ‘Ōpae (Shrimps, *Malacostraca* spp.)  
 ‘Ōpelu (Mackerel Scad, *Decapterus macarellus*)  
 ‘Opihi (Limpets, *Cellana* spp.)  
 ‘Opihi makaiauli (Blackfoot ‘pihi, *Cellana exarata*)  
 ‘Opihi ‘ālinalina (Yellowfoot ‘Opihi, *Cellana sandwicensis*)  
 ‘Opihi ko‘ele (Giant ‘Opihi, *Cellana talcosa*)  
 Pipipi (Black Nerite, *Nerita picea*)  
 Po‘opa‘a (Hawkfish, *Cirrhitis pinnulatus*)  
 Uhu (Parrotfishes, *Scaridae*)  
 Uku (Blue-Green Snapper, *Aprion virescens*)  
 Ula (Banded Spiny Lobster, *Panulirus marginatus*, Green Spiny Lobster, *Panulirus penicillatus*)  
 Ulua (Jacks, *Carangidae*)  
 Ulua Aukea (Giant Trevally (*Caranx ignobilis*))  
 Uouoa (Sharpnose Mullet, *Neomyxus leuciscus*)  
 ‘U‘u (Soldierfishes, *Holocentridae* spp.)  
 Wana (Sea Urchins, *Echinoidea* spp.)



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