Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration

HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY

Hawaiian Islands Humpback Whale
National Marine Sanctuary

Draft Management Plan and Draft Environmental Impact Statement

http://hawaiihumpbackwhale.noaa.gov

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act of 1969 (NEPA), the National Oceanic and Atmospheric Administration (NOAA) encloses for your review the Draft Environmental Impact Statement (DEIS) for the Hawaiian Islands Humpback Whale National Marine Sanctuary. Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS), designated in 1992, is a federally protected marine area within the waters surrounding the main Hawaiian Islands. The sanctuary contributes greatly to ocean and coastal management by engaging in public outreach and education to promote stewardship, conducting scientific and applied research initiatives, and developing and supporting programs that strengthen resource protection for the long-term health of the region.

This DEIS is prepared pursuant to NEPA to assess the environmental impacts associated with NOAA developing revised regulations for HIHWNMS under the National Marine Sanctuaries Act and expanding the sanctuary. To allow the addition of new areas and the regulation of certain activities not currently identified as subject to regulation, these proposed changes will require NOAA to change the existing terms of designation for HIHWNMS. The proposed rule published concurrently with this DEIS presents the proposed new regulations and the text of the proposed revised terms of designation for HIHWNMS.

Public hearings will be held as follows:

1) Hale'iwa, HI (O'ahu)
Date: April 27, 2015
Location: Sunset Beach Recreation Center
Address: 59-540 Kamehameha Highway, Hal'eiwa, HI 96712
Time: 5:30 pm - 8:30 pm

2) Honolulu, HI (O'ahu)
Date: April 28, 2015
Location: Honolulu Waldorf School
Address: 350 Ulua Street, Honolulu, HI 96821
Time: 5:30 pm - 8:30 pm

3) Kihei, HI (Maui)
Date: April 29, 2015
Location: Kihei Youth Center
Address: 131 S. Kihei Road, Kihei, HI 96753
Time: 5:30 pm - 8:00 pm

4) Lahaina, HI (Maui)
Date: April 30, 2015
Location: Kaunoa Senior Center

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Address: 788 Pauoa St., Lahaina, HI 96761
Time: 5:00 pm - 7:30 pm

5) Kaunakakai, HI (Molokaʻi)
Date: May 1, 2015
Location: Lanikeha Community Center
Address: 2200 Farrington Ave., Kaunakakai, HI96748
Time: 4:00 pm - 6:30 pm

6) Lānaʻi City, HI (Lānaʻi)
Date: May 2, 2015
Location: Lānaʻi High and Elementary School
Address: 555 Fraser Avenue, Lānaʻi City, HI 96763
Time: 9:30 am - 12:00 pm

7) Kilauea City, HI (Kauaʻi)
Date: May 4, 2015
Location: Kilauea Elementary School Cafeteria
Address: 2440 Kolo Road, Kilauea, HI 96754
Time: 5:30 pm - 8:30 pm

8) Niʼihau, HI*
Date: May 5, 2015
Location: Niʼihau School Cafeteria
Address: Puuwai Village, Niʼihau, HI 96769
Time: 10:00 am - 1:00 pm
*Please note that due to limited access to the island this is not a public meeting. This meeting is for people residing on and landowners of Niʼihau Island.

9) Lihuʼe, HI (Kauaʻi)
Date: May 6, 2015
Location: King Kaumualiʼi Elementary School Cafeteria
Address: 4380 Hanamaʼulu Road, Lihuʼe, HI 96766
Time: 5:30 pm - 8:30 pm

10) Kailua-Kona, HI (Hawaiʻi)
Date: May 7, 2015
Location: Kealakehe High School Cafeteria
Address: 74-5000 Puohulihuli Street, Kailua-Kona, HI 96740
Time: 5:30 pm - 8:00 pm

Written comments will be accepted until June 19, 2015, and should be directed to the sanctuary official identified below.

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Responsible Official: Russell Callender, Ph.D.
Acting Assistant Administrator for Ocean Services and Coastal Zone Management

Sanctuary Official: Malia Chow, Superintendent
Hawaiian Islands Humpback Whale National Marine Sanctuary
NOAA/DKIRC
ATTN: NOS/HIHWNMS
1845 Wasp Blvd., Bldg 176
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Ph. (808) 725-5901

Sincerely,

TRONVIG.KRISTEN.A.1365886012

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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=TRONVIG.KRISTEN.A.1365886012
Date: 2015.02.19 12:10:50 -05'00'

for Patricia A. Montanio
NOAA NEPA Coordinator

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Cover Photo

Aerial view of the north shore of Kaua‘i. © Jason Waltman

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Executive Summary

This document describes the federally-mandated review and update of the Hawaiian Islands Humpback Whale National Marine Sanctuary Management Plan, which outlines a proposed shift to ecosystem-based management supported by a suite of sanctuary-wide and location-specific regulations designed to enhance protection of sanctuary resources while limiting, to the extent possible, adverse impacts to the public. Additionally, up to five boundary additions are proposed, the sum of which amounts to 235.2 square miles, or 17 percent of the current size of the sanctuary.

Hawaiian Islands Humpback Whale National Marine Sanctuary Context

The Hawaiian Islands Humpback Whale National Marine Sanctuary (sanctuary) covers approximately 1,370 square miles of federal and state waters in the Hawaiian Islands. Congress designated the sanctuary in 1992 through the Hawaiian Islands National Marine Sanctuary Act (HINMSA). The Act requires the development of a comprehensive management plan with implementing regulations to govern the overall management of the site and to protect sanctuary resources and qualities. As expressed by Congress in the HINMSA, the purposes of the sanctuary are to (1) protect humpback whales and their habitat in the area described in section 2305(b); (2) educate and interpret for the public the relationship of humpback whales to the Hawaiian Islands marine environment; (3) manage human uses of the sanctuary consistent with the Act and National Marine Sanctuaries Act (NMSA); and (4) provide for the identification of marine resources and ecosystems of national significance for possible inclusion in the sanctuary.

The sanctuary is co-managed by the National Oceanic and Atmospheric Administration (NOAA) and the State of Hawai‘i (State) through a compact agreement that was signed in 1998. NOAA and the State entered into an intergovernmental Compact Agreement in 1998 for the purpose of clarifying the relative jurisdiction, authority, and conditions of the NOAA-State partnership for managing the sanctuary. It clarifies the State's continuing authority and jurisdiction over its State waters, submerged lands, and other resources within the sanctuary. The agreement establishes provisions with respect to NOAA's collaboration with the State of Hawai‘i on sanctuary management issues and recognizes that no federal, state, or local title or authority to manage and regulate submerged lands, resources, or activities, has been limited, conveyed or relinquished. The Compact Agreement states that NOAA and the State will collaborate in the management of the sanctuary and its resources, and clarifies that the sanctuary management plan will apply throughout the sanctuary, including the portion of the sanctuary within the seaward boundary of the State. The Department of Land and Natural Resources (DLNR) serves as the lead agency in administering the co-management of the sanctuary.

Management Plan Review Process

The sanctuary management plan was last updated in 2002. A sanctuary management plan is a site-specific planning and management tool that describes the sanctuary’s goals, objectives, guides future activities, outlines staffing and budget needs, and sets priorities and performance measures for resource protection, research and education programs. The NMSA requires the Office of National Marine Sanctuaries (ONMS) to periodically review and evaluate the progress

in implementing the management plan and goals for each sanctuary, with special focus on the effectiveness of site-specific approaches and strategies. ONMS must revise management plans and regulations as necessary to fulfill the purposes and policies of the NMSA (16 U.S.C. §1434(e)) to ensure that sanctuary sites continue to best conserve, protect, and enhance their nationally significant living and cultural resources.

Sanctuary management has been considering the need for a more comprehensive approach to marine resource management in Hawaiʻi for some time. The Hawaiian Islands National Marine Sanctuary Act (HINMSA) expressly states that the sanctuary will "provide for the identification of marine resources and ecosystems of national significance for possible inclusion in the sanctuary" (Section 2304(b)). During the 2002 management plan review (MPR), the sanctuary received comments from the general public requesting that the sanctuary consider the conservation and management of marine resources in addition to humpback whales and their habitat. In response, sanctuary management included a goal in the 2002 management plan to "identify and evaluate resources and ecosystems for possible inclusion in the sanctuary" (HIHWNMS Management Plan 2002). This updated management plan is designed to address all of these factors and through the management plan review process to inform (and be informed by) sanctuary constituents regarding the sanctuary, its accomplishments to date, and its revised goals, objectives and planned management actions.

The process to develop the sanctuary draft management plan proposed in this document began in the summer of 2010 when the sanctuary initiated a 90-day public scoping process. During that time, sanctuary management conducted a series of public meetings to solicit feedback from the public about how to proceed with management. In total, several hundred community members, stakeholders, and agency representatives attended ten public scoping meetings held on the islands of Hawaiʻi, Oʻahu, Kauaʻi, Maui, Molokaʻi, and Lānaʻi. Individuals and stakeholders who were unable to attend the public scoping meetings also had the opportunity to submit written comments online or in writing. A total of 12,375 public submissions were submitted to the sanctuary by agencies, organizations, elected officials and community members. The sanctuary advisory council (council) reviewed the public scoping comments and established working groups to further examine priority issues. The working groups were made up of council members, community and user group representatives, and technical experts. The working groups produced reports that overwhelmingly illustrated the need for a more holistic approach to managing marine resources within the sanctuary. The *Ecosystem Protections Recommendation Report,* developed by the Ecosystem Protections working group, specifically recommended ecosystem-based management as an appropriate approach to effectively managing the marine environment. The *Native Hawaiian Culture Recommendation Report,* developed by the Native Hawaiian working group, provided guidance about integrating traditional Native Hawaiian management perspectives into an ecosystem-based management framework. The activities described in the draft management plan reflect these recommendations and describe how the sanctuary proposes to transition from single-species management of humpback whales to an ecosystem-based management approach.

Structure of the Draft Management Plan and Draft Environmental Impact Statement

This document includes both the draft management plan (DMP) and a draft environmental impact statement (DEIS). The DEIS evaluates the potential environmental, cultural and

socioeconomic impacts of the proposed sanctuary actions, including: changing the name from Hawaiian Islands Humpback Whale National Marine Sanctuary to *Hawaiian Islands National Marine Sanctuary - Nā Kai ʻEwalu*, expanding sanctuary boundaries, revising sanctuary regulations and implementing new sanctuary action plans. The DEIS has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), 42 U.S.C. § 4321 *et seq*., its implementing regulations (40 C.F.R. § 1500-1508), and NOAA's implementing procedures for NEPA (NAO 216-6). Below is a summary of each of the major sections of this combined DMP/DEIS.

Section 1 (Introduction) of this document explains the components and function of the draft management plan and draft environmental impact statement, and points to the NEPA required sections.

Section 2 (Background) provides overviews of the sanctuary, the National Marine Sanctuary System, DLNR, and the sanctuary advisory council. It also describes the mandate of the ONMS under the National Marine Sanctuaries Act.

Section 3 (Sanctuary Management Plan Review) describes the process undertaken to produce the management plan proposed in this document. This section describes the history of considering a more holistic approach to resource management in the sanctuary, beginning with assessing additional resources in the sanctuary, followed by workshops and briefings with the sanctuary advisory council, staff and the public. A public scoping process was initiated by the sanctuary in 2010 and over 12,000 comments were received. Based on the priority issues identified from that feedback, the sanctuary organized workshops that lead to the development of the action plans presented in this document.

Section 4 (Purpose and Need) articulates the reasoning for the sanctuary's proposed transition to ecosystem-based management. This section defines ecosystem-based management and how its application in the sanctuary could benefit marine resources in Hawaiʻi, honoring the legacy of native Hawaiian stewardship. The section also includes the purpose that drives the proposed action, which includes the sanctuary's vision, mission, values, guiding principles and goals. These elements were inspired by the findings of the *Visioning Workshop* conducted with the sanctuary advisory council and sanctuary staff.

Section 5 (Site Description) details the physical attributes of the Hawaiian archipelago, including the geology, geomorphology/bathymetry, oceanography, ocean chemistry, meteorology and climatology. This general information provides context for the description, in the following section, of the aspects of the environment that could be affected by the proposed action.

Section 6 (Affected Environment) provides a description of biophysical and human environments in Hawaiʻi as subtext to the management plan, as well as context for understanding how each of the alternatives may affect those environments. The description of the biophysical environment of Hawaiʻi includes habitat types, marine species, protected marine species, and water quality, as well as a summary of the current threats to the biophysical environment. The description of the human environment encompasses economic, social, cultural, and historical aspects of the population in Hawaiʻi, both resident and visitor alike, including human uses of the marine environment. The description of the institutional environment in Hawaiʻi provides

context for how the sanctuary operates amongst other state and federal agencies. The current roles of sanctuary staff, and the facilities that the sanctuary operates, are all described in the subsection on operational environment.

Section 7 (Site Specific Affected Environment) details the environments, both human and biophysical, within and adjacent to specific locations proposed for inclusion in the sanctuary or for which site-specific actions are proposed. The biophysical environment of each specific location is detailed, including habitats and marine species, along with the threats to marine resources. The cultural and historic significance of the area, along with current human uses of the marine environment, are included to provide context for the local human environment. Institutions with particular management objectives in the area are described to explain how sanctuary actions will complement current management. The areas detailed in this section are Niʻihau, Haena, Hanalei and Pīlaʻa on Kauaʻi, Aliʻi Beach and Maunalua Bay on Oʻahu, Penguin Bank off Molokaʻi and the Maui Nui area. The information in this section is used to analyze the potential consequences (see Section 9) of the proposed actions (see Section 8).

Section 8 (Proposed Action and Alternatives) describes a suite of alternatives, each of which describes a differing set of proposed boundary additions, new and revised *regulations*, and non-regulatory actions (see **Table 1**).

The section explains how the ONMS and sanctuary superintendent developed these alternatives. In addition, the section describes alternatives considered, but eliminated, and explains the reasons for such eliminations. Alternatives analyzed herein include the following (summarized in brief):

Alternative 1 – Status Quo

- Continued operation under the 2002 Management Plan
- Existing regulations protecting humpback whales and their habitats
- Existing sanctuary boundaries

Alternative 2

- Five boundary changes:
  - Establishing new sanctuary boundaries around Niʻihau
  - Extending boundary to Aliʻi Beach on the North Shore of Oʻahu
  - Aligning boundary with the ahupuaʻa of Haʻena on Kauaʻi
  - Aligning boundary with the ahupuaʻa of Pīlaʻa on Kauaʻi
  - Extending the boundary around the ledges on the south end of Penguin Bank
- Revised management plan with an ecosystem-based approach (see Section 10)
- New and revised regulations
  - Sanctuary name changed to *Hawaiian Islands National Marine Sanctuary – Nā Kai ʻEwalu*
  - Revision of existing sanctuary-wide regulations (see explanation below)
  - New sanctuary-wide regulation prohibiting the disturbance of submerged cultural and maritime heritage resource
  - New Special Sanctuary Management Area regulations (see explanation below) apply to Penguin Bank and Maui Nui

Alternative 3 (preferred alternative)

- Same boundary changes as under Alternative 2
- Same revised management plan as Alternative 2
- Same new and revised regulations as Alternative 2, plus
  - New Special Sanctuary Management Area regulations apply to Maunalua Bay in addition to Penguin Bank and the Maui Nui Area

Alternative 4

- Same boundary changes as under Alternatives 2 and 3, plus
  - Extending boundary 1.5 miles up the Hanalei River on Kaua‘i
- Same revised management plan as Alternative 2 and 3
- Same new and revised regulations as Alternative 2 and 3, plus
  - New Special Sanctuary Management Area regulations apply sanctuary-wide

Alternative	Boundary changes	Regulations		
		Revised Sanctuary-Wide Regulations	New Sanctuary-Wide Regulations	Special Sanctuary Management Area Regulations
1	*Status Quo – none of the above boundary changes or regulations apply.*			
2	Ni‘ihau North Shore, O‘ahu Ha‘ena, Kaua‘i Pīla‘a, Kaua‘i Penguin Bank	Sanctuary-wide	Sanctuary-wide	Penguin Bank/ Maui Nui
3 (Preferred)	Ni‘ihau North Shore, O‘ahu Ha‘ena, Kaua‘i Pīla‘a, Kaua‘i Penguin Bank	Sanctuary-wide	Sanctuary-wide	Penguin Bank/ Maui Nui and Maunalua
4	Ni‘ihau North Shore O‘ahu Ha‘ena, Kaua‘i Pīla‘a, Kaua‘i Penguin Bank Hanalei, Kaua‘i	Sanctuary-wide	Sanctuary-wide	Sanctuary-wide

Table 1. Comparison of Proposed Alternatives and Preferred Alternative (Alternative 3).

Special Sanctuary Management Area regulations, which apply to differing areas in Alternatives 2, 3 and 4, include prohibitions against: (1) taking or possessing marine species in addition to humpback whales; (2) discharging from within the sanctuary; (3) discharging from outside the sanctuary anything that enters and injures a sanctuary resource; (4) altering submerged lands; (5) using explosives; (6) introducing non-native species; and (7) damaging or destroying signs.

The revisions to the current sanctuary-wide regulations, proposed under Alternative 2, 3 and 4, include: (1) the approach regulation would be clarified and articulated; (2) the two regulations prohibiting the taking and possession of humpback whales would be combined into one regulation; (3) the prohibition against discharge in the sanctuary would be removed as the current language provides no real regulatory authority to the sanctuary to directly address this issue; (4) the prohibition against discharging from outside the sanctuary anything that enters and injures a sanctuary resource would be removed as the current language provides no real regulatory authority to the sanctuary to directly address this issue; (5) the prohibition on altering submerged lands would be removed as the current language provides no real regulatory authority to the sanctuary to directly address this issue; and (6) authority to issue sanctuary permits and authorizations would be added.

The sanctuary proposes four boundary changes under Alternatives 2, 3, and 4 including extending the western sanctuary boundary on the north shore of O‘ahu to include Ali‘i Beach Park, extending the sanctuary eastern and western boundaries on the north shore of Kaua‘i to include the Pīla‘a ahupua‘a and the Hā‘ena ahupua‘a, and establishing new sanctuary boundaries around NI‘ihau. In addition, Alternative 4 proposes to incorporate the estuarine waters of the Hanalei River into the sanctuary on the north shore of Kaua‘i.

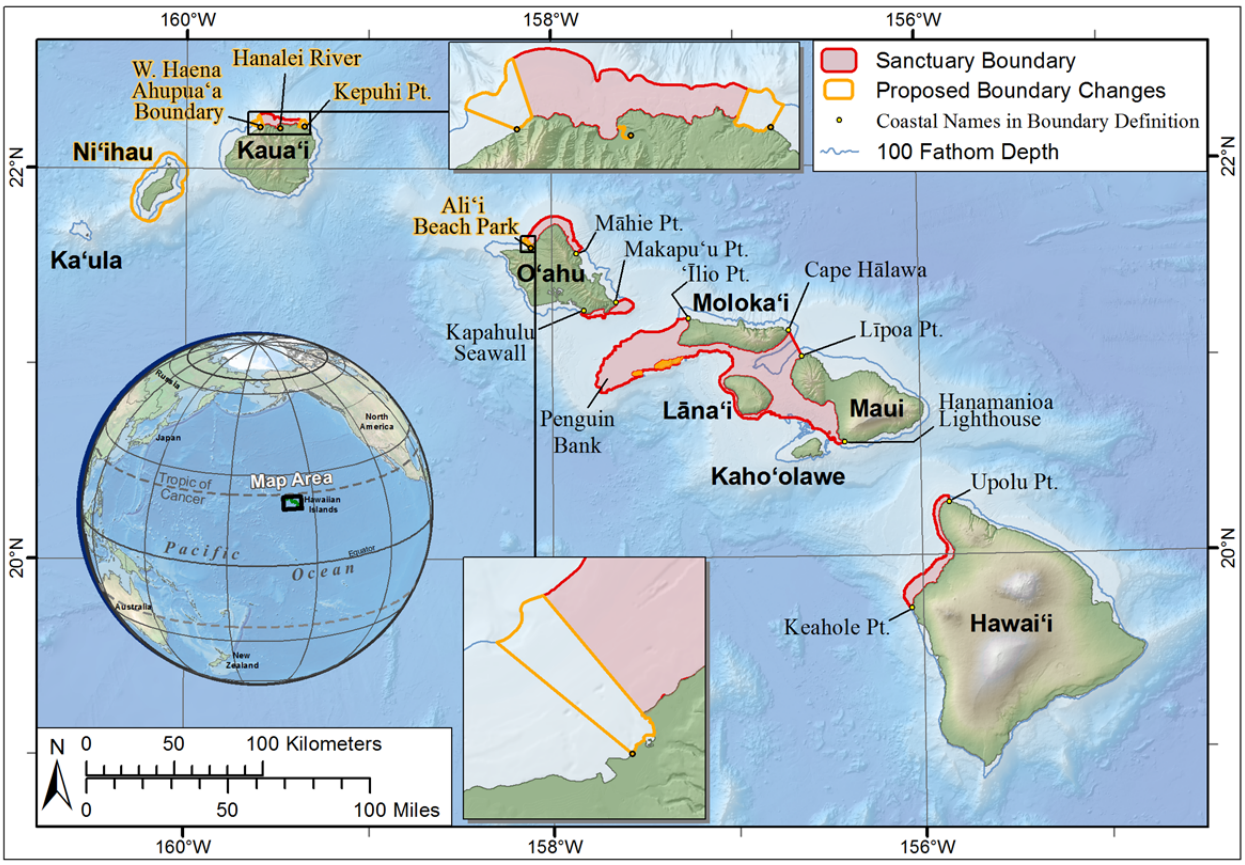

Figure 1. Proposed boundary changes for the Hawaiian Islands National Marine Sanctuary.

Section 9 (Environmental Consequences) provides a summary of potential impacts of the proposed alternatives on the natural and human environment in comparison to the baseline of No

Action. The impact analysis for each of the alternatives occurs on three levels: (1) the set of actions proposed for each of the alternatives; (2) the physical, biological, and cultural resources and human uses impacted by those actions; and (3) the specific locations where these impacts occur. A discussion of the factors used to determine the significance of direct and indirect impacts (pursuant to 40 C.F.R. § 1508.8 section 5.1.2) is included.

Alternative 1 upholds the status quo therefore has no new environmental impacts, positive or negative. Each subsequent alternative has increasingly beneficial impacts to the biophysical environment due to the increased area proposed for inclusion in the sanctuary and increased protection by regulatory and non-regulatory actions. As such, Alternative 4 offers the most benefits to biological and physical resources. In the summary below of environmental consequences of proposed actions, the impacts of regulatory and non-regulatory action, both positive and negative, increase in each subsequent alternative due to the increasing size of the sanctuary as a whole and the regulated Special Sanctuary Management Areas therein.

Given the ecosystem-based management approach adopted in developing the proposed management plan and regulations, many aspects of the marine ecosystems within the sanctuary should benefit from these actions. For example, through water quality monitoring and restoration activities proposed in the *Water Quality Protection Action Plan* along with the proposed discharge regulation, water quality should see a significant benefit. Management activities outlined in actions plans, such as *Understanding and Managing Species and Habitats* and *Resilience to a Changing Climate*, should benefit marine species and habitats. The application of Special Sanctuary Management Area regulations, including the prohibition of taking and possessing special marine species, altering submerged lands, discharging, using explosives, and introducing non-native species, marine species and habitats in the sanctuary should benefit from increased protections.

Most aspects of the human environment in the sanctuary should benefit from the proposed actions through the conservation of cultural, historic and natural resources. The proposed regulatory and non-regulatory ecosystem-based management actions should provide economic benefits by preserving a healthy ecosystem, which is more valuable than an unhealthy one to both ocean users and non-users. Cultural and maritime heritage resources should benefit both from the proposed regulation prohibiting disturbance of these resources, as well as the non-regulatory actions proposed in the *Living and Evolving Cultural Traditions* and *Maritime Heritage Action Plans*. Human activities that depend on healthy marine resources, such as fishing, recreation and tourism, should also benefit from the proposed regulatory and non-regulatory ecosystem-based management actions. Legal fishing activities will not be negatively impacted by the prohibitions against altering submerged lands and discharging in the sanctuary due to exceptions to those prohibitions. Education, research and monitoring efforts should benefit from the support and opportunities provided in *Ocean Literacy* and *Understanding and Managing Species and Habitats Action Plans*. Human health and safety in the sanctuary and adjacent areas would benefit from the protections outlined in the *Emergency Preparedness and Damage Assessment Action Plan*.

Section 10 (Action Plans) presents sixteen action plans designed to guide sanctuary management over the next five to ten years in transitioning to ecosystem-based management and achieving the sanctuary vision, mission and goals outlined in this document. This section explains how the

action plans were developed based on public comments and working group recommendations. Each action plan begins with an overview, which explains the issues their activities aim to address, and a desired future outcome attained through the plan's activities. An output is defined for each activity and performance measures based on these outputs are designed to guide the sanctuary's accomplishment of the plans. Sanctuary staff developed budgets for the execution of each plan over the next five years. **Table 2** lists the sixteen action plans by thematic area, along with the desired future outcome that the sanctuary seeks to attain through implementing the plan.

Action Plan	Desired Outcome
Implementing Ecosystem Protection	
Understanding and Managing Species and Habitats	A resilient marine ecosystem able to respond to and recover from change, that supports sustainable ecosystem functions and services, and healthy populations of biologically, culturally, and economically significant marine species and habitats.
Resilience to a Changing Climate	A climate resilient sanctuary maintained through innovative management approaches and supported by an informed public.
Water Quality Protection	Water quality standards and levels of compliance that support healthy ecosystems, habitats and marine resources, as well as human activities that are compatible with resource protection.
Perpetuating Cultural Heritage	
Living and Evolving Cultural Traditions	Hoʻohawaiʻi: foster the uniqueness of Hawaiʻi through the understanding of both historical and contemporary local knowledge about coastal and marine environments, and the perpetuation of customary environmental practices and principles within the sanctuary.
Maritime Heritage	NOAA, the State of Hawaiʻi, partner agencies, businesses and local communities are engaged in the identification and appreciation of maritime heritage resources in Hawaiʻi to effectively preserve these resources for the benefit of current and future generations.
Transitioning Towards Sustainability	
Community Partnerships	Informed and empowered human communities that are actively engaged in dialogues and initiatives to facilitate an integrated management approach that perpetuates a healthy co-existence between humans and the marine environment.
Ocean Literacy	An ocean literate public with increased awareness, knowledge and appreciation of natural and cultural marine resources in order to promote and enhance ocean stewardship.

Sustainable Use	Vibrant coastal communities and economies that promote the sustainable use of the marine environment.
Sanctuary Focus Areas	
NIʻihau	The preservation of healthy coastal and marine ecosystems, and the rich cultural history of Niʻihau.
Pīlaʻa	A replicable model for applying both traditional Hawaiian and western science-based management practices to restore the health of nearshore ecosystems in the Pīlaʻa ahupuaʻa.
Southern Maui Nui	Establish a research area in the waters of the Māʻalaea area of Maui island to better understand and improve water quality.
Maunalua Bay	The community's kuleana of Maunalua Bay characterized by healthy coral reef and sea grass habitats, abundant coral reef marine life and high water quality standards is achieved by caring for this place with future generations in mind.
Ensuring Management Effectiveness	
Operational Foundation	Effective and well-planned operations, human resources and adequate physical infrastructure to support effective management of the sanctuary.
Compliance and Enforcement	A high level of compliance achieved through the adherence to sanctuary regulations, guidelines, and best practices resulting in increased protection of the marine environment within the sanctuary.
Emergency Preparedness and Damage Assessment	Increased protection of sanctuary resources from both natural hazards and human-caused incidents or injuries, through coordinated emergency response and damage assessment.
Assessing Progress	A performance evaluation framework to continually gauge the sanctuary's progress in meeting its management goals and objectives.

Table 2. Action plans grouped in thematic areas with desired outcomes.

This document includes twelve appendices: Appendix A lists relevant protected species in Hawai'i; Appendix B lists cultural sites occur within or adjacent to the sanctuary; Appendix C describes military activities in Hawaiʻi; Appendix D details the proposed sanctuary regulations; Appendix E describes the proposed new regulations, permits and authorization; Appendix F includes other authorities in Hawaiʻi who regulate the same activities the sanctuary proposes to regulate; Appendix G lists State of Hawaiʻi DLNR marine bottom ecosystem classifications; Appendix H lists agencies receiving copies of this DMP/DEIS; Appendix I lists acronyms used in this document and their meaning; Appendix J lists Hawaiian terms used in this document and their English translations; Appendix K defines technical words used in this document; Appendix

L is the sanctuary designation document; Appendix M lists credits for images used in this document.

It should be noted that a separate rulemaking package will be proposed in the Federal Register to request public comment on the proposed changes to the sanctuary's regulations under the proposed action. Descriptions of these potential regulatory changes appear in Section 8; and the environmental consequences of these regulatory changes are analyzed in Section 9.

A notice will be published in the Federal Register to alert the public of both the availability of the joint DMP/DEIS as well as the opening of a public comment period. Written public comments can be submitted via e-mail, fax, phone or letter. Oral public comments can be submitted at any of the several public hearings that ONMS will hold in the state. For more information on these public hearings or on how to submit public comments, in addition to all the documents developed for the management plan review, please visit the sanctuary's management plan website at:
http://hawaiihumpbackwhale.noaa.gov/management/management_plan_review.html

1. Introduction

This document is a combined draft management plan (DMP) and draft environmental impact statement (DEIS). Proposed revisions to sanctuary regulations are published concurrently in the Federal Register (FR) as a proposed rule. The National Oceanic and Atmospheric Administration (NOAA) is the lead agency for this proposed action.

The basic elements of a DEIS include the purpose and need for the proposed action (Section 4), the affected environment (Section 7 and 8), a description of the proposed action and alternatives (Section 5), and the environmental consequences of the alternatives (Section 9). The affected environment describes the biological, cultural, and socioeconomic value of the marine habitats of the populated Hawaiian Islands and more specifically details these values for the proposed additional sanctuary units. The description of the proposed action and alternatives includes a description of a no-action alternative, the proposed action, and two other alternatives. The description of the affected environment and the description of the proposed action and alternatives (along with the action plans in Section 10) present decision makers and the public with the information necessary to understand the analysis of potential environmental, cultural, and socioeconomic consequences or impacts of the alternatives.

Management plans are sanctuary-specific planning and management documents used by all national marine sanctuaries. Management plans fulfill many functions, including outlining staffing and budget needs, setting priorities and performance measures for resource protection, research and education programs, and guiding development of future budgets and management activities. When final, this plan will chart the course for the sanctuary over the next 5 to 10 years.

Section 304(a)(4) of the NMSA requires that "terms of designation may be modified only by the same procedures by which the original designation is made." When HIHWNMS was designated in 1999, an EIS was prepared prior as required by the NMSA. As such, since the proposed action would modify the sanctuary's terms of designation, the NMSA requires preparation of an EIS regardless of the significance of the impacts of the alteration. There are no anticipated significant effects of this action.

The DEIS evaluates the potential environmental, cultural, and socio-economic impacts of the proposed Hawaiian Islands Humpback Whale National Marine Sanctuary actions, including changing the name from Hawaiian Islands Humpback Whale National Marine Sanctuary to Hawaiian Islands National Marine Sanctuary - Nā Kai 'Ewalu, designating additional areas to be included in the sanctuary, revising sanctuary regulations, and implementing new sanctuary action plans. The DEIS has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), 42 United States Code (U.S.C.) § 4321 *et seq*., its implementing regulations (40 Code of Federal Regulations [C.F.R.] § parts 1500–1508), and NOAA's implementing procedures for NEPA (NOAA's Administrative Order 216-6). The Notice of Intent to prepare this EIS was published on [insert date here] (insert F.R.N. number here). To help readers locate topics required by NEPA, Table 3 lists them with the corresponding section of this document and the relevant page numbers. An index of important terms is also provided at the end of the document.

NEPA REQUIREMENT	DOCUMENT SECTION	PAGE
Cover Sheet		24
Table of Contents		4
List of Preparers		3
Executive Summary		14
Purpose and Need for Action	Section 4	38
Affected Environment	Section 6 & 7	72
Alternatives	Section 8	47
Environmental Consequences	Section 9	176
List of Agencies, Organizations, and Persons Receiving Copies of the DEIS	Appendix H	402
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Table 3. Legal requirements for the DMP/DEIS.

2. Background

This section provides overviews of the Hawaiian Islands Humpback Whale National Marine Sanctuary, the National Marine Sanctuary System, the State of Hawai‘i Department of Land and Natural Resources, and the sanctuary advisory council. It also describes the mandate of the Office of National Marine Sanctuaries (ONMS) under the National Marine Sanctuaries Act (NMSA).

2.1. Hawaiian Islands Humpback Whale National Marine Sanctuary

The Hawaiian Islands Humpback Whale National Marine Sanctuary (sanctuary) covers approximately 1,370 square miles of federal and state waters in the Hawaiian Islands. Congress designated the sanctuary in 1992 through the Hawaiian Islands National Marine Sanctuary Act (HINMSA). The Act requires the development of a comprehensive management plan with implementing regulations to govern the overall management of the site and to protect sanctuary resources and qualities. As expressed by Congress in the HINMSA, the purposes of the sanctuary are to (1) protect humpback whales and their habitat in the area described in section 2305(b); (2) educate and interpret for the public the relationship of humpback whales to the Hawaiian Islands marine environment; (3) manage human uses of the sanctuary consistent with the Act and NMSA; and (4) provide for the identification of marine resources and ecosystems of national significance for possible inclusion in the sanctuary. The boundaries and terms of designation were established in 1997 through an administrative process with extensive public input.

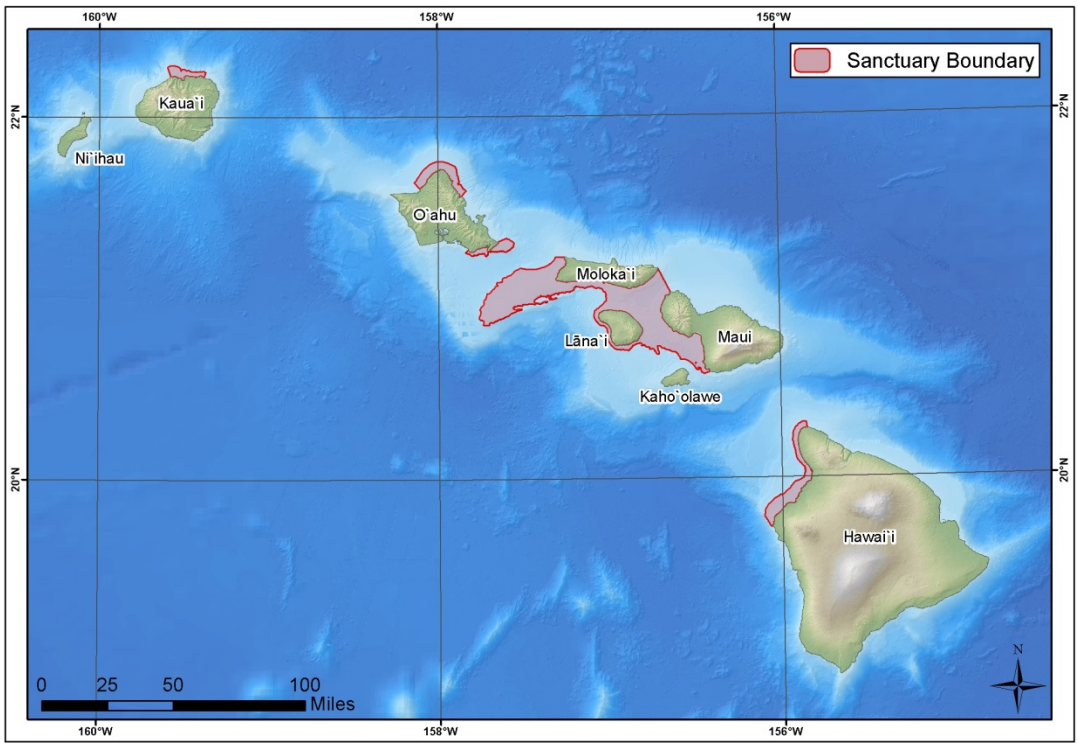


Figure 2. Current sanctuary boundaries.

The current sanctuary boundary encompass the submerged lands and waters off the coast of the Hawaiian Islands extending seaward from the shoreline, cutting across the mouths of rivers and streams, unless otherwise indicated (Figure 2):

(1) to the l00-fathom (183 meter) isobath adjoining the islands of Maui, Molokaʻi and Lānaʻi, including Penguin Bank, but excluding the area within three nautical miles of the upper reaches of the wash of the waves on the shore of Kahoʻolawe Island;
(2) to the deep water area of Pailolo Channel from Cape Halawa, Molokaʻi, to Nakalele Point, Maui, and southward;
(3) to the 100-fathom (183 meter) isobath from Upolu Point southward to Keahole Point, Hawaiʻi.
(4) to the l00-fathom (183 meter) isobath from Kailiu Point eastward to Makahuena Point, Kauaʻi; and
(5) to the l00-fathom (183 meter) isobath from Puaʻena Point eastward to Mahie Point, and from the Ala Wai Canal eastward to Makapuʻu Point, Oʻahu .

Excluded from the sanctuary are the following commercial ports and small boat harbors:

- **Hawaiʻi (Big Island)**: Kawaihae Boat Harbor & Small Boat Basin
- **Maui:** Lahaina Boat Harbor; Māʻalaea Boat Harbor
- **Kauaʻi:** Hanamaulu Bay
- **Lānaʻi:** Kaumalapau Harbor; Manele Harbor
- **Molokaʻi:** Kaunakakai Harbor; Hale o Lono Harbor

The sanctuary is co-managed by the National Oceanic and Atmospheric Administration (NOAA) and the State of Hawaiʻi (State) through a compact agreement that was signed in 1998. NOAA and the State entered into an intergovernmental Compact Agreement in 1998 for the purpose of clarifying the relative jurisdiction, authority, and conditions of the NOAA-State partnership for managing the sanctuary. It clarifies the State's continuing authority and jurisdiction over its State waters, submerged lands, and other resources within the sanctuary. The agreement establishes provisions with respect to NOAA's collaboration with the State of Hawaiʻi on sanctuary management issues and recognizes that no federal, state, or local title or authority to manage and regulate submerged lands, resources, or activities, has been limited, conveyed or relinquished. The Compact Agreement states that NOAA and the State will collaborate in the management of the sanctuary and its resources and clarifies that the sanctuary management plan will apply throughout the sanctuary, including the portion of the sanctuary within the seaward boundary of the State. The Department of Land and Natural Resources (DLNR) serves as the lead agency in administering the co-management of the sanctuary.

2.2. National Marine Sanctuary System

The National Marine Sanctuary System includes thirteen national marine sanctuaries and one marine national monument, encompassing more than 170,000 square miles of ocean and Great Lakes waters from Washington State to the Florida Keys, and from New England to American Samoa (Figure 3). They range in size from the one mile diameter Monitor National Marine Sanctuary off the coast of North Carolina, to the more than 139,000 square mile Papahānaumokuākea Marine National Monument, located in the Northwestern Hawaiian Islands of the Archipelago.

National marine sanctuaries are special areas set aside for long-term protection and conservation and are part of our nation's legacy to future generations. Sanctuaries are an essential part of this country's collective environmental and cultural riches, with natural, cultural and scenic endowments as significant as any national park. They contain deep ocean habitats of resplendent marine life, kelp forests, coral reefs, whale migration corridors, deep-sea canyons, historically significant shipwrecks, and other underwater archaeological sites. Each sanctuary is a unique place worthy of special protection. Because they are integral to coastal communities, sanctuaries serve as natural classrooms, cherished recreational spots, and places for valuable commercial activities. National marine sanctuaries represent many things to many people.

2.3. Office of National Marine Sanctuaries

The Office of National Marine Sanctuaries (ONMS), formerly the National Marine Sanctuary Program, serves as the trustee for the National Marine Sanctuary System and is an office within the National Ocean Service (NOS) of NOAA. The mission of ONMS is to identify, protect, conserve, and enhance the natural and maritime heritage resources, values, and qualities of the National Marine Sanctuary System for this and future generations throughout the nation.

Figure 3. The National Marine Sanctuary System.

2.4. Department of Land and Natural Resources

The State of Hawai'i Department of Land and Natural Resources (DLNR), headed by an executive Board of Land and Natural Resources, is responsible for managing, administering, and exercising control over public lands, water resources, ocean waters, navigable streams, coastal areas (except commercial harbors), minerals, and all interests therein. The department's jurisdiction encompasses nearly 1.3 million acres of state lands, beaches, and coastal waters as well as 750 miles of coastline (the fourth longest in the country). It includes state parks, historical sites, forests and forest reserves, aquatic life and state sanctuaries, public fishing areas, boating, ocean recreation, and coastal programs, wildlife and its sanctuaries, game management areas, public hunting areas, and natural area reserves.

The mission of DLNR is to enhance, protect, conserve and manage Hawai‘i’s unique and limited natural, cultural and historic resources held in public trust for current and future generations of visitors and the people of Hawai‘i in partnership with others from the public and private sectors. The DLNR contains 10 Divisions and Offices that work to accomplish this mission, including Aquatic Resources (DAR), Boating and Ocean Recreation (DBOR), Bureau of Conveyances (BOC), Conservation and Coastal Lands (OCCL), Conservation and Resources Enforcement (DOCARE), Engineering Division (ENG), Forestry and Wildlife (DOFAW), Historic Preservation Division (SHPD), Land Division (LAND), and State Parks (SP). In addition, the DLNR administers the following Boards, Commissions, Committees, and Councils: Aha Moku Advisory Committee, Commission on Water Resource Management, Endangered Species Recovery Committee, Hawai‘i Historic Places Review Board, Island Burials Councils, Kaho‘olawe Island Reserve Commission, Legacy Land Conservation Commission, and the Natural Area Reserves Systems Commission.

2.5. National Marine Sanctuaries Act

The National Marine Sanctuaries Act (NMSA) (16 U.S.C. §§1431 *et seq*.) is the legislative mandate governing ONMS. The NMSA authorizes the Secretary of Commerce to designate as national marine sanctuaries those areas of the marine environment or Great Lakes with special national significance based on their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational or esthetic qualities. The primary objective of the NMSA is to protect sanctuary resources. The NMSA also focuses on education, public outreach and research.

The NMSA states that the National Marine Sanctuary Program (now ONMS) shall “maintain for future generations the habitat and ecological services of the natural assemblage of living resources that inhabit [sanctuaries]” (16 U.S.C. § 1431(a)(4)(A),(C)). The NMSA further recognizes that “while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of the marine environment” (16 U.S.C. § 1431 301(a) (3)). Accordingly, ONMS subscribes to a broad and comprehensive ecosystem-based management approach to meet the NMSA’s primary objective of resource protection.

The NMSA was the first legislation to focus on comprehensive and area-specific protection of the marine environment resulting in most national marine sanctuaries using an ecosystem-based management approach that focuses on the maintenance of high levels of biodiversity to meet the NMSA’s primary objective of resource protection. The NMSA is unique in that it promotes management actions focused on the protection and conservation of the full spectrum of biological diversity as defined by each site, and can serve as an important complement to other laws and regulations. Sanctuaries may consider an array of management measures to maintain “natural biological communities.” By including the broad mandate “to protect, and where appropriate, restore and enhance natural habitats, populations, and ecological processes,” the NMSA highlights its purpose as providing protection of overall biodiversity in these special areas. In specifying the management of “natural biological communities,” “natural assemblages of living resources,” and “natural habitats” national marine sanctuaries can be managed to broadly protect and conserve biodiversity. This comprehensive management approach differs

from many other laws and regulations, which tend to address specific problems or resource issues such as water quality, endangered species, or particular fishery stocks, but are not really geared to consider management of human use impacts as they affect the whole marine environment.

2.6. Sanctuary Advisory Council

The sanctuary advisory council (council) is a community-based advisory group consisting of representatives from various ocean user groups and industries, scientists, environmentalists, communities, government agencies and the public at large. The council consists of nineteen voting members and their alternates, and fifteen non-voting members, all of whom are confirmed by the ONMS Director in consultation with the State of Hawai‘i (Table 4). The role of the council is to provide advice and recommendations on sanctuary operations and programs. Additionally, council members serve as liaisons between their constituents and communities and the sanctuary staff to promote communication on key issues and concerns that may affect research, resource protection, management actions, education, and economic opportunities.

Sanctuary Advisory Council Members	
Non-Government Members (voting unless otherwise indicated)	**Government Members** (non-voting unless otherwise indicated)
Business/Commerce	Hawaiian Islands Humpback Whale National Marine Sanctuary Superintendent
Citizen At-Large	National Marine Sanctuary of American Samoa Superintendent
Commercial Shipping	NMFS, Office of Law Enforcement
Conservation	NMFS, Pacific Islands Regional Office
Education	Office of Hawaiian Affairs (voting)
Fishing	Papahānaumokuākea Marine National Monument Superintendent
Hawai‘i County	State of Hawai‘i Co-Manager
Honolulu County	State of Hawai‘i Dept. of Business, Economic Development & Tourism
Kaua‘i County	State of Hawai‘i Dept. of Health
Lāna‘i Island Representative	State of Hawai‘i Dept. of Land and Natural Resources
Maui County	State of Hawai‘i Dept. of Transportation Harbors Division
Moloka‘i Island Representative	State of Hawai‘i Office of Planning
Native Hawaiian	U.S. Army Corps of Engineers
Ocean Recreation	U.S. Coast Guard
Research	U.S. Navy
Tourism	Western Pacific Regional Fisheries Management Council (voting)
Whale Watching	
Youth (non-voting)	

Table 4. Sanctuary advisory council representation.

3. Sanctuary Management Plan Review

New challenges and opportunities emerge with time. For this reason, the National Marine Sanctuaries Act (NMSA) requires periodic review of sanctuary management plans to reevaluate site-specific goals and objectives and to develop management strategies and activities to ensure that each sanctuary properly conserves and protects its nationally significant living and cultural resources. Management plans are sanctuary-specific planning and management documents used by all national marine sanctuaries. Management plans fulfill many functions, including outlining staffing and budget needs, setting priorities and performance measures for resource protection, research and education programs, and guiding development of future budgets and management activities.

3.1. History

The original 1997 Management Plan and the revised 2002 Management Plan defined actions tailored to specific issues affecting the sanctuary. The specified requirements of the plans were compatible with the overall sanctuary management approach embodied in the NMSA and implementing regulations (15 C.F.R. Part 922). The 1997 Management Plan recognized the need for facilitating human uses of the sanctuary compatible with the primary purpose of protecting humpback whales and their habitat. Successful implementation of the original management plan required continuing cooperation and coordination among many Federal, State, and county agencies and representatives, as well as private organizations and individuals. Management initiatives fell into five fundamental program areas: resource protection, research and long-term monitoring, education and outreach, administration, and enforcement.

What is Management Plan Review?
The sanctuary management plan review process is based on five fundamental steps:

1. Public scoping, which includes a formal comment period and public meetings to identify a broad range of issues and concerns related to management of the sanctuary.
2. Analysis and prioritization of the issues raised during scoping, followed by development of actions plans.
3. Preparation of the draft management plans and relevant National Environmental Policy Act (NEPA) documentation such as an Environmental Impact Statement or Environmental Assessment.
4. Formal Public Comment Period.
5. Preparation of the final management plans and relevant NEPA documentation.

The 2002 Management Plan restructured and revised the 1997 Management Plan. The sanctuary had accomplished many of the goals in the original plan and many of the goals and objectives needed to be revised to reflect the future direction of the sanctuary. The primary purpose of the 1997 continued to be to protect humpback whales and their habitat. The five action plans contained in the plan include natural resource protection, education and outreach, research and monitoring, cultural resource enhancement, and administration. In response to the overwhelming public comments received to protect additional resources and species, the process to include new species was detailed in the 2002 Management Plan. Additionally, a new activity relating to the development of a cultural protocol to respond to stranding was incorporated. The remainder of the changes between the 1997 Management and

the 2002 Management Plan were minor and included such information as updating partner lists and inclusion of cost estimates.

Sanctuary management has been considering the need for a more comprehensive approach to marine resource management in Hawai‘i for some time. The Hawaiian Islands National Marine Sanctuary Act (HINMSA) expressly states that the sanctuary will “provide for the identification of marine resources and ecosystems of national significance for possible inclusion in the sanctuary” (Public Law 102-581, Section 2304(b)). During the 2002 management plan review (MPR), the sanctuary received comments from the general public requesting that the sanctuary consider the conservation and management of marine resources in addition to humpback whales and their habitat. In response, sanctuary management included a goal in the 2002 management plan to “identify and evaluate resources and ecosystems for possible inclusion in the sanctuary” (HIHWNMS Management Plan 2002). Sanctuary managers followed up by conducting an assessment of living marine resources and maritime heritage resources within the sanctuary (Assessment of Additional Resources for Possible Inclusion in the Hawaiian Islands Humpback Whale National Marine Sanctuary, 2007). The assessment considered population trends, past and current threats, existing management authorities, and conservation needs. The assessment report was shared with then Governor Linda Lingle who publicly expressed her support for the sanctuary to consider protecting additional marine species and maritime heritage resources.

Between April 2009 and February 2010, the sanctuary conducted a series of meetings and workshops to solicit public input on the inclusion of additional marine resources into sanctuary management and raise awareness about the management plan review process. These events were conducted formally and informally across the State of Hawai‘i on all islands with a sanctuary presence. The most significant meetings and workshops are described in additional detail below:

- *Sanctuary Advisory Council Briefing*: The sanctuary advisory council was briefed on the management plan review process at a public meeting in February 2009. Additionally, council members were invited to participate in the process through island-wide public meetings. By engaging their constituents, council members were able to provide input on many of the management issues being addressed. The council expressed their support for the management plan review process and approved of the plan to engage the public in the process. The council also recommended that the sanctuary begin the process of assessing opportunities to broaden the scope of sanctuary management to potentially include additional marine resources beyond humpback whales. In July 2009, the council established a Change Solutions Working Group to address new issues facing the sanctuary and to answer the question as to how to proactively engage with the larger public to identify issues that may come up during MPR.
- *Hawai‘i Conservation Conference:* In the summer of 2009, the sanctuary hosted a public workshop at the Hawai‘i Conservation Conference to begin to identify key issues that needed to be addressed during the sanctuary management plan review. The annual conference facilitates interaction and information exchange between the scientific community and natural resource managers. The workshop provided background on sanctuary programs, partnerships, and opportunities for public participation in the review process but was designed to discuss emerging issues and gauge public concerns.
- *MPR Constituent Engagement Workshop:* In March 2010 the Change Solutions Working Group of the sanctuary advisory council hosted a 2-day facilitated workshop for representatives of key communities and stakeholder groups of the sanctuary to address the following questions: What is the sanctuary doing now and what can it do better? What should

the sanctuary be doing to increase natural and cultural resource protections within its boundaries? Outside its boundaries? What could the sanctuary look like in 10 years? Workshop participants identified local issues specific to communities and a series of recommendations for conducting an outreach strategy to different island communities to effectively address local and community specific issues. In May 2010, the council voted to approve the workshop recommendations to guide the overall management plan review process. Recommendations to engage community leaders and decision-makers, neighborhood-level boards, and statewide organizations and agencies were used to inform engagement with communities during the management plan review process.

- *Public Information Session:* In the spring of 2010, the sanctuary hosted eight public information sessions in Waialua and Hawaiʻi Kai, Oʻahu; Lānaʻi City, Lānaʻi; Kīhei, Maui; Hilo and Kailua-Kona, Hawaiʻi; Līhuʻe, Kauaʻi; and Kaunakakai, Molokaʻi. Sanctuary staff shared information about the management plan review process and provided opportunities for public feedback. Participants were invited to share their thoughts about the future role of the sanctuary in the conservation of the marine resources in Hawaiʻi. Several hundred members of the public attended the informational meetings.

The sanctuary also developed outreach materials to inform the public about current sanctuary programs, marine resource management, and opportunities to participate in the MPR process. "The Koholā Connection: State of the Sanctuary - Management Plan Review Special Edition" described sanctuary programs and accomplishments as well as the history of the sanctuary, and identified emerging marine conservation issues. The "MPR Informational Sheet" provided an overview of the MPR process. The sanctuary newsletter, Au O Ka ʻIke provided periodic updates on the MPR process, sanctuary advisory council meetings, and other opportunities for public participation. The "Public Information Meetings Summary" synthesized the input from the public collected during the statewide information sessions. The Sanctuary Condition Report (2010) assesses the status and trends of humpback whales and their habitat, and the human activities that may affect the sanctuary.

In 2010 sanctuary staff and council members participated in a *Visioning Workshop* to identify common elements that should be reflected in sanctuary management. The proposed elements are identified below:

- A sanctuary that restores marine ecosystems in Hawaiʻi;
- A sanctuary based on community involvement, collaboration and inspired partnerships;
- A sanctuary that inspires a diverse community of ocean stewards;
- A model of global marine conservation leadership based on traditional connections between land and sea manifested in the Hawaiian ahupuaʻa model;
- The sanctuary that provides/supports a legacy of a healthy marine ecosystem through education, research and addressing threats to sanctuary/marine resources;
- The sanctuary that becomes focal point for learning Hawaiian culture and values (regarding environment/land); and

- A sanctuary that preserves the biodiversity of a healthy ecosystem for the North Pacific humpback whales and other species sharing the ecosystem.

3.2. Public Scoping Process

NOAA formally initiated the public scoping process, required under NEPA, on July 14, 2010, by publishing a notice of intent in the *Federal Register* (*75 FR 40759*). This notice of intent (1) informed the public that the sanctuary was initiating a review of its management plan and regulations; (2) served as the official start of the 90-day public scoping and comment period; (3) announced the ten public scoping meetings held on six islands across the state; and (4) provided public notice of NOAA's intent to prepare an environmental impact statement (EIS) pursuant to the National Environmental Policy Act (NEPA), and develop a new management plan.

In August 2010, the sanctuary held ten public scoping meetings in communities across Hawaiʻi. Meetings took place on the island of Hawaiʻi in Hilo and Kailua-Kona; Oʻahu in Honolulu and Haleʻiwa; Kauaʻi in Līhuʻe and Kīlauea; Maui in Kīhei and Lahaina; Molokaʻi in Kaunakakai; and Lānaʻi in Lānaʻi City, and they were collectively attended by several hundred community members, stakeholders, and agency representatives. The meetings provided participants the opportunity to learn about sanctuary programs and interact with sanctuary staff. A formal presentation provided a more structured introduction to sanctuary initiatives. Participants were also invited to participate in small break out sessions to provide feedback on sanctuary management and program priorities.

Individuals and stakeholders who were unable to attend the public scoping meetings also had the opportunity to submit written comments online or in writing. In total, 12,375 public submissions were received over the 90-day public comment period (July to October 2010). Comments were submitted by agencies, organizations, elected officials and community members from throughout Hawaiʻi, the U.S. mainland and elsewhere (**Table 5**). Submissions were received as letters, faxes, voicemails and emails, in addition to the comments provided at public scoping meetings. The submissions included two petitions with a total of 12,019 signatures. All comments received during the public comment period were documented as part of the administrative record. The public scoping process is described in additional detail in the "Public Scoping Report: Community Engagement in the Management Plan Review" (http://hawaiihumpbackwhale.noaa.gov/management/pdfs/final_scoping.pdf).

Public Input	Hawai‘i	Other U.S.	International	Unknown	Totals
Agencies /Organizations[1]	32	9	0	0	41
Individuals[2]	140	9	0	0	149
MCBI Petition[3]	52	4,397	1,805	49	6,303
Kaua‘i Ballot[4]	166	0	0	0	166
Fishing Community Petition[5]	5,625	89	2	0	5,716
Location Sub-totals	6,015	4,504	1,807	49	12,375

Table 5. Summary of submissions received during scoping period.

The sanctuary advisory council (council) has played a key role in increasing cultural relevance for sanctuary programs and management approaches. The addition of representation from Lāna‘i and Moloka‘i on the council in 2011 provided sanctuary managers with insights from these smaller and more rural populations. In 2012, the Native Hawaiian Subcommittee was established as a subunit of the full council, and the Kumulipo was also officially acknowledged as a gift from our kūpuna offering clarity to decision-making. As discussions in council meetings gained more cultural context, it became clear that sanctuary management would benefit from even more outside expertise in cultural perspectives of traditional resource management. Subsequently, the Native Hawaiian Subcommittee and Research Subcommittee of the council helped coordinate a workshop to describe future potential for the integration of western and indigenous knowledge and science. The Aloha ‘Āina Workshop resulted in a guidance document that was further voted on with unanimous support by the full sanctuary advisory council to serve as a guiding document for the sanctuary’s management plan review (Aloha ‘Āina Guidance Document 2012).

3.3. Action Plan Development

In sanctuary management plans, action plans describe and prioritize activities for the next 5 to 10 years. The review of the Hawaiian Islands Humpback Whale National Marine Sanctuary management plan, required under NMSA Sec. 304(e), provided ONMS an opportunity to conduct public scoping during the summer of 2010 to gauge interest in modifying the management approach of the sanctuary. Following the public comment period, sanctuary staff assessed the comments and organized them into categorical bins based on their primary theme. These themes were further refined into overarching considerations, issues, and potential approaches (Table 6).

In December 2010, the sanctuary advisory council was presented with an overview of the comments and established working groups to further examine nine of the eleven issues that were identified through the public scoping process. It was determined that two of the issues: Management Effectiveness, and Marine Animal Assessment and Response, would be addressed through consultation meetings with targeted stakeholders. The working groups were made up of

[1] Includes federal and state agencies, as well as organizations and local county council members. Input was received as emails and letters.
[2] Includes letters, emails, and comment sheets received from individual citizens.
[3] Online petition from the Marine Conservation Biology Institute, which was forwarded to the sanctuary superintendent as individual emails.
[4] Concerned citizens from Kaua‘i produced their own ballot to provide their comments during the scoping period. Hard copies of the ballots were received by the sanctuary office by mail.
[5] Includes individuals representing ocean users and the fishing community. A hard copy of the petition was submitted to sanctuary staff in person.

council members, community and user group representatives, and technical experts. Working group meetings were open to the public and facilitated public participation by gathering input from relevant constituent groups. Each working group produced a technical report, which included recommendations for management actions that the sanctuary should take to address those issues. In January 2012, the council voted to forward all nine working group reports to sanctuary management to serve as the framework for the revised draft management plan. Together the reports contained over 150 recommendations for sanctuary management activities. Sanctuary staff considered all of the proposed activities when developing the revised draft management plan.

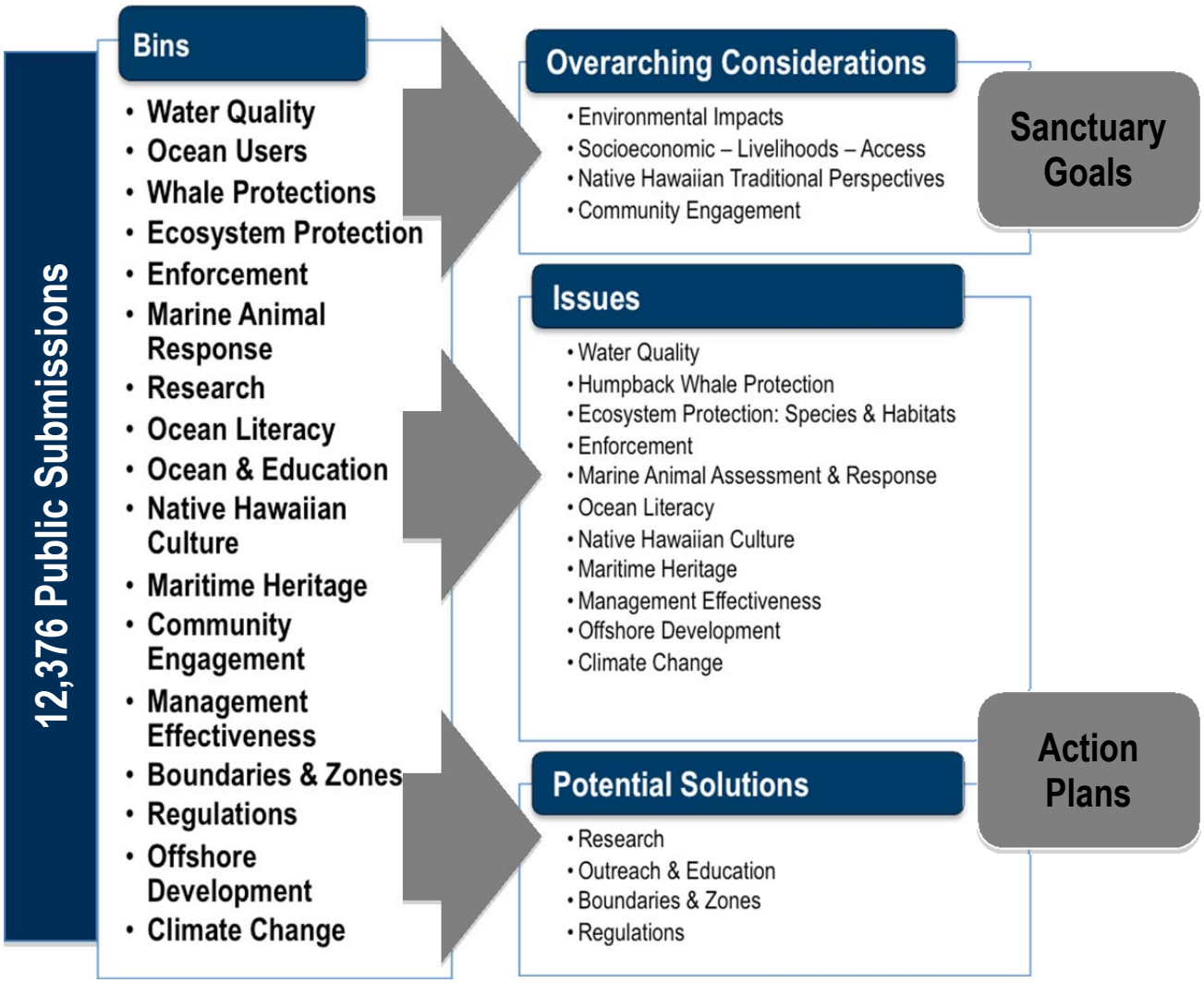


Table 6. Process to organize public comments.

4. Purpose and Need

The NMSA requires the ONMS to periodically evaluate the progress toward implementing the management plan and goals for each sanctuary, focusing on the effectiveness of site-specific management approaches. This evaluation is called a management plan review, during which ONMS reviews and, as appropriate, revises the management plans and regulations as necessary to fulfill the purposes and policies of the NMSA (16 U.S.C. § 1434(e)) to ensure that each sanctuary continues to best conserve, protect, and enhance their nationally significant natural and cultural resources. The Hawaiian Islands Humpback Whale National Marine Sanctuary management plan was last updated in 2002.

As a result of the management plan review, NOAA is proposing revisions to the terms of designation and the sanctuary-specific regulations in addition to the revised management plan. This includes a proposal for including additional areas within the sanctuary, as well as a proposal for new ecosystem-based regulations for discrete areas within the sanctuary. The proposed actions trigger a need for an environmental impact statement (EIS) under the NMSA (16 U.S.C. § 1434(a)(4)). The EIS focuses on presenting and analyzing proposed changes to the sanctuary regulations, boundary, and non-regulatory actions.

What is an Ecosystem?

An ecosystem is defined as a community of living organisms (e.g., plants, animals and microbes) in conjunction with the nonliving components of their environment (e.g., air, water and mineral soil), interacting as a system. Humans are an integral part of marine and terrestrial ecosystems. The "interconnectedness" within and among ecosystems is provided both by the physical environment (for example, currents transporting larvae from one part of the ecosystem to another) and by biological interactions (for example, kelps or seagrasses creating habitat or predators consuming prey).

What is a Healthy Ecosystem?

A healthy ecosystem is one with the capacity to maintain:

(1) Biotic structure, diversity, and interactions between species and the environment;
(2) Biological productivity and functions;
(3) Resilience (Costanza & Mageau 1999; Rapport & Maffi 2011).

This management plan review process provided sanctuary management with an opportunity to consider the value of marine ecosystems across the state, assess existing threats and protection to these valuable resources, and determine where the NMSA can provide added value to the resource management efforts provided by the state and other federal agencies. Amendments to the NMSA in 1988, 1992, 1996, and 2000 have strengthened and clarified the conservation principles for the program, including increased enforcement efforts, improved natural resource damage assessment tools, and emphasis on the protection of cultural resources. Further incorporating these new tools and techniques into the current management plan would allow for improved management and conservation, which are needed to slow both the short and long-term decline of marine ecosystems throughout Hawai‘i.

The management plan review process provided an opportunity to consider a broader context for marine resource management needs in Hawai‘i (Table 6). A review of the public scoping comments suggests that there is a range of issues that would benefit from additional management attention. Many people commended sanctuary management for their active role promoting the conservation of humpback whales and their habitat and suggested there were more opportunities

Defining Ecosystem-Based Management in Hawai'i
The sanctuary advisory council Ecosystem Protections Working Group developed a definition of ecosystem-based management based on both traditional Native Hawaiian concepts of management and western ecological knowledge and includes protection of both human uses and ocean habitats and species. The definition reads as follows:

Protect and Promote Sustainable Human Use
Protect and develop connections that humans have with the marine environment, their associated knowledge systems and socio-cultural traditions. Promote inter-generational cultural transmission of those knowledge systems and the preservation and perpetuation of local traditional and ecological knowledge that is place based. Promote sustainable use of marine resources; preserve and enhance ecosystem services (including ecological and socio-cultural services).

Protect and Conserve Ocean Habitats and Species
Protect areas of habitat complexity, areas of high biodiversity, endemism and cultural value, and key ecological species and functional groups. Protect a range of habitat types and critical biological zones (e.g. spawning grounds, juvenile nursery habitat), protect and recover if necessary populations of keystone or determinant species, such as habitat builders (e.g. reef-building corals) and key ecological functional groups (e.g. reef herbivores, top predators). Recover depleted populations of endemic species; and conserve species and places of high cultural value (e.g., underwater heiau, archeological sites, fishponds).

to continue to expand efforts in this area. It was also proposed that the sanctuary consider expanding the scope of management to also conserve additional marine species and habitats. It was suggested that there is a need to address anthropogenic threats to the marine environment including water quality, offshore development, and climate change. Commenters also identified opportunities to improve and expand upon enforcement, management effectiveness, and marine animal assessment and response, and recommended that Native Hawaiian culture and maritime heritage need be considered and integrated throughout sanctuary management and planning. Ocean literacy was identified as the cornerstone of sanctuary activities and would need to continue to play a significant role in sanctuary activities moving forward. Other tools that were proposed for sanctuary management included research, regulations, and boundary modifications.

An ecosystem-based management approach would provide sanctuary management with the platform to begin to address the full suite of issues proposed during the public comment period. An ecosystem-based management approach that is more comprehensive and inclusive of all aspects of the marine ecosystem than a single species approach. It emphasizes the biological, physical, and human components of a healthy marine environment. Humpback whales and their habitat are an essential component of the marine ecosystem in Hawai'i and the sanctuary would continue to support current programs, but under this new approach the sanctuary will also have the opportunity to engage in research, response, community engagement, and education in all other areas of the marine environment.

Ecosystem-based management is defined as an "environmental management approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation" (Christensen et al. 1996, McLeod et al. 2005). The goal of ecosystem-based management is "to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need." McLeod et al. explain that "ecosystem-based management differs from current [management] approaches that usually focus on a single species, sector, activity, or concern; it considers the cumulative impacts of different sectors" (McLeod et al. 2005). Ecosystem-based

management is currently recognized as the most effective mechanism to preserve our national marine resources. The National Ocean Policy Implementation Plan (2013) directs resource management agencies to utilize ecosystem-based management with an adaptive management approach. The sanctuary advisory council Ecosystem Protections Working Group also proposed ecosystem-based management to protect marine resources within the sanctuary.

Integrating Nature and Culture in Hawai'i

In his cultural-historical narrative of Ka'eo ahupua'a and other ahupua'a within the Honua'ula area, Kepa Maly writes:
All forms of the natural environment – from the heavens and mountain peaks, to the valleys, *kula* (flat sloping lands) and lava plains, and to the shoreline and ocean depths; as well as the winds, rains, clouds, stars in the heavens, and all forms of life – animate and inanimate – were believed to be embodiments of Hawaiian gods and deities. One Hawaiian genealogical account records that Wākea (sky father) and Papa-hānau-moku (island-bearing 'Earth' mother), also called Haumea-nui-hānau-wā-wā (Great Haumea-born time and time again), and various gods and creative forces of nature, gave birth to the islands.

As the Hawaiian genealogical account continues, we find that these same god-beings or creative forces of nature (parents of the islands), were also the parents of Hā-loa-na-ka-lau-kapalili (long stalk, quaking and trembling leaf). This Hāloa was born as a "shapeless mass" and buried outside the door of his parents' house (Pukui and Elbert 1981), and from his grave grew the *kalo* (taro). The next child born to these god-parents was also called Hāloa (the long stalk or breath of life), and he is credited as being the progenitor of the Hawaiian race (Malo 1951, Beckwith 1970, Pukui and Korn 1973). It was in this context of kinship, that the ancient Hawaiians addressed their environment and it is the basis of the Hawaiian system of land use. (*He Mo`olelo `Āina no Ka`eo me Kāhi `Āina E A`e Ma Honua`ula O Maui* 2005).

An ecosystem-based management approach was used by Native Hawaiians in the conservation of both land and aquatic resources (Kikoloi 2011, Andrade 2008, and McGregor 2007). Hawaiian culture viewed biological and cultural resources as being interrelated and therefore all biological resources were culturally significant. Hawaiian tradition assigns people the role as stewards of the natural environment. This relationship is present in the Hawaiian language (i.e., E Mālama I Ke Kai (to care for the ocean), Mālama 'Āina (to care for the land), and Aloha 'Āina (love of the land)). Cultural practice clearly defines how people are expected to collect natural resources (i.e, ferns and flowers). Additionally, harvesting fish and planting crops followed cyclical patterns. It has been suggested that any culturally sensitive discussion on land use in Hawai'i, one must understand that Hawaiian culture evolved in close partnership with its natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture ends and nature begins" (Maly 2001). The Native Hawaiian Working Group recommended that sanctuary management incorporate sustainable use of biocultural resources into planning to ensure future generations can benefit from the natural environment.

4.1. Need for the Proposed Action

ONMS completed the most recent management plan review for the Hawaiian Islands Humpback Whale National Marine Sanctuary management plan on [date]. This review uncovered the following issues:

(1) The Hawaiian Islands Humpback Whale National Marine Sanctuary ("the sanctuary") currently operates with a single species focus, as opposed to an ecosystem based management focus that would be consistent with most other national marine sanctuaries. The single species focus does not represent the most effective approach to resource management, and does not efficiently meet the requirements of the NMSA.

(2) Some existing sanctuary regulations protecting humpback whales lack clarity.

(3) Some sanctuary boundaries on the islands of Oʻahu and Kauaʻi are not aligned with other existing state and traditional use management areas, which has complicated sanctuary administration and management.

(4) Marine areas outside of the sanctuary have been identified which meet the national significance criteria for inclusion within the sanctuary. These areas, located around the island of Niʻihau and Lehua Rock (approximately 218 square miles) contain significant stands of healthy coral, populations of marine mammals, including whales and monk seals, as well as important historic and cultural resources.

(5) The 2002 management plan lacked several desirable non- regulatory management measures including: community involvement; outreach and education; research that not only addresses overall sanctuary needs, but focuses on several high priority areas; and focused management approaches to address specific issues in Maunalua Bay (Oʻahu), Niʻihau, Pīlaʻa (Kauaʻi) and Maʻalea Bay (Maui).

(6) Change the name of the sanctuary from Hawaiian Islands Humpback National Marine Sanctuary to Hawaiian Islands National Marine Sanctuary: Nā Kai ʻEwalu. The change in scope of the sanctuary to ecosystem based management renders the existing name obsolete.

The proposed action triggers a need for an environmental impact statement (EIS) under the NMSA (16 U.S.C. § 1434(a)(4)). The EIS focuses on presenting and analyzing proposed changes to the sanctuary regulations, boundary, and non-regulatory actions.

4.2. Purpose of the Proposed Action

The purpose of the proposed action is to resolve the issues identified during the management plan review (Section 4.1) in order to fulfill the purposes and policies of the NMSA (16 U.S.C. § 1434(e)), ensuring that each sanctuary continues to best conserve, protect, and enhance their nationally significant natural and cultural resources.

The purpose of developing a new management plan and associated regulations and boundary changes is to best fulfill the needs identified through the management plan review process and the directives of the NMSA to move towards a more ecosystem-based management approach guided by traditional native Hawaiian principles of resource management. The management plan review process assesses the need, and proposes how best to revise sanctuary goals and regulations and develop new action plans and activities. Following the public scoping meetings, sanctuary staff identified a need to establish a new vision, mission and values for the sanctuary. These elements were inspired by the outputs from the *Visioning Workshop* conducted with the sanctuary advisory council and input from sanctuary staff. The vision is an inspired statement representing the future direction of the sanctuary. The mission defines the sanctuary's purpose and focus of its work.

Vision
The sanctuary, as a place, realizes a healthy and diverse ocean environment, with thriving communities of responsible ocean stewards striving to maintain a balance of appropriate uses and ensure the perpetuation of the natural and cultural systems that define Hawai'i.

Mission
The sanctuary promotes a holistic and adaptable management approach that perpetuates the natural health of the environment, supports sustainable use, fosters local stewardship and community involvement, and perpetuates the cultural heritage of Hawai'i.

The values are presented through Hawaiian concepts that describe a holistic and adaptable approach to resource management.

Values

‘Auamo kuleana *(carry responsibility)*

As stewards of the ‘āina, both land and ocean, we embrace our responsibility for the ocean and people of Hawai‘i. This responsibility is made easier through working together, and sharing and receiving knowledge from communities throughout Hawai‘i, past and present. Through fulfilling our kuleana (responsibility), we honor and acknowledge our accountability to the ocean and the people of Hawai‘i.

Aloha ‘Āina *(love of the land)*

The concepts of aloha ‘āina (love of the land) and mālama ‘āina (to care for the land) encompass all areas mauka (inland) to makai (ocean). ‘Āina is not only the dirt and rocks of Hawai‘i but also the ocean; it is what provides ‘ai (food) for Hawai‘i. In Hawai‘i, people often feel an emotional and familial connection to the land and ocean, so we recognize that our relationship to the ‘āina of Hawai‘i is what moves us to care for this environment, and by doing so care for ourselves.

Huliāmahi *(many hands)*

We believe that no task is too great when shared by all. Our effectiveness is enhanced through collaboration, magnified through our partnerships, and realized through results-based management. We value our place within the ‘ohana of our communities, and we strive for active and robust community engagement.

Ho‘okaulike *(to balance)*

We strive for a healthy balance between the natural environment of Hawai‘i, the communities it supports, and the linkage to our cultural heritage. A healthy ecosystem relies on an uninterrupted connection between mauka and makai, which is the lifeline of a balanced system supporting both humans and the natural environment.

A‘o aku, a‘o mai *(to teach, to learn)*

The sanctuary strives to be both a leader and a learner, using our strengths to nourish and conserve Hawai‘i’s ecosystems and culture, sharing our experiences, and seeking the wisdom of others. We gather and use this knowledge to both better understand the ocean that surrounds our islands and to inform our decisions about leaving a better place for future generations.

Ka wā ma mua, ka wā ma hope *(the time before, the time after)*

There is a great wealth of knowledge from the past that provides historical answers and informs our management decisions that will affect the future. “The time before” refers to the past because it comes ma mua (before) the present; “the time after” refers to the future because it comes ma hope (after) the present.

Makawalu *(eight eyes)*

We recognize that there are many perspectives and ways to understand our surrounding environment, including our place and role within it. We strive to honor the diversity of knowledge systems in Hawai‘i, as well as the many methodologies and approaches for understanding and interacting with the natural world.

Sanctuary staff also developed guiding principles and corresponding revised sanctuary goals to develop a contemporary set of activities. The guiding principles provide direction for making informed decisions on the overarching policy and guidance for sanctuary management.

Guiding Principles
Honoring the Uniqueness of Hawai'i The ecosystems in Hawai'i are unlike any other in the world (e.g. endemism, Roberts et al. 2002), and the traditional practices and diverse communities in these islands are equally unique. In order to perpetuate the health of these ecosystems, practices, and communities, the sanctuary will strive to understand them and the ways they are interconnected. Place-based management for different areas may be the most effective way to protect uniqueness of each setting.
Diverse and Continuous Learning A set of cultural values have been identified to support a new management approach and includes diverse ways of learning, including traditional perspectives, contemporary place-based knowledge, and scientific research methods and processes. All knowledge resources will be considered and used to inform the development of sanctuary programs and management decisions.
Rigorous Progress Assessment Sanctuary managers and staff are mindful of the need to ensure successful implementation of the management plan and related actions. Subsequently, there is an action plan focused on both time-tested and innovative ways to assess progress.
Flexible and Adaptive Management Incremental progress assessment and an ever-growing understanding about the marine environment necessitate an adaptive management approach to enhance the capacity of resource managers to learn and adjust as conditions change. Sanctuary managers will need to adapt to fluctuations both in the physical environment and within communities.

The sanctuary goals are the unifying elements of successful sanctuary management. They identify and focus management priorities, resolve issues, and link to the public interest in preserving and caring for sanctuary resources.

GOALS	
Goal 1	Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.
Goal 2	Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.
Goal 3	Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.
Goal 4	Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.
Goal 5	Use collaborative and adaptive management approaches to optimize effectiveness.
Goal 6	Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai'i.

5. Proposed Action and Alternatives

5.1. Alternative Development Process

The proposed action and the alternatives, including the proposed boundary adjustments, meet the sanctuary designation standards of Section 303 of the NMSA (see sidebar). The sanctuary advisory council working groups considered management actions necessary to conserve marine resources within the proposed sanctuary boundaries. Their recommendations were then considered in the development of the proposed ecosystem-based regulations to add additional protection to marine resources within the sanctuary. The proposed transition from single species management of humpback whales to ecosystem-based management is consistent with ongoing federal and state initiatives to provide additional protection and sustainable management of marine resources in Hawai‘i.

National Marine Sanctuaries Act (NMSA) Sanctuary Designation Standards (16 U.S.C. §1433 (a)(2))

A National Marine Sanctuary is an area of national significance based on:

- The conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or esthetic qualities;
- The communities of living marine resources it harbors;
- Its resource or human use values.

Existing state and federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management.

The area is of a size and nature that will permit comprehensive and coordinated management.

5.2. Alternatives Considered but Eliminated

A variety of strategies were suggested during the public scoping process indicating support in areas such as expanding the sanctuary, de-designating the sanctuary, and adding additional species to sanctuary management. Some of these strategies were not developed into alternatives because they did not achieve the Purpose and Need for Action (see Section 4) or it was determined that they were unreasonable because they were either technically of financially infeasible. The following strategies were eliminated from consideration for the reasons discussed below.

No Sanctuary

During the public scoping process, a small number of commenters requested that NOAA and the State of Hawai‘i cease to manage a sanctuary in Hawaiian waters. These individuals claimed that the humpback whale population had recovered so there was no longer a need for the sanctuary. Additionally, they expressed concern about the potential loss of livelihoods or restriction to rights of access that could result if sanctuary regulations and prohibitions were expanded.

The proposed action was eliminated from consideration because it would be infeasible to effectively manage marine resources without a sanctuary. Terminating the management of a national marine sanctuary in the populated Hawaiian Islands would not meet the purpose and need for action. The first goal of sanctuary management is to holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment. Without a sanctuary, the proposed management plan and ecosystem-based regulations would not be implemented and the program would fail to effectively manage marine resources. The second goal of sanctuary management is to share

mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses. If the sanctuary were to cease in Hawai‘i, existing coordination mechanisms (i.e., the sanctuary advisory council) would cease to exist and the public may have less ability to influence research, education, enforcement, and management of humpback whales and their habitat in these critical areas. Additionally, all sanctuary funded contracts for research, education, and information dissemination would cease. The sanctuary offices on Maui, O‘ahu, and Kaua‘i would shut down and no longer provide opportunities and venues for public education and outreach. The thriving volunteer programs and award-winning Ocean Count program would also cease to operate if the sanctuary were to shut down.

Adding Limited Additional Species

During the 2002 Management Plan Review process, the public requested that sanctuary management consider strategies to protect additional marine species. NOAA assessed a range of marine species for possible inclusion in the sanctuary including Hawaiian monk seals, hawksbill sea turtles, false killer whales, and maritime heritage resources. The assessment considered population trends, past and current threats, existing management authorities, and conservation needs. The proposed action was eliminated from consideration because it would be infeasible to effectively manage marine resources using a species-management approach. Adding limited additional species would not statisy the goals outlined in the purpose and need for the sanctuary. In particular, a species-management approach fails to holistically manage biocultural resources in the sanctuary. Additionally, the NMSA calls for a “comprehensive approach to the conservation and management of the marine environment” (16 U.S.C. §1431 *et seq*., 301 (3) (3)).

Expand Boundary to 1000-Fathom Isobaths around the Populated Hawaiian Islands

The 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final Environmental Impact Statement/Management Plan (1997 EIS) considered a sanctuary boundary that extended from the shoreline out to the 1000-fathom isobath around the entire populated Hawaiian Islands. Although there was a general consensus among scientists at the time that humpback whale habitat is generally within the 100-fathom isobath, the 1997 EIS notes that about a quarter of humpback whale sightings had occurred between the 100-fathom and 1000-fathom isobaths (Mobley et al. 1993). The 1997 EIS analysis suggested that the additional area may include important humpback whale use areas and would provide a buffer around the 100-fathom isobath.

This strategy was not considered in the current range of alternatives because the cost of managing such a large area was not feasible and the resource demands would exceed the sanctuary budget. The sanctuary boundaries would extend out to 40 miles in some areas and if research and enforcement activities were dispersed over such a large region, it would diminish effective management in nearshore areas of the sanctuary. Additionally, the 1997 EIS suggested that extending the boundary out to the 1000-fathom isobaths would interfere with military areas and activities that are essential to national security and defense.

5.3. Description of Proposed Action and Alternatives

This section provides a description of the proposed action and alternatives for consideration in the draft management plan, including the proposed changes to regulations. The sanctuary is considering three alternatives to achieve the proposed goals (described in Section 4 Purpose and Need), as well as a No Action alternative. The No Action alternative (Alternative 1) proposes that the sanctuary continue to operate under the *2002 Management Plan* without any additional regulations or boundary changes. Alternatives 2-4 propose a revised management plan as a way to coordinate a transition from a single species management approach to an ecosystem-based management approach. Alternatives 2-3 propose extending the western sanctuary boundary on the north shore of Oʻahu to include Aliʻi Beach Park, extending the sanctuary boundaries on north shore of Kauaʻi to include the Pīlaʻa ahupuaʻa and the Hāʻena ahupuaʻa, extending the boundary around the ledges on the south end of Penguin Bank, and establishing new sanctuary boundaries around Niʻihau. Alternative 4 proposes these boundary extensions plus one additional boundary extension on the north shore of Kauaʻi to include the Hanelei River. Alternative 2 proposes new and revised sanctuary-wide regulations to apply to the existing sanctuary area and the proposed boundary additions. Alternative 2 also proposes Special Sanctuary Management Area regulations for the Penguin Bank and Maui Nui areas (outside of 3 nautical miles). Alternative 3 proposes the same new and revised sanctuary-wide regulations and extends the Special Sanctuary Management Area regulations to apply to Maunalua Bay in addition to the Penguin Bank and Maui Nui areas. Alternative 4 proposes to extend the Special Sanctuary Management Area regulations to the entire sanctuary. For each alternative, the proposed actions are described below, including any proposed management changes, boundary adjustments, or regulations.

5.4. Alternative 1: No Action

Alternative 1 proposes that the sanctuary maintain status quo operations. Under this alternative, NOAA would continue to follow the *2002 Management Plan* for HIHWNMS and there would be no changes to the current sanctuary regulations or current sanctuary boundaries. However operating under the *2002 Management Plan* does not mean reverting to 2002 operations. Sanctuary programs have evolved over the past decade and many programs have expanded to include additional resources found within the sanctuary. A recent assessment of the *2002 Management Plan* found that the sanctuary had become engaged in several activities that support broader missions, particularly in the areas of resource protection and education and outreach. For example, sanctuary programs have been set up for monitoring water quality, introduced limu, fish, and ʻopihi. Additionally, sanctuary staff have provided assistance in stranding and disentanglement of monk seals, green sea turtles, and other cetaceans. A full description of these sanctuary activities is provided in the "2002 Management Plan Assessment" (HIHWNMS 2011).

Currently, there are six activities that are prohibited in the sanctuary with the intent of protecting humpback whales and their habitat (15 C.F.R. §922.184 (a)(1) – (5)). It is currently prohibited to approach or cause a vessel or other object to approach a humpback whale within 100 yards or to operate an aircraft within 1,000 feet of a humpback whale. Taking or possessing any portion or a humpback whale is also prohibited unless authorized under the Marine Mammal Protection Action (MMPA) or the Endangered Species Act (ESA). It is also prohibited to discharge material or alter the seabed of the sanctuary in a way that that injures a humpback whale or humpback whale habitat if it is unauthorized by other Federal or State permit, license, lease or other authorization. Finally, it is prohibited to interfere with an investigation or enforcement effort (15 C.F.R. §922.184(6)). These prohibitions do not apply to emergency or law enforcement situations (15 C.F.R. §922.184(b)). Sanctuary regulations also state that any sanctuary fishery regulations shall not take effect in Hawaiʻi State waters until established by the State Board of Land and Natural Resources (15 C.F.R. §922.184(c)).

Although Alternative 1 does meet the statutory requirement for management plan review (NMSA Sec. 304(e)), it does not fulfill the revised sanctuary goals set out in Section 4 of this document.

5.5. Alternative 2

Alternative 2 proposes a revised management plan as a way to coordinate a transition from a single species management approach to an ecosystem-based management approach. The revised management plan would replace the *2002 Management Plan* as the basis for sanctuary operations. Alternative 2 proposes extending the western sanctuary boundary on the north shore of Oʻahu to include Aliʻi Beach Park, extending the sanctuary eastern and western boundaries on the north shore of Kauaʻi to include the Pīlaʻa ahupuaʻa and the Hāʻena ahupuaʻa, extending the boundary around the ledges on the south end of Penguin Bank, and establishing new sanctuary boundaries around Niʻihau. Alternative 2 also proposes new and revised sanctuary-wide regulations to apply in existing sanctuary areas and and proposed boundary additions. The revised sanctuary wide-regulations are largely modeled off the current sanctuary-wide regulations with the following changes: (1) the regulations prohibiting the take and possess of humpback whales would be combined; (2) the approach regulation would be clarified and articulated; (3) the prohibition against discharge would be removed; (4) the prohibition on altering submerged lands would be removed; and (5) authority to issue permits and authorizations would be added. Additionally, Alternative 2 proposes a new sanctuary-wide regulation prohibiting the disturbance of submerged cultural and maritime heritage resources. Alternative 2 proposes Special Sanctuary Management Area regulations to apply to the Penguin Bank and Maui Nui areas (outside of 3 nautical miles). Special Sanctuary Management Area regulations would include prohibitions against: (1) taking or possessing additional marine species; (2) discharge; (3) altering submerged lands; (4) using explosives; (5) introducing non-native species; and (6) damaging or destroying signs.

5.5.1. Revised Management Plan

The Office of National Marine Sanctuaries (ONMS) and the State of Hawaiʻi have prepared a revised management plan (Section 10) with input from the sanctuary advisory council, the public, state and federal agencies, and other constituents. The revised management plan describes an ecosystem-based management approach to the conservation of resources within the sanctuary. Ecosystem-based management is an integrated approach that considers all key activities, particularly anthropogenic, that affect marine environments (see definition in Section 4 Purpose and Need). The draft management plan updates the sanctuary mission, vision, and goals to better reflect the new management approach. The draft management plan includes sixteen action plans. Action plans are designed to directly address current priority resource management issues and guide management of the sanctuary over the next five to ten years. The action plans identify and organize a wide variety of management tools sanctuary staff could employ. Action plans would allow ONMS to articulate the programs and projects it uses to address the resource issues identified for this management plan, to fulfill the purposes and policies of the NMSA, and to achieve sanctuary goals. In general, action plans are designed to address:

- The management issues identified during the management plan review process;
- The goals and objectives of the NMSA and the sanctuary;
- Extensive comments, input and ideas from the sanctuary advisory council;
- The scientific, socioeconomic, and local knowledge gathered about the status of sanctuary resources and resource management issues;

- The unique, non-duplicative, and beneficial services the sanctuary can offer to improve resource management; and
- The need for evaluating the effectiveness of the sanctuary over time.

The action plans would be sorted into five thematic areas that serve to organize and structure the plans as outlined in Table 7.

Thematic Area	Action Plan
Implementing Ecosystem Management	• Understanding and Managing Species and Habitats • Resilience to a Changing Climate • Water Quality Protection
Perpetuating Cultural Heritage	• Living and Evolving Cultural Traditions • Maritime Heritage
Transitioning Towards Sustainability	• Community Partnerships • Ocean Literacy • Sustainable Use
Sanctuary Focus Areas	• Niʻihau • Pīlaʻa • Southern Maui Nui • Maunalua
Ensuring Management Effectiveness	• Operational Foundation • Compliance and Enforcement • Emergency Preparedness and Damage Assessment • Assessing Progress

Table 7. Sanctuary draft management plan structure.

5.5.2. Regulations

Alternative 2 proposes a new name, new and revised sanctuary-wide regulations to apply across existing sanctuary area and and proposed boundary additions, and Special Sanctuary Management Area regulations for the Penguin Bank and Maui Nui areas. The revised sanctuary wide-regulations are largely modeled off the current sanctuary-wide regulations with the following changes (1) the regulations prohibiting the take and possess of humpback whales would be combined; (2) the approach regulation would be clarified and articulated; (3) the prohibition against discharge would be removed; (4) the prohibition on altering submerged lands would be removed; and (5) authority to issue permits and authorizations would be added. Additionally, Alternative 2 proposes a new sanctuary-wide regulation prohibiting the disturbance of submerged cultural and maritime heritage resources. Alternative 2 proposes Special Sanctuary Management Area regulations for the Penguin Bank and Maui Nui areas (outside of 3 nautical miles). Special Sanctuary Management Area regulations would include prohibitions against: (1) taking or possessing additional marine species; (2) discharge; (3) altering submerged lands; (4) using explosives; (5) introducing non-native species; and (6) damaging or destroying signs.

5.5.2.1. Name Change

Alternative 2 proposes a new sanctuary name: *Hawaiian Islands Humpback Whale National Marine Sanctuary - Nā Kai ʻEwalu.* A name-change for the sanctuary would better reflect holistic thinking about the marine environment. In January 2012, the council established a

Sanctuary Naming Working Group to develop recommendations for a possible new name to replace the Hawaiian Islands Humpback Whale National Marine Sanctuary. The working group considered a range of potential names that communicated important aspects of a new management approach for the sanctuary, namely holistic management and a sense of community throughout Hawai‘i, with humans being a part of the larger ecosystem picture. The working group presented three names to the council who voted to forward all three names to the sanctuary manager.

Based on input from the council, the Office of National Marine Sanctuaries (ONMS) and the State of Hawai‘i, the new name was selected. The phrase “Nā Kai ‘Ewalu” means “the eight seas”. It is a reference to the channels between the populated Hawaiian Islands and a poetic reference to the Hawaiian Islands themselves. It illustrates the interconnectedness between the ocean and the people of Hawai‘i and their communities. Together these three words are referenced over 150 times in Hawaiian language newspapers. On several occasions, “Nā Kai ‘Ewalu” is written at the beginning of an article as a greeting from the author to the readers. This proposed new name of the sanctuary better reflects the move from single species management to ecosystem-based management.

5.5.2.2. New and Revised Sanctuary-Wide Regulations

Alternative 2 proposes the following revisions to the current sanctuary-wide regulations: (1) the regulations prohibiting the take and possess of humpback whales would be combined; (2) the approach regulation would be clarified and articulated; (3) the prohibition against discharge would be removed; (4) the prohibition on altering submerged lands would be removed; and (5) authority to issue permits and authorizations would be added. Additionally, Alternative 2 proposes a new sanctuary-wide regulation prohibiting the disturbance of submerged cultural and maritime heritage resources.

Action: Combine humpback whale take and possess regulations

Alternative 2 proposes combining the regulations prohibiting the take and possession of humpback whales within the sanctuary into one regulation. Combining the regulations is consistent with humpback whale take and approach regulations under the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA) and the State of Hawai‘i. There would be no impact to the meaning or interpretation of the regulations by combining the language. Under current regulations, taking a humpback whale includes actions to harass, harm, pursue, hunt, wound, kill, trap, capture, collect or injure a humpback whale or protected species, or to attempt to engage in any such conduct. Furthermore, taking includes but is not limited to any of the following activities: collecting any dead or injured humpback whale or protected species, or any part thereof; restraining or detaining any humpback whale or protected species, or any part thereof, no matter how temporarily; tagging any humpback whale; operating a vessel or aircraft or doing any other act that results in the disturbing or molesting of any humpback whale or protected species.

Action: Clarify humpback whale approach regulation

Under Alternative 2, the current regulation prohibiting approaching humpback whales (922.184 (a)(1)) would be clarified to include additional regulatory language. The revised regulation

would prohibit interception, or placing a vessel in the path of an oncoming humpback whale so that the whale surfaces within 100 yards (91.4 m) of the vessel. Additionally, it would be prohibited to disrupt the normal behavior or prior activity of a whale by any other act or omission. Exceptions would be recognized for permits issued under the NOAA Fisheries, as well as for state, local, or federal government vessels operating in the course of official duty, and vessels otherwise restricted.

Action: Remove existing prohibitions on disturbance of submerged lands and discharge

Alternative 2 proposes removing the current regulation prohibiting discharge into the sanctuary (from either inside or outside the sanctuary) and prohibiting altering the seabed. The current regulation is tied to existing management authorities over these activities (discharge and disturbing the seabed) and violation of any user group in regards to these authorities' permit requirements and/or permit conditions.

Action: Add prohibition on disturbance of cultural and maritime heritage resources

Alternative 2 proposes a new regulation to prohibit removing, damaging, or tampering with any historical or cultural resource anywhere in the sanctuary.

Action: Add authority to issue sanctuary permits and authorizations

Alternative 2 proposes to add the authority for the ONMS Director (delegated to the sanctuary superintendent) to issue general permits, authorizations and special use permits for the sanctuary. The regulations would specify that general permits could be issued for management, research, education purposes for activities that would otherwise violate regulations that prohibit discharge, altering submerged lands, and disturbing cultural and maritime heritage resources. An additional sanctuary-specific general permit category would also be added for the installation of submarine cables. In addition, the regulations would propose a specific review criterion for the installation of submarine cables general permit catgory, which would require that the proposed cable installation be approved by the State of Hawaii for state waters of the sanctuary in order to be eligible for permit approval by ONMS. Alternative 2 would add the authority to authorize other federal, state, or local permits. This alternative would also add the authority to issue special use permits, as described in section 310 of the NMSA.

5.5.2.3. Special Sanctuary Management Area Regulations

Alternative 2 proposes Special Sanctuary Management Area regulations for the Penguin Bank and Maui Nui areas (outside of 3 nautical miles). Special Sanctuary Management Area regulations would include prohibitions against: (1) taking or possessing additional marine species; (2) discharge; (3) altering submerged lands; (4) using explosives; (5) introducing non-native species; and (6) damaging or destroying signs. Maui Nui is a unique, semi-enclosed, shallow protected sea bound by the islands of Maui, Molokaʻi, Lānaʻi, and Kahoʻolawe. The Maui Nui area refers to the adjoining submerged base of the mountain that used to connect Maui, Lānaʻi, and Molokaʻi and ranges to depths more than 262 feet (80 m).

Action: Add prohibition on take or possess of additional marine species

Under Alternative 2, the regulation prohibiting taking and possessing of humpback whales would be expanded to also prohibit taking or possessing marine mammals, sea turtles, seabirds, ESA-listed species or Hawai‘i Revised Statutes chapter 195D listed species. The sanctuary would recognize any activities that are exempted under the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), the Magnuson Stevens Fishery Conservation and Management Act, or Hawai‘i State Law. The sanctuary could authorize other state and federal permits.

Action: Add new prohibition on discharges

Under Alternative 2, it would be prohibited to discharge or deposit any material or other matter into the Penguin Bank and Maui Nui areas, which is located in federal waters, outside of 3 nautical miles from shore. Exceptions would be made for fish, fish parts, chumming materials or bait used for fishing, biodegradable effluents incidental to vessel use, water generated by routine vessel operations, and material deposited for ceremonial purposes. Additionally, it would be prohibited to discharge or deposit any material or matter outside the sanctuary that subsequently enters the Penguin Bank and Maui Nui areas and injures a resource within the area. Under this alternative, sanctuary management could issue permits for research, education, and management. They could also authorize other state and federal permits for activities that would violate this regulation, provided it met permit criteria.

Action: Add new prohibition on disturbance of the submerged lands

Dredging, drilling into, or otherwise altering in any way the submerged lands (including bottom formations, live rock and coral) would be prohibited within the Penguin Bank and Maui Nui areas (federal waters outside of 3 nautical miles) under Alternative 2. Anchoring a vessel on sandy bottom or substrate other than live rock or coral would be permitted, as would routine maintenance, ecological maintenance and navigation. Legal fishing activities permitted under NOAA Fisheries would be allowed. Additionally, aquaculture activities authorized under state and federal permits would be permitted. Under this alternative, sanctuary management could issue permits for research, education, and management and sanctuary management could authorize other state and federal permits for activities that would violate this regulation, provided it met permit criteria.

Action: Add new prohibition on use of explosives

Alternative 4 would prohibit possessing, or using explosives within the Penguin Bank and Maui Nui areas (federal waters outside of 3 nautical miles) except for valid law enforcement purposes or under a valid permit.

Action: Add new prohibition on introduction of introduced species

Alternative 4 would prohibit introducing or otherwise releasing an introduced species within or into the Penguin Bank and Maui Nui areas (federal waters outside of 3 nautical miles). Exceptions would be made for species cultivated by mariculture activities in federal waters pursuant to a valid lease, permit, license or other authorization issued by the National Marine Fisheries Service in effect on the effective date of the final regulation.

Action: Add new prohibition on damaging and destroying signs

Under Alternative 4, it would be illegal to mark, deface or damage any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to Penguin Bank and the Maui Nui area.

5.5.3. Boundary Changes

Alternative 2 proposes boundary changes on the north shore of O‘ahu and the north shore of Kaua‘i, extending the boundary around the ledges on the south end of Penguin Bank, as well as establishing new sanctuary boundaries around Ni‘ihau. A range of boundary changes were proposed during the public comment period. A full description of the geography and major attributes of the proposed sites is described in the Affected Environment (Section 7). The Affected Environment also describes the current human uses, management regimes, and threats to resources. The justification for including these areas in the sanctuary, as well as a description of the proposed impact to the biological and human environment, is included in the Environmental Consequences (Section 9).

5.5.3.1. Ni‘ihau

Alternative 2 proposes to incorporate the waters around the island of Ni‘ihau into the sanctuary (Figure 4).. The sanctuary does not currently manage the marine environment around Ni‘ihau. The proposed boundary would extend out three nautical miles to be consistent with state waters. The sanctuary would allow managers to collect user information around Ni‘ihau. The total area of the proposed boundary expansion would be approximately 217 square miles.

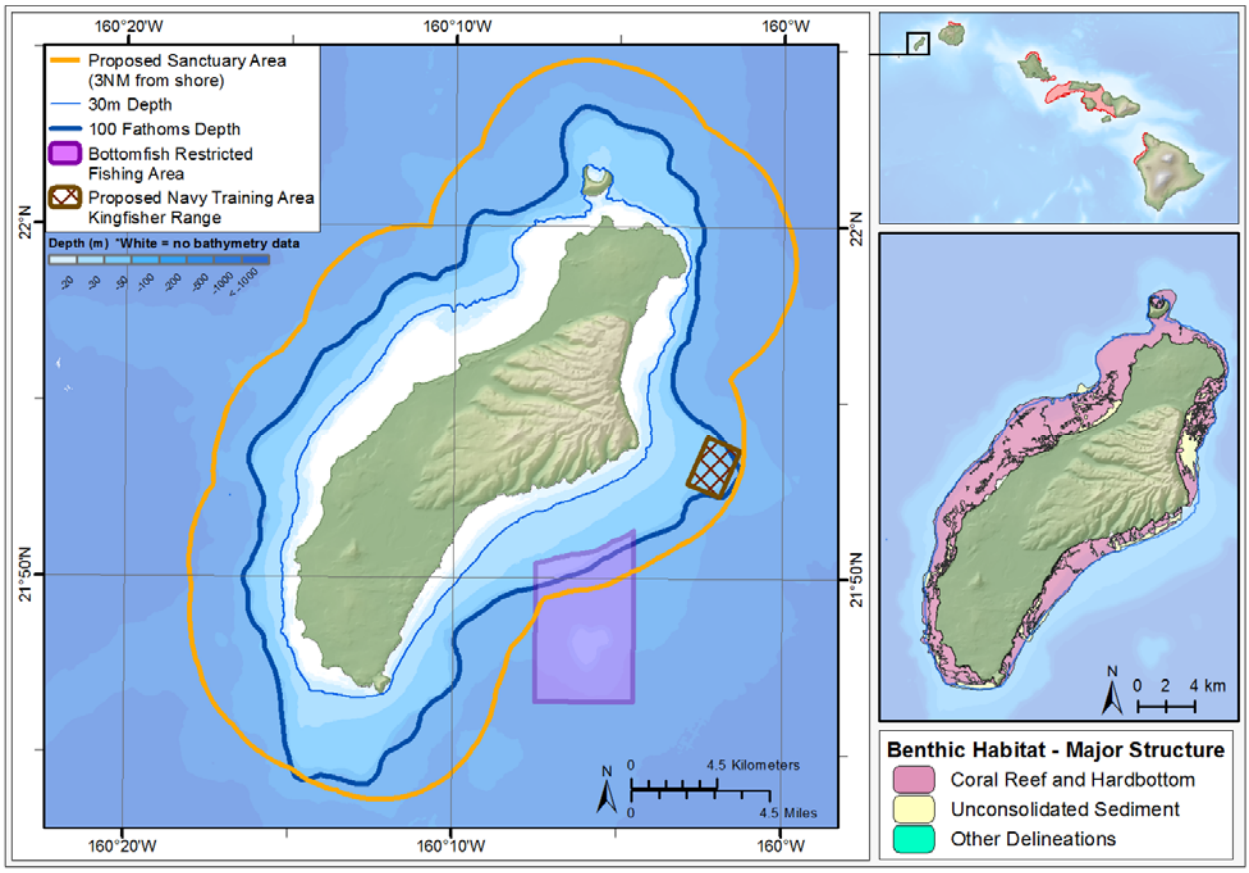


Figure 4. Proposed boundary expansion around Ni‘ihau.

5.5.3.2. Kaua‘i: Hā‘ena Ahupua‘a

The current sanctuary boundary on the north shore of Kaua‘i extends from Kailiu Point eastward to Mokolea Point out to the 100-fathom (183 m) isobath. The western boundary of the sanctuary on the north shore of Kaua‘i intersects the Hā‘ena ahupua‘a just over one mile east of the western boundary of the ahupua‘a (Figure 5). Under Alternative 2, the sanctuary proposes to extend the western boundary of the sanctuary to Ke‘e Beach to include the full Hā‘ena ahupua‘a. By integrating this traditional land division into sanctuary management, the sanctuary is recognizing the natural contours of the land and the interrelationship between land and sea to effectively manage resources from the ridge to the reef. Extending the sanctuary boundary to align with the ahupua‘a boundary would establish a precedent for future sanctuary boundary changes. Since the original sanctuary boundaries were established to protect humpback whales and their habitat, only some of the current sanctuary boundaries currently align with traditional ahupua‘a boundaries. The boundary adjustment would also make the sanctuary consistent with the boundary of the Hā‘ena community-based subsistence fishing area (CBSFA). The total area of the proposed boundary expansion would be approximately 8 square miles.

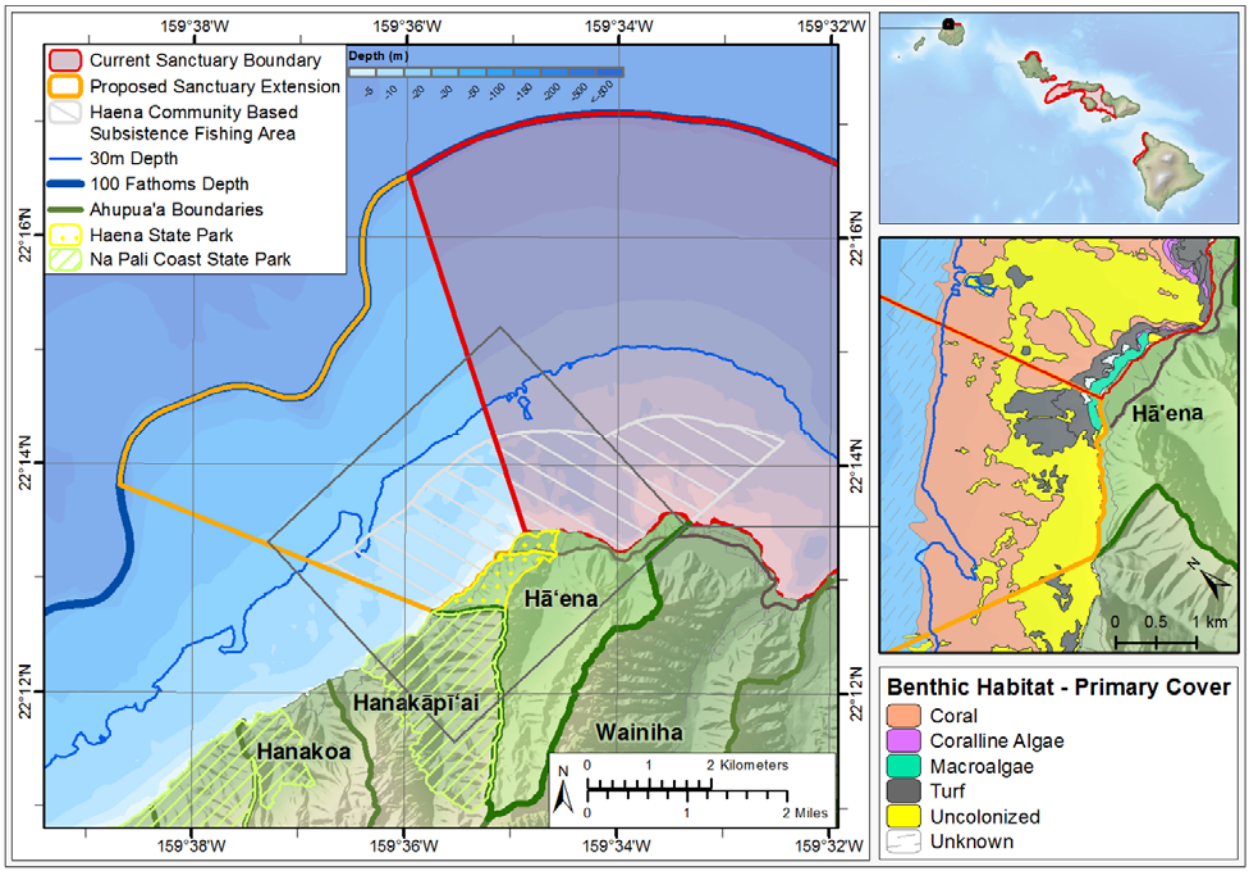


Figure 5. Proposed boundary adjustment in Hā‘ena.

5.5.3.3. Kaua‘i: Pīla‘a Ahupua‘a

The current sanctuary boundary on the north shore of Kaua‘i extends from Kailiu Point eastward to Mokolea Point out to the 100-fathom (183 m) isobath. Alternative 2 proposes to adjust the eastern-boundary of the sanctuary on the north shore of Kaua‘i from Mokolea Point to Kepuhi Point to include Kāhili, West Waiakalua, East Waiakalua and Pīla‘a ahupua‘a (Figure 6). The total area of the proposed boundary expansion would be approximately 5 square miles. The proposed sanctuary area would be used to pilot traditional marine management approaches along with science-informed management to restore the degraded coral reef ecosystem.

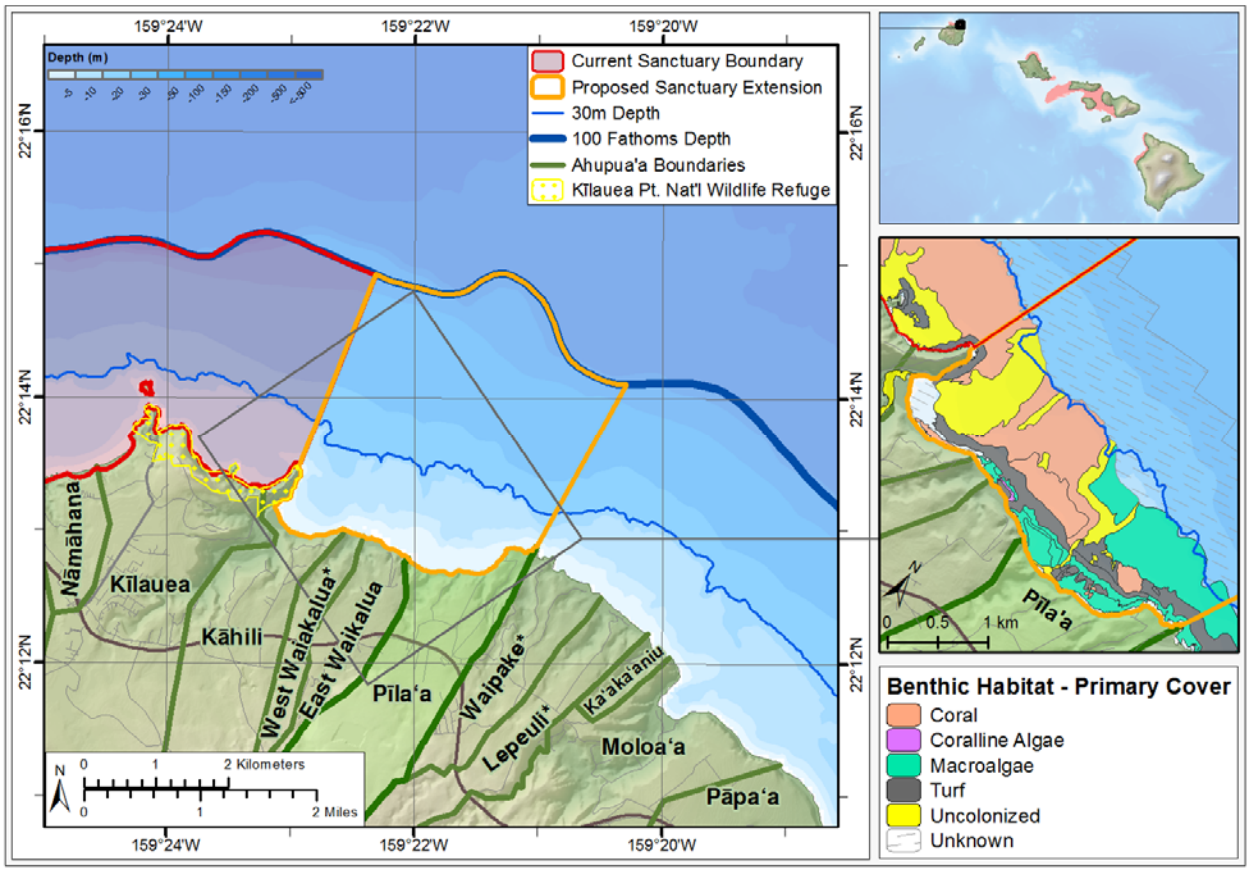


Figure 6. Proposed boundary adjustment at Pīla‘a.

5.5.3.4. O‘ahu

The current sanctuary boundary on the north shore of O‘ahu extends from Pua‘ena Point eastward to Māhie Point, out to the 100-fathom (183 m) isobath (Figure 7). Under Alternative 2, the sanctuary proposes to adjust the western boundary of the sanctuary to Ali‘i Beach Park, out to 100-fathom isobath to be consistent with the boundary of the North Shore Surfing Reserve established under Executive Order 10-07. The Surfing Reserve was part of an effort to acknowledge the cultural and historic significance of important surf sites in Hawai‘i. The proposed sanctuary boundary adjustment would exclude Hale‘iwa Harbor. The total area of the proposed boundary expansion would be approximately 4 square miles.

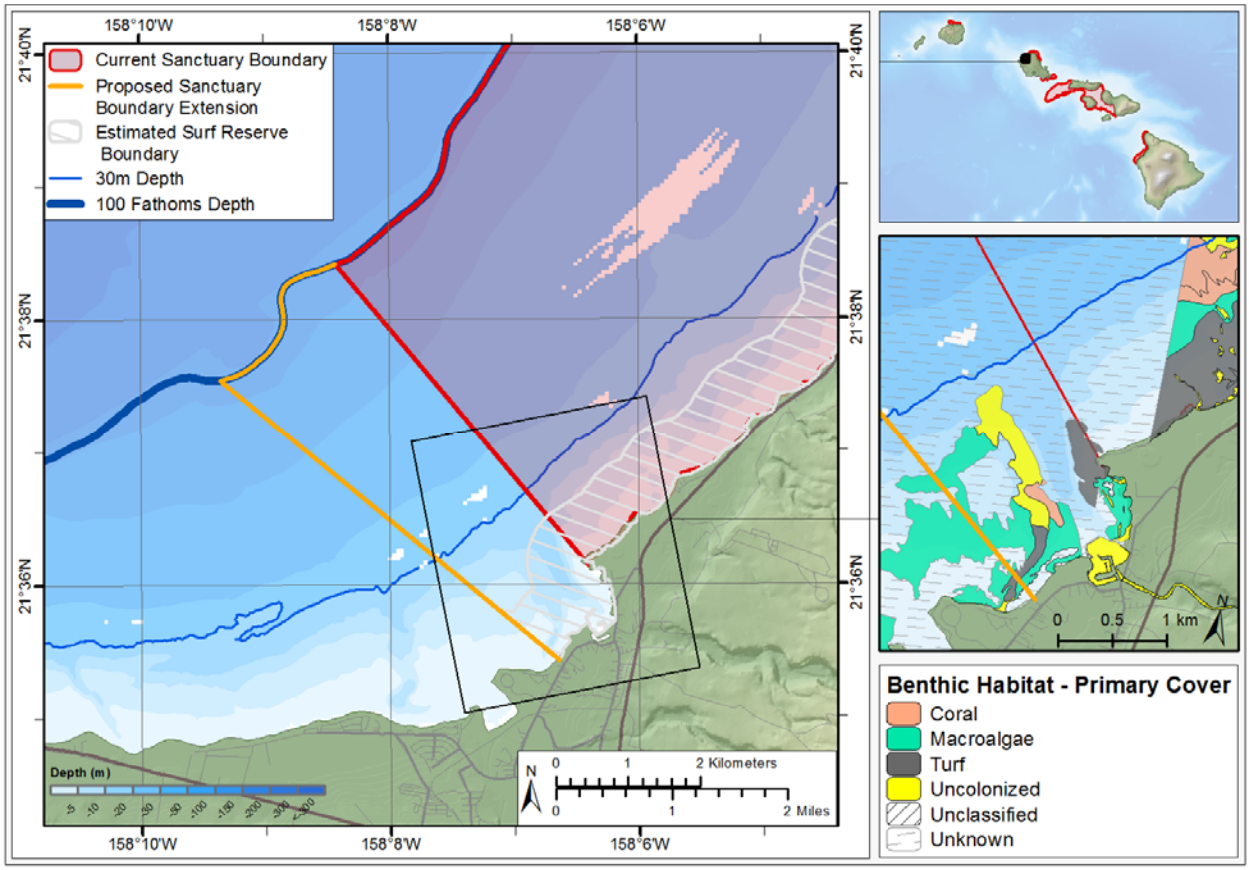


Figure 7. Proposed boundary adjustment on O‘ahu.

5.5.3.5. Penguin Bank

The current sanctuary boundary approximates the 100-fathom (183 m) isobath around Penguin Bank. Under Alternative 2, the sanctuary proposes extending the boundary around the ledges on the south end of Penguin Bank (Figure 8). The boundary adjustment will facilitate enforcement efforts and clarify boundaries for ocean users. The total area of the proposed boundary expansion would be approximately 21 square miles.

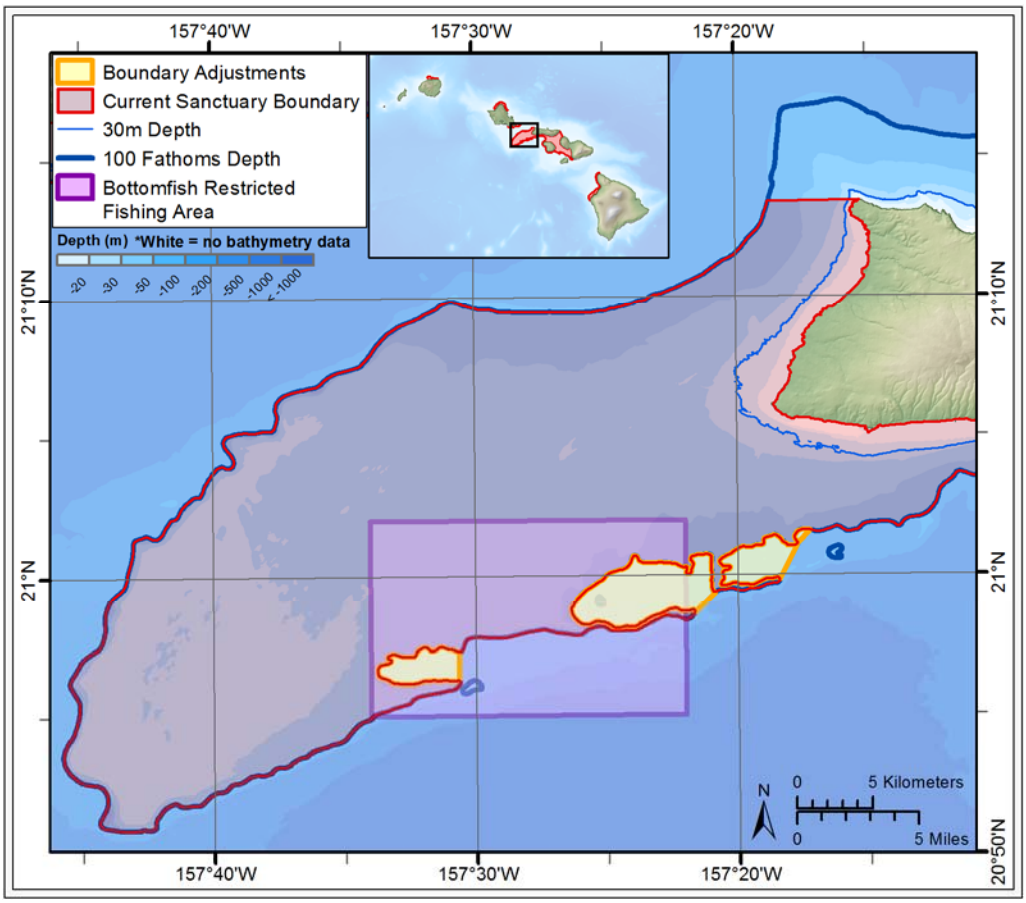


Figure 8. Proposed boundary adjustment to Penguin Bank.

5.6. Alternative 3: Proposed Action

5.6.1. Revised Management Plan

Alternative 3 proposes the same revised management plan as proposed in Alternative 2 as a way to coordinate a transition from a single species management approach to an ecosystem-based management approach. The revised management plan would replace the 2002 Management Plan as the basis for sanctuary operations.

5.6.2. Regulations

5.6.2.1. Name Change

The new sanctuary name proposed under Alternative 2 would also be proposed under alternative 3: *Hawaiian Islands National Marine Sanctuary - Nā Kai 'Ewalu.*

5.6.2.2. New and Revised Sanctuary-Wide Regulations

The revisions to the current sanctuary-wide regulations proposed under Alternative 2 would also apply under Alternative 3 including: (1) the regulations prohibiting the take and possess of humpback whales would be combined; (2) the approach regulation would be clarified and articulated; (3) the prohibition against discharge would be removed; (4) the prohibition on altering submerged lands would be removed; and (5) authority to issue permits and authorizations would be added. The new sanctuary-wide regulation prohibiting the disturbance of submerged cultural and maritime heritage resources proposed under Alternative 2 will also apply under Alternative 3. The new and revised sanctuary-wide regulations proposed in Alternative 3 are the same as those proposed in Alternative 2.

5.6.2.3. Special Sanctuary Management Area Regulations

The Sanctuary Management Area regulations proposed in Alternative 2 for Maui Nui and Penguin Bank would apply to Maunalua Bay in addition to Maui Nui and Penguin Bank under Alternative 3 (Figure 9). These regulations include prohibitions against: (1) taking or possessing additional marine species; (2) discharge; (3) altering submerged lands; (4) using explosives; (5) introducing non-native species; and (6) damaging or destroying signs. Applying these proposed Special Sanctuary Management Area regulations to Maunalua Bay is the only difference between Alternatives 2 and 3.

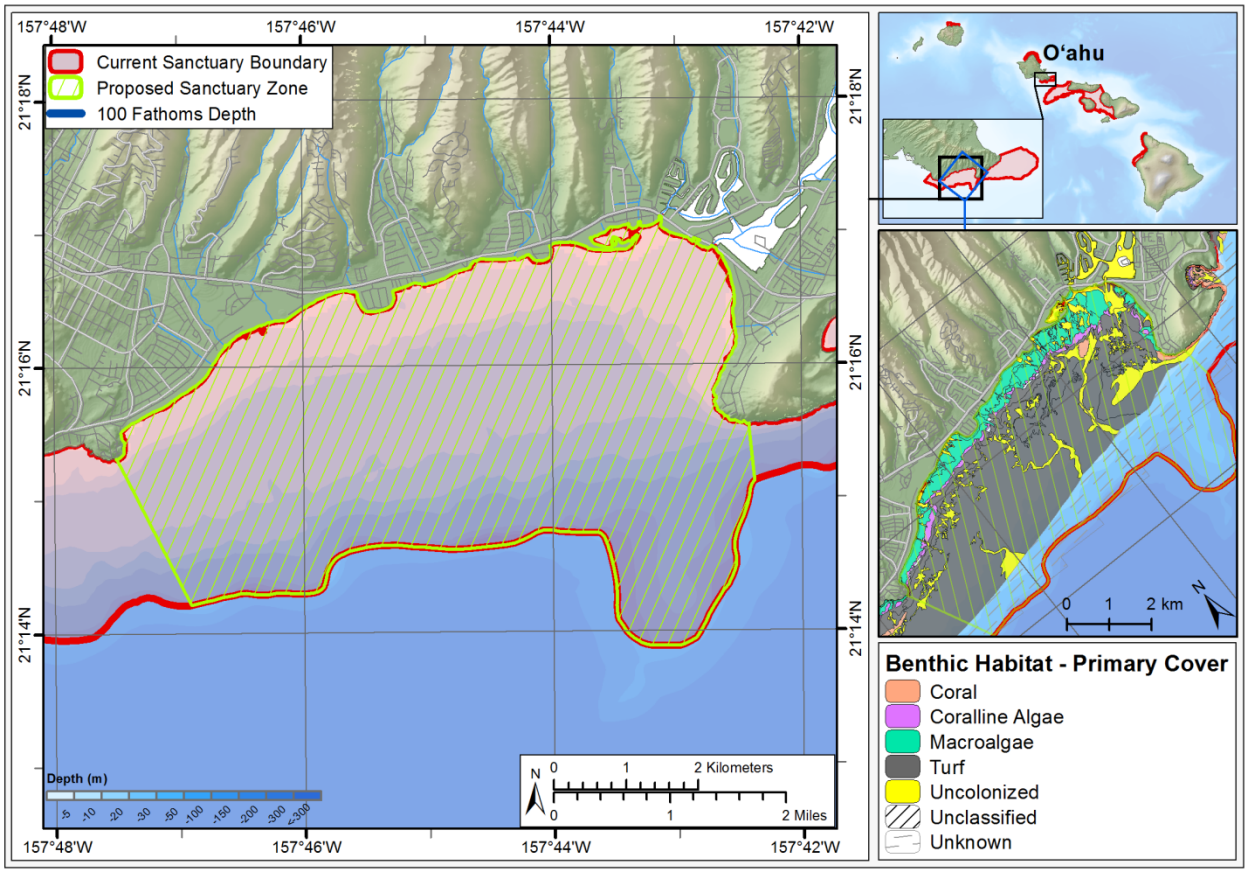


Figure 9. Proposed regulatory area for Maunalua Bay Special Sanctuary Management Area.

5.6.3. Boundary Changes

The proposed boundary changes on O‘ahu, Kaua‘i, Penguin Bank and Ni‘ihau described under Alternative 2 are also proposed under Alternative 3. A full description of the geography and major attributes of the proposed sites is described in the Affected Environment (Section 7). The Affected Environment also describes the current human uses, management regimes, and threats to resources. The justification for including these areas into the sanctuary, as well as a description of the proposed impact to the biological and human environment, is included in the Environmental Consequences (Section 9).

5.7. Alternative 4

5.7.1. Revised Management Plan

Alternative 4 proposes the same revised management plan as proposed in Alternative 2 as a way to coordinate a transition from a single species management approach to an ecosystem-based management approach. The revised management plan would replace the 2002 Management Plan as the basis for sanctuary operations.

5.7.2. Regulations

5.7.2.1. Name Change

The new sanctuary name proposed under Alternative 2 would also be proposed under alternative 4: *Hawaiian Islands National Marine Sanctuary - Nā Kai ʻEwalu.*

5.7.2.2. New and Revised Sanctuary-Wide Regulations

Alternative 4 proposes to apply sanctuary-wide prohibitions against: (1) taking or possessing additional marine species; (2) discharge; (3) altering submerged lands; (4) using explosives; (5) introducing non-native species; and (6) damaging or destroying signs. In Alternatives 2 and 3, these regulations would only apply to Special Sanctuary Management Areas. In Alternative 4, these regulations would apply to the entire sanctuary. The revisions to the current sanctuary-wide regulations proposed under Alternative 2 would also apply under Alternative 4 including: (1) the regulations prohibiting the take and possess of humpback whales would be combined; (2) the approach regulation would be clarified and articulated; (3) the prohibition against discharge would be removed; (4) the prohibition on altering submerged lands would be removed; and (5) authority to issue permits and authorizations would be added. The new sanctuary-wide regulation prohibiting the disturbance of submerged cultural and maritime heritage resources proposed under Alternative 2 will also apply under Alternative 4.

5.7.3. Boundary Changes

The proposed boundary changes on Oʻahu, Kauaʻi, Penguin Bank and Niʻihau described under Alternative 2 are also proposed under Alternative 4. In addition, Alternative 4 proposes to incorporate the estuarine waters of the Hanalei River into the sanctuary on the north shore of Kauaʻi. A full description of the geography and major attributes of the proposed sites is described in the Affected Environment (Section 7). The Affected Environment also describes the current human uses, management regimes, and threats to resources. The justification for including these areas into the sanctuary, as well as a description of the proposed impact to the biological and human environment, is included in the Environmental Consequences (Section 9).

5.7.3.1. Kaua‘i: Hanalei River

The current sanctuary boundary consists of the submerged lands and waters seaward from the shoreline, cutting across the mouths of rivers and streams. Under Alternative 4, the sanctuary proposes to incorporate the estuarine waters of the Hanalei River into the sanctuary on the north shore of Kaua‘i. Currently the U.S. Fish and Wildlife Service (USFWS) manages the Hanalei National Wildlife Refuge (NWR) which includes the upper Hanalei River (Figure 10). The sanctuary boundary would extend up the river approximately 1.5 miles so the boundary would be adjacent to the Hanalei NWR boundary (partial extant of salt water intrusion range). The proposed boundary adjustment would ensure that activity upstream does not impact marine resources in Hanalei Bay including the Hanalei River.

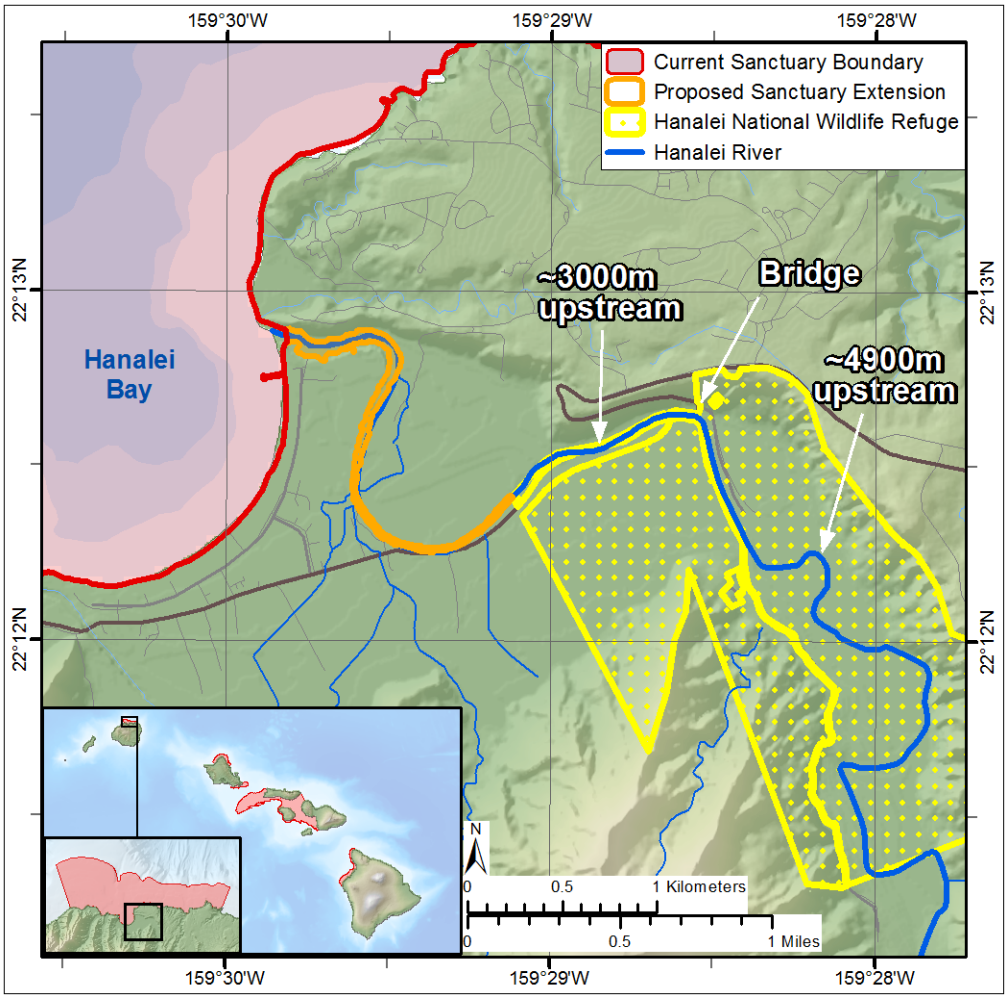


Figure 10. Proposed boundary adjustment for Hanalei River.

5.7.4. Comparison of Alternatives

In general, each subsequent alternative broadens the proposed regulatory area expands boundaries of the sanctuary to protect sanctuary resources. Table 8 summarizes the actions proposed under each of the four alternatives. The proposed action is Alternative 3.

Alternative	Boundary changes	Regulations		
		Revised Sanctuary-Wide Regulations	New Sanctuary-Wide Regulations	Special Sanctuary Management Area Regulations
1	*Status Quo – none of the above boundary changes or regulations apply.*			
2	Niʻihau North Shore, Oʻahu Haʻena, Kauaʻi Pīlaʻa, Kauaʻi Penguin Bank	Sanctuary-wide	Sanctuary-wide	Penguin Bank/ Maui Nui
3 (Preferred)	Niʻihau North Shore, Oʻahu Haʻena, Kauaʻi Pīlaʻa, Kauaʻi Penguin Bank	Sanctuary-wide	Sanctuary-wide	Penguin Bank/ Maui Nui and Maunalua
4	Niʻihau North Shore Oʻahu Haʻena, Kauaʻi Pīlaʻa, Kauaʻi Penguin Bank Hanalei, Kauaʻi	Sanctuary-wide	Sanctuary-wide	Sanctuary-wide

Table 8. Comparison of Alternatives in the DEIS.

Table 9 summarizes the proposed regulations under each of the four alternatives. Regulations in light blue are the current regulations that apply sanctuary-wide. Alternative 1 does not propose any changes to the current sanctuary regulations. Alternative 2 proposes changes to the existing sanctuary-wide regulations and proposes additional regulations for the Special Sanctuary Management Areas at Penguin Bank and Maui Nui. Alternative 3 proposes to extend the Special Sanctuary Management Area regulations to Maunalua Bay. Alternative 4 proposes sanctuary-wide regulations to protect sanctuary resources.

Regulations		Alternative			
Description		1	2	3	4
Approach	Approaching, or causing a vessel or other object to approach within 100 yards of any humpback whale.	✓			
	Approaching a humpback whale within 100 yards of any humpback whale by any means including by interception, causing a vessel or other object to approach a humpback whale, or disrupting the normal behavior or prior activity of a whale by any other act or omission.		✓	✓	✓
Overflight	Operating an aircraft above the Sanctuary within 1,000 feet of any humpback whale.	✓	✓	✓	✓
Take & Possess	Taking any humpback whale.	✓			
	Possessing any living or dead humpback whale.	✓			
	Taking or possessing any humpback whales within the Sanctuary.		✓	✓	*
	Taking or possessing any marine mammal, sea turtle, seabird, Endangered Species Act-listed species or Hawai'i Revised Statutes chapter 195D listed species, within or above the Special Sanctuary Management Areas (Penguin Bank, Maui Nui Area).		✓		
	Taking or possessing any marine mammal, sea turtle, seabird, Endangered Species Act-listed species or Hawai'i Revised Statutes chapter 195D listed species, within or above the Special Sanctuary Management Areas ((Penguin Bank, Maui Nui Area, and Maunalua Bay).			✓	
	Taking or possessing any marine mammal, sea turtle, seabird, Endangered Species Act-listed species or Hawai'i Revised Statutes chapter 195D listed species, within or above the Sanctuary.				✓
Discharge	Discharging or depositing any material or other matter in the sanctuary that injures a humpback whale or humpback whale habitat without a permit, license, lease, or other authorization from another agency.	✓			
	Discharging or depositing any material or other matter in the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area).		✓		
	Discharging or depositing any material or other matter in the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area and Maunalua Bay.			✓	
	Discharging or depositing any material or other matter in the Sanctuary.				✓
Enter & Injure	Discharging or depositing any material or other matter outside of the sanctuary if the discharge or deposit subsequently enters and injures a humpback whale or humpback whale habitat without a permit, license, lease, or other authorization from another agency.	✓			
	Discharging or depositing any material or other matter outside of the Special Sanctuary Management Areas if the discharge or deposit subsequently enters and injures a sanctuary resource within the Special Sanctuary Management Areas (Penguin Bank and Maui Nui Area).		✓		
	Discharging or depositing any material or other matter outside of the Special Sanctuary Management Areas if the discharge or deposit subsequently enters and injures a sanctuary resource within the Special Sanctuary Management Areas (Penguin Bank, Maui Nui Area, and Maunalua Bay).			✓	
	Discharging or depositing any material or other matter outside of the Special Sanctuary Management Areas if the discharge or deposit subsequently enters and injures a sanctuary resource within the Sanctuary.				✓

Altering Submerged Lands	Altering the seabed of the Sanctuary without a permit, license, or authorization.	✓			
	Dredging, drilling into, or otherwise altering in any way the submerged lands (including natural bottom formations, live rock and coral) within the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area).		✓		
	Dredging, drilling into, or otherwise altering in any way the submerged lands (including natural bottom formations, live rock and coral) within the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area, and Maunalua Bay).			✓	
	Dredging, drilling into, or otherwise altering in any way the submerged lands (including natural bottom formations, live rock and coral) within the Sanctuary.				✓
Explosives	Possessing or using explosives within the Special Sanctuary Management Areas, except for valid law enforcement purposes (Penguin Bank and Maui Nui area).		✓		
	Possessing or using explosives within the Special Sanctuary Management Areas, except for valid law enforcement purposes (Penguin Bank, Maui Nui area, and Maunalua Bay).			✓	
	Possessing or using explosives within the Sanctuary, except for valid law enforcement purposes				✓
Introduced Species	Introducing or otherwise releasing from within or into the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area) an introduced species.		✓		
	Introducing or otherwise releasing from within or into the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area, and Maunalua Bay) an introduced species.			✓	
	Introducing or otherwise releasing from within or into the Sanctuary an introduced species.				✓
Historical & Cultural	Removing, damaging, or tampering with any historical or cultural resource within the Sanctuary.		✓	✓	✓
Signage	Marking, defacing, or damaging in any way, or displacing or removing or tampering with any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to the Sanctuary including boundary markers related to the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area).		✓		
	Marking, defacing, or damaging in any way, or displacing or removing or tampering with any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to the Sanctuary including boundary markers related to the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area, and Maunalua Bay).			✓	
	Marking, defacing, or damaging in any way, or displacing or removing or tampering with any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to the Sanctuary including boundary markers related to the Sanctuary.				✓
Enforcement	Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of either of the Acts or any regulations issued under either of the Acts.	✓	✓	✓	✓

Table 9. Summary of proposed regulations by Alternative.

6. Site Description

6.1. Geography

The Hawaiian Archipelago is a group of eight inhabited islands together with 124 islets (some of which are unrelated to the archipelago), shoals, and reefs stretching about 1,490 nautical miles along a southeast-northwest axis in the North Central Pacific. The State of Hawaiʻi consists of 6,471 square miles of land, ranges in elevation from sea level to 13,796 feet at the peak of Mauna Kea on the island of Hawaiʻi, and has 750 miles of coastline with 40 square miles of estuaries, harbors, and bays. Lying in the Tropic of Cancer between 154°40' to 178°75' W longitude and 18°40' to 28°25' N latitude, the inhabited islands in order of size are Hawaiʻi, Maui, Oʻahu, Kauaʻi, Molokaʻi, Lānaʻi, Niʻihau, and Kahoʻolawe. The major ocean and interisland channels of the inhabited islands are shown in Figure 11. The inhabited islands are the youngest of the Hawaiian Archipelago and comprise approximately 4,845 square miles (12,548 square km) of land and 889 miles (1,431 km) of coastline.

Island	Size (sq mi)	Shoreline (miles)	Max Elevation (ft)	Latitude/ Longitude	Special Features
Niʻihau	70	90	1,250 Mt. Pānīʻau	21°54′N 160°10′W	7th largest; mostly private, limited public access
Kauaʻi	562	136	5,243 Kawaikini	22°05′N 159°30′W	4th largest; Waimea Canyon; "Barking Sands" Pacific Missile Range
Oʻahu	597	112	4,003 Mt. Kaʻala	21°28'N 157°59'W	3rd largest; most populous island; Waianae & Koʻolau mountain ranges
Maui	727	86	10,238 Haleakalā	20°48′N 156°20′W	2nd largest; wintering area for humpbacks in ʻAuʻau Channel
Molokaʻi	206	88	4961 Kamakou	21°08′N 157°02′W	5th largest
Lānaʻi	141	121	3,366 Lānaihale	20°50′N 156°56′W	6th largest
Kahoʻolawe	45	30	1,438 Puʻu Moaulanui [Lua Makika]	20°33′N 156°36′W	8th largest; Kahoʻolawe Island Reserve; commercial uses prohibited
Hawaiʻi	4028	266	13,796 Mauna Kea	19°34′N 155°30′W	Largest island; Great Crack 9 8 mi deep fissure; active volcano, Kilauea

Table 10. Key physical attributes of the populated Hawaiian Islands.
Source: *Coastal Geology Group (2011) http://www.soest.Hawaiʻi.edu/coasts/data/*

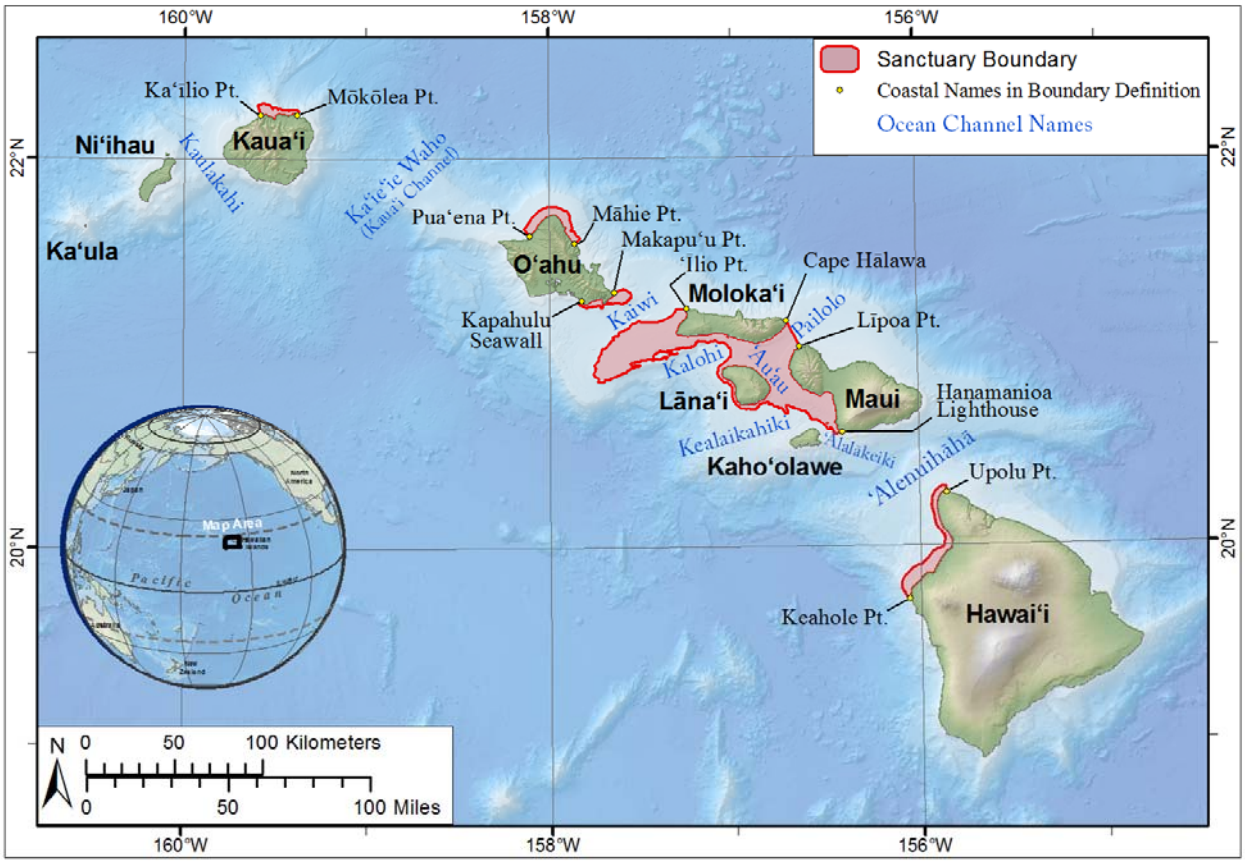


Figure 11. Sanctuary boundary and major channels.
Source: *Hawaiian Islands Humpback Whale National Marine Sanctuary 2013.*

6.2. Geology

The populated Hawaiian Islands were formed during the last few million years by the gradual accretion of basaltic lava flows. Their geologic features have been formed by successive periods of volcanic activity interspersed with submergence, weathering, and fluctuations in sea level. The volcanic activity that created the Hawaiian Islands formed comparatively gradual mountain masses that rise abruptly from the relatively smooth archipelagic apron of the adjacent sea floor. This apron extends a few tens of kilometers outward from the islands slopes slightly upward from the base of the islands at 4,375-5,468 yards (4,000-5,000m) deep. The sea floor at the base of the islands is slightly depressed and forms a moat-type structure around the islands. Beyond the moat is a bulge or arch, apparently formed by the weight of the islands pushing the displaced material outward (Menard 1964).

The islands generally are surrounded by coral reefs and contain numerous bays. Along some of the windward shorelines where perennial streams empty into the ocean, estuarine-like conditions prevail. Relatively abundant rainfall and persistent northeasterly trade winds contribute to the steady weathering of the islands. Sandy beaches are found along the shorelines of all the islands but are best developed on Kaua'i and Ni'ihau and least developed on Hawai'i, where mountain-building and shoreline creation is still occurring (Aki et al. 1994).

6.3. Geomorphology/Bathymetry

The islands of Maui, Lānaʻi, Molokaʻi, and Kahoʻolawe are the remnants of a single massive volcanic conglomerate. In the past, these four islands were connected to form a single island called "Maui Nui" (Stearns and Macdonald 1942). In 2004, Price & Elliott-Fisk published a model that estimated timing, duration, and topographic attributes of different island configurations for Maui Nui over time. The Maui Nui island reached its largest areal extent around 1.2 million years ago when it was larger than the current island of Hawaiʻi (Price and Elliott-Fisk 2004). Maui Nui spent approximately 75% of its history as a single large landmass. This landscape history is important to the biogeographic patterns of organisms on and near the current Maui Nui islands (Price and Elliott-Fisk 2004). The adjoining submerged base of Maui, Lānaʻi, and Molokaʻi ranges to depths more than 260 feet (80 m).

The average depth of water over Penguin Bank is about 200 feet (60 m), but ranges from 150-650 feet (50-200 m). The bathymetry of the area, bound by Maui, Molokaʻi, Lānaʻi, and Kahoʻolawe, along with the extension of the shallow Penguin Bank southwest of Molokaʻi, represents a unique, semi-enclosed, shallow protected sea in the midst of an expansive ocean. As recently as the last glacial maximum (20,000-21,000 years ago), Penguin Bank was above sea level as part of a large “Maui Nui” island (Price and Elliott-Fisk 2004).

The nearshore topography of Oʻahu is characterized by a series of marine terraces. The terraces, which are separated by escarpments, reflect periods of emergence, submergence, and changes in sea level. The upper level terrace extends seaward to about 200 feet (60 m) followed by a steep escarpment and then a second or intermediate terrace from about 225 to 400 feet (70 m to 120 m). Another steep escarpment is found at this depth and then a gently sloping terrace extends from about 425 to 2000 feet (130 m to the 600 m) contour (Brock and Chamberlain 1968). Sonic depth recorders indicate a relatively flat or gently sloping bottom at depths near 650 feet (200 m) (100-fathom isobaths) (EPA 1980). With few exceptions, the bottom topography from 0.2 miles (0.3 km) seaward is very steep and drops almost immediately to the abyssal plains at 3 miles (4.8 km).

6.4. Oceanography

Centered at about 28° N, ocean currents form a large clockwise circulation called a gyre. At the latitudes around the islands of Hawaiʻi, the circulation runs roughly east to west, increasing in strength as it moves south. The geostrophic current strength decreases with depth by about half every few hundred meters. Below 1000 m (3300 feet), the average current strength is below 5 cm/s (0.1 knot), though patterns at this depth are not entirely known (Flament et al. 1996).

The North Equatorial Current (NEC) runs on the surface reaching an average westward speed of 6.7 in/s (17 cm/s) (0.35 knots) at 13° N, gradually decreasing in speed as it moves north towards the islands. The islands strongly affect the movement of ocean currents between 18° N and 22° N. At the island of Hawaiʻi, the NEC forks, creating the North Hawaiian Ridge Current (NHRC) with its northern branch. Near the islands, the NHRC on average has a width of 62 miles (100 km) and speed of 10 in/s (25 cm/s) (0.5 knots). West of the islands, a clockwise circulation centered at 19° N merges with the southern fork of the NEC and a counterclockwise circulation is centered around 20° 30' N. Between the two circulations lies the Hawaiian Lee Counter Current (HLCC) which ranges from 170° W to 158 °W (Flament et al. 1996; Ocean Atlas).

6.5. Ocean Chemistry

Three major water masses surround the Hawaiian Islands: the North Pacific Central (NPC), the North Pacific Intermediate, and the Pacific Deep Water. Out of these three water masses, the NPC is found within the sanctuary. The NPC forms shallow water masses ranging in depth from 330 to 980 feet (100 to 300 m) and is characterized by temperatures between 50 °F (10 °C) and 64 °F (18 °C) and salinities between 34.2 ppt and 35.2 ppt (EPA 1980). The water in the NPC mass has the highest salinity of the three masses, but higher temperatures counteract the high salt content, making its relative density the lowest (1997 EIS).

Surface salinities near the Hawaiian Islands range from 35.2 ppt at 26 °N to 34.3 ppt at 10 °N (Flament et al. 1996). Salinity reflects the balance between precipitation and evaporation so the decrease in salinity at the southern end of the Hawaiian Islands reflects the higher amount of precipitation near the Inter-Tropical Convergence Zone. Salinity tends to decrease with depth, indicating the sinking of lower salinity water from the Northern Ocean. Higher salinity water (35.2 ppt) is present at the surface down to 500 feet (150 m), lower salinity (34.1 ppt) down to 1,670 feet (500 m), and then the salinity increases slightly to 34.7 ppt for very deep abyssal waters (Flament et al. 1996).

General approximations of the water chemistry based on measurements taken at a nearshore site off O‘ahu (Chave and Miller 1977), suggest that dissolved oxygen is high, perhaps supersaturated in the surface waters, ranging from 5.4 mL/L at the surface to 5.7 mL/L at 100 m. At 980 feet (300 m) depth off O‘ahu, these values decreased to 5.0 mL/L. A similar distribution pattern for pH was noted off O‘ahu, in December, 1976, where values in the surface waters averaged 8.1 and increased to 8.2 between 82 feet and 154 feet (25 m and 50 m) depths. A decrease to 7.9 was noted at 980 feet (300 m). Environmental Protection Agency (2012) reported that dissolved oxygen conditions in Hawai‘i’s coastal waters are rated good with only 6% of the area rated “fair”. The sites rated “fair” were Pearl Harbor and Kāne‘ohe Bay, with dissolved oxygen just below 5mg/L at Kāne‘ohe Bay.

6.6. Meteorology and Climatology

The outstanding features of Hawai‘i’s climate include mild temperatures throughout the year, moderate humidity, persistence of northeasterly trade winds, significant differences in rainfall within short distances, and infrequent severe storms. For most of Hawai‘i, there are only two seasons: "summer," between May and October, and "winter," between October and April (NWS 2013).

Average wind speeds in Hawai‘i are highest during the summer when persistent trade winds blow in from the northeast at speeds of 10-25 mph. Trade winds are less prevalent in winter: wind speed exceeds 12 mph only 40% of the time. Major storms mostly occur in the winter and may yield very high winds from any direction.

A mixed water layer is present below the surface and ranges in depth from 400 feet (120 m) in winter to less than 100 feet (30 m) in summer. Below this layer there is a thermocline (sharp decrease in temperature) from 77 °F (25 °C) at the surface to 41 °F (5 °C) at 2,300 feet (700 m), then decreases to 35 °F (1.5 °C) at the bottom. Water temperatures near the Hawaiian Islands are several degrees lower than in the tropical Western Pacific, leading to a decrease in diversity of

aquatic species (Juvik and Juvik 1998). Surface water temperatures have a strong north to south gradient, and a small annual cycle, being lowest around March 15, and highest around September 15. The average surface water temperature around O‘ahu is 75 °F (24 °C) in winter and 81 °F (27 °C) in summer. The variations of temperature tend to parallel the island chain, i.e. surface waters are in general warmer to the west at a given latitude (Figure 12; Flament et al. 1996).

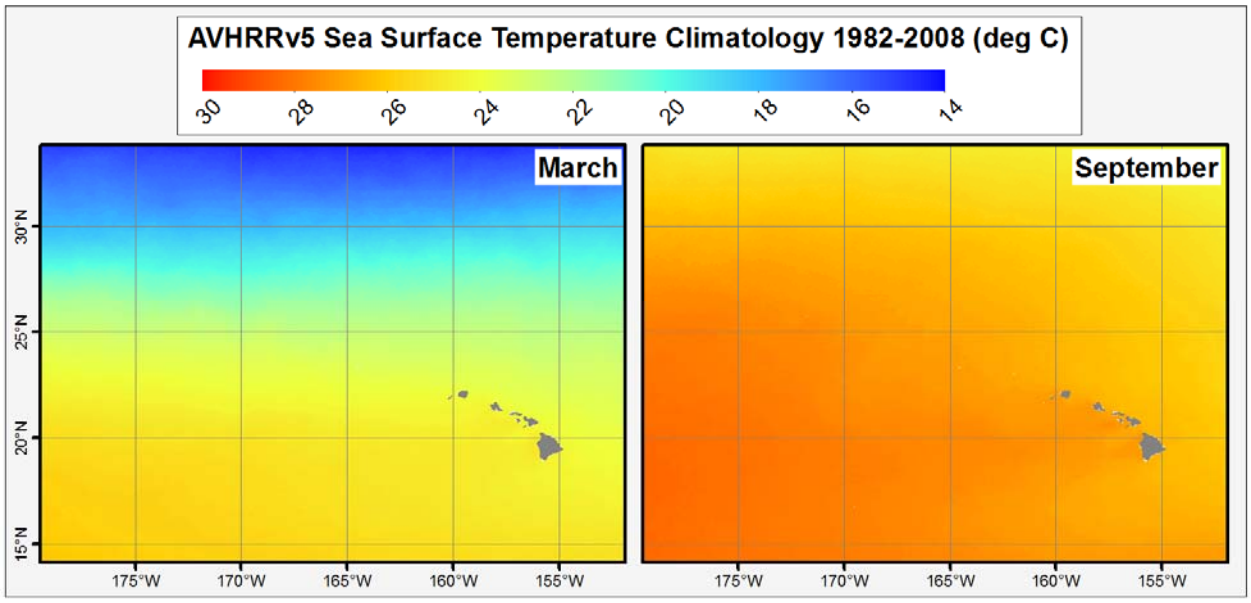


Figure 12. Average sea surface temperature near the Hawaiian Islands.
Source: *Hawaiian Islands Humpback Whale National Marine Sanctuary 2013.*

Winds blow many miles across the Pacific Ocean before reaching the Hawaiian Islands. Rainfall occurs when warm, moisture-laden trade wind air is forced up and over mountain peaks causing condensation of atmospheric moisture. The northeastern sides of the islands (the direction of the prevailing winds) are usually the wettest. As the winds descend the leeward slopes, they become warm and dry, thus making the leeward coasts some of the driest in the State.

The Hawaiian Islands have one of the most diverse rainfall patterns on Earth (Giambelluca et al. 2013). Based on data from 1,000 stations from 1978-2007, annual mean rainfall over the State varies from 8 in (204 mm) near the summit of Mauna Kea to 404 in (10,271 mm) near Big Bog on the windward slope of Haleakalā, Maui (Giambelluca et al. 2013). Precipitation is highly variable and is heavily influenced by local topography and the sheltering effects of adjacent islands.

7. Affected Environment

This section describes the affected environment across Hawai‘i in general, followed by a detailed description of the affected environment at specific locations proposed for incorporation into the sanctuary. The region of interest (ROI) or area of potential affect includes all lands and waters within and adjacent to the sanctuary in the populated Hawaiian Islands. There are currently sanctuary areas that border Hawai‘i, Kaho‘olawe, Maui, Lāna‘i, Moloka‘i, O‘ahu, and Kaua‘i. The sanctuary is proposing boundary changes on the north shores of O‘ahu and Kaua‘i, as well as the inclusion of new sanctuary boundary around Ni‘ihau.

7.1. Biophysical Environment

7.1.1. Habitats

The current and proposed sanctuary boundaries include a wide range of sub-tropical marine habitat types including coastal and shoreline areas, estuaries, seagrass, sandy, hard and rubble habitat, coral reefs, and deep ocean. These habitats support diverse marine species, which are presented in more detail in the next section. This section provides an overview of the primary habitat types within the current and proposed sanctuary boundaries. The primary threats to habitats are discussed in Section 6.1.4., such as coral bleaching, coral disease, vessel grounding, and pollution.

For the populated Hawaiian Islands, NOAA mapped 32 distinct habitat types (i.e., 4 major and 14 detailed geomorphological structure classes; 7 major and 3 detailed biological cover types) within 13 nearshore zones using satellite imagery (Battista et al. 2007). Total coral reef and hard bottom and total “other” substrate (e.g. sand, mud, artificial) are shown in Table 11.

Coral Reef Structure Type	*Major and Detailed Habitat Area (square miles)*							
	Ni‘ihau/ Ka‘ula	Kaua‘i	O‘ahu	Moloka‘i	Maui	Lāna‘i	Kaho‘olawe	Hawai‘i
Total Coral/Hard Bottom	38.1	64.6	110.3	45.0	39.7	10.2	5.1	40.5
Sand	5.6	21.5	24.7	19.7	38.2	5.4	2.4	7.8
Mud	0.0	0.6	19.1	2.4	0.3	0.0	0.0	2.0
Artificial	0.0	0.2	1.8	0.8	0.1	0.0	0.0	0.1
Total Coral Reef Area	**43.7**	**86.9**	**155.9**	**68.0**	**78.2**	**15.7**	**8.2**	**50.4**

Table 11. Coral reef habitat classes in Hawai‘i.
Source: *Adapted from http://ccma.nos.noaa.gov/products/biogeography/Hawai‘i_cd_07/*

Table 12 describes the major habitat types on each of the populated Hawaiian Islands. The major biological cover types in the nearshore environment include coral, macroalgae, coralline algae, seagrass, turf, emergent vegetation or uncolonized cover (Battista et al. 2007). The area in which each biological cover type constitutes the major cover type (with at least 10% the cover type present) is shown. Uncolonized habitat has less than 10% of any biological cover type and is usually sand or mud structures. Figure 13 and Figure 14 illustrates examples of habitat types throughout the populated Hawaiian Islands.

Major Biological Cover Type	Major and Detailed Habitat Class Area (square miles)							
	Niʻihau/ Kaʻula	Kauaʻi	Oʻahu	Molokaʻi	Maui	Lānaʻi	Kahoʻolawe	Hawaiʻi
Coral	1.90	25.90	21.89	12.51	21.58	5.79	4.02	28.84
Macroalgae	0.08	19.22	38.15	22.39	27.72	4.63	0.00	0.77
Coralline Algae	0.23	0.35	1.85	0.04	0.27	0.04	0.00	0.58
Seagrass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turf	92.80	19.42	51.27	18.46	12.12	2.01	1.70	10.04
Emergent Vegetation	0.00	0.11	0.69	1.74	0.00	0.00	0.00	0.00
Uncolonized	5.60	21.74	40.27	11.78	16.25	3.28	2.47	9.69
Total Cover by Island	100.61	86.74	154.13	66.91	77.95	15.75	8.19	49.92

Table 12. Coral reef biological cover classes.
Source: *Adapted from* http://ccma.nos.noaa.gov/products/biogeography/Hawaiʻi_cd_07/

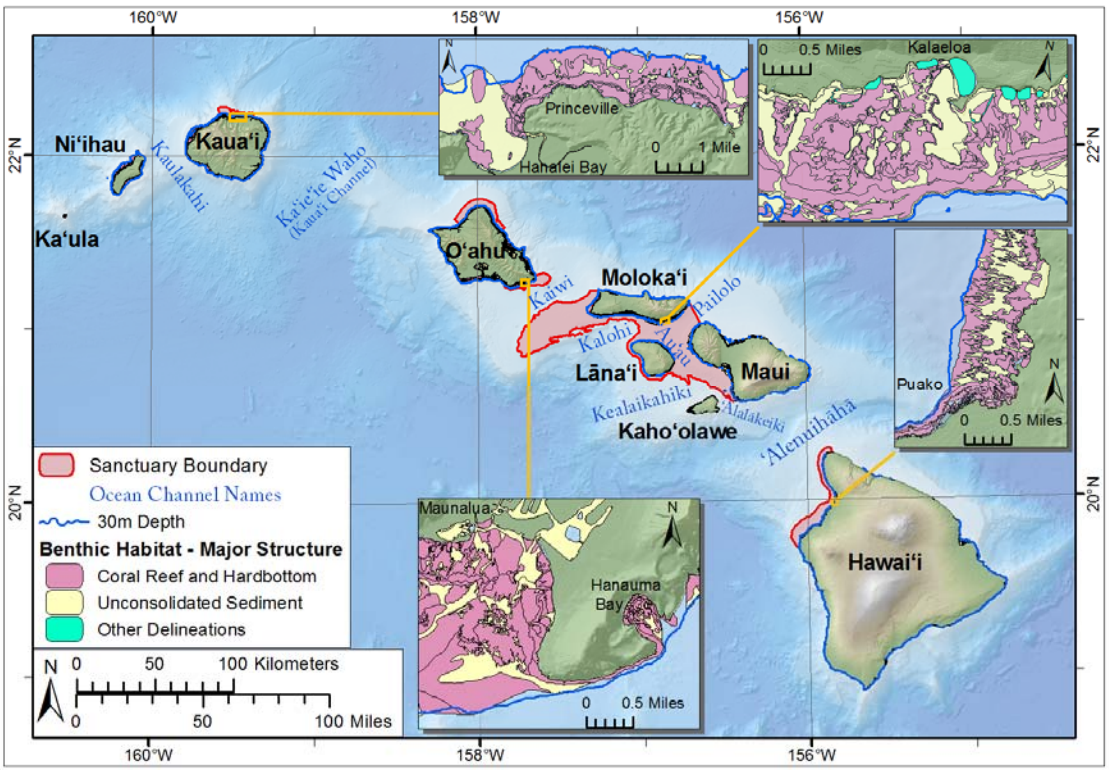


Figure 13. Examples of nearshore benthic habitat structure.
Source: *Hawaiian Islands Humpback Whale National Marine Sanctuary 2013.*

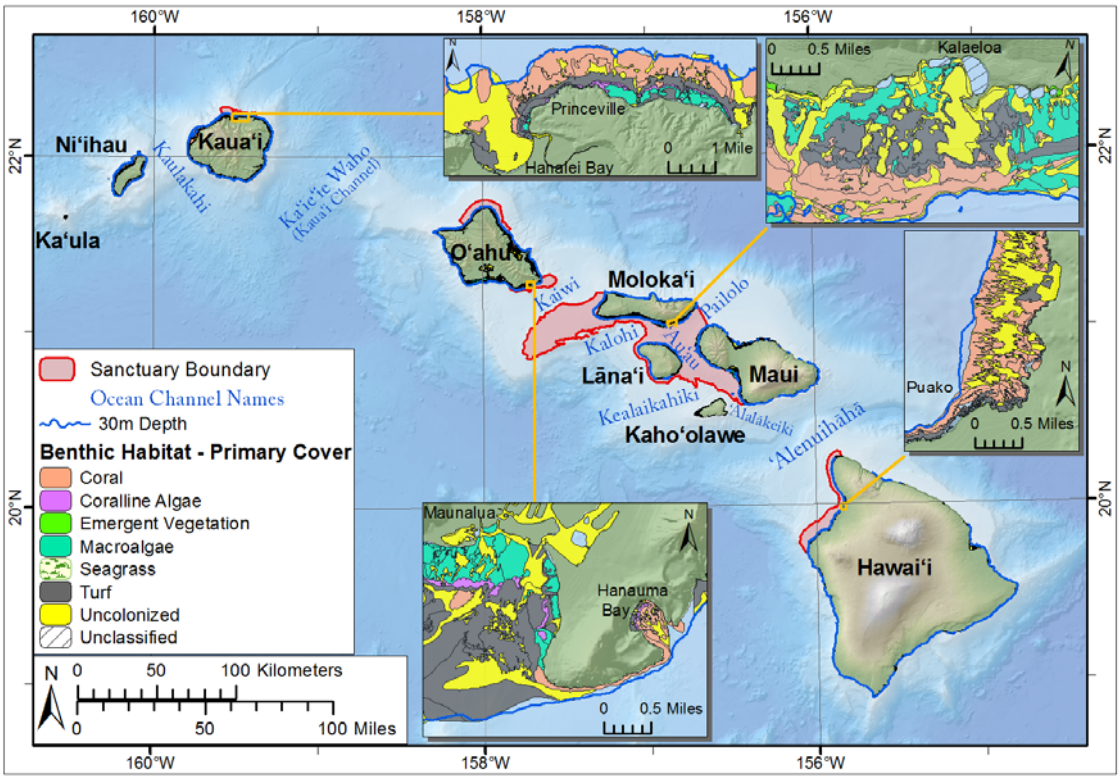


Figure 14. Examples of major and detailed nearshore habitat classes.
Source: *Hawaiian Islands Humpback Whale National Marine Sanctuary 2013.*

7.1.1.1. Coastal and Shoreline Areas

Intertidal zones found along the shoreline are the physical areas along the shoreline that are covered by water during high tide and waves. The tidal range in the populated Hawaiian Islands is relatively small and can vary by the bathymetry of the location. While extreme tides can reach 3 feet, on average the tides don't fluctuate more than 2 feet. In spring when extreme low tides are observed, intertidal habitats and some shallow reefs and rocks can be exposed to the air and direct solar effects for periods of hours. In addition, wave action can splash seawater above the upper tidal limits and create a habitat called the splash zone. This zone provides unique habitat because any plants or animals that live in this zone must

be able to tolerate periodic exposure to air and direct sunlight and variations in temperature. Many organisms live in the intertidal and splash zones including species of red, brown, and green algae, species of fish including gobies, and benthic invertebrates such as Nerite snails (Pipipi), limpets (‘Opihi), barnacles, tube snails, crabs, and sea slugs. The specific range of sedentary and mobile invertebrates in the intertidal area may be controlled by the ranges of predators, competing species, and their physiological limits and varying temperature and desiccation tolerances. Fish in intertidal habitats are limited to tide pools or passing through the intertidal zone at high tide. Additionally, shorebirds forage in the intertidal at low tide, while some roost in aggregations on cliffs just above the shore. Hawaiian monk seals as well as sea turtles often haul out to rest or bask in shoreline areas.

7.1.1.2. Estuaries

An estuary is an area of brackish water between a body of coastal freshwater and the open ocean. Freshwater inputs into estuaries are major sources of sediment and nutrients to the open ocean and therefore can be very productive ecosystems. Only distinct groups of species can tolerate these variable conditions and use estuaries as a habitat. Some species that commonly live in freshwater and saltwater may also live in estuaries depending on whether the conditions are suitable for the species. Species of endemic and indigenous freshwater fish (such as gobies) and invertebrates (such as shrimp and snails) have lifecycles in freshwater bodies, estuaries and the open ocean. In addition, estuaries are habitat for many endemic and indigenous marsh and shore birds. Many Native Hawaiian fishponds were originally built in estuary habitats.

7.1.1.3. Seagrass

There are two species of seagrass in Hawai‘i, *Halophila hawaiiana* and *Halophila decipiens*. *Halophila hawaiiana* is an endemic species of seagrass that is only found in Hawai‘i in soft bottom or sandy habitats. The blades of Halophila are generally 1-2 inches (2-5 cm) length so meadows of these sea grasses do not create the same kind of habitat that many other seagrass species do in other parts of the world. However Halophila do provide microhabitats for many species of algae and invertebrates (McDermid et al. 2003). The Hawaiian green sea turtle (*Chelonia mydas*) is known to feed on seagrass in Hawai‘i and the endemic snail *Smaragdia bryanae* is a specialist herbivore on *Halophila hawaiiana* (Unabia 2011). Seagrass provides many ecological services including stabilizing bottom sediments and particulate matter, providing food for grazers and detritivores, serving as shelter for small invertebrates and processing nutrients.

7.1.1.4. Sandy, Hard and Rubble Subtidal Habitat

Subtidal habitat generally ranges between 0-100 feet (0-30 m) and includes softbottom, rubble and hard substrate. Each substrate type supports different communities of species. Softbottom habitats in Hawai‘i are generally composed of calcium carbonate sand, volcanic sand or other land sourced soils or mud. Softbottom habitats support two species of seagrass, *Halophila hawaiiana* (endemic) and *Halophila decipiens*, as well as native and introduced macroalgae. Halimeda spp. green macroalgae are a typical component of sandy habitats (Macintyre et al. 1987). The introduced green macroalgal species *Avrainvillea amadelpha* grows in sandy habitats and competes with native algae and seagrass for space and resources (Peyton 2009). Sand dwelling species include crabs, goby fish, bonefish, flounder, scorpion fish, sting rays, and sea cucumbers.

Hard bottom substrate is generally composed of volcanic basalt or calcium carbonate biologically derived material. Coral reef organisms such as coral, crustose coralline algae and other calcifiers are the major contributors of hard bottom material. Hard bottom substrates provide the relatively stable structure that many species need to attach and become established on the bottom of the ocean. Coral, crustose coralline algae as well as other kinds of algae, many invertebrates and fish species are all associated with hard bottom substrate. Rubble habitats generally consist of pieces of volcanic or calcium carbonate rock that can be either or both permanently fixed or perpetually moved by waves and currents overlying soft or hard bottom substrate. Many of the same species from soft and hard bottom habitats also live within rubble habitats. However the motion of rubble can damage and thus reduce the number of hard bottom specific species. The shallow subtidal zone includes many coral reef habitats and provides major habitat for photosynthetic coral reef organisms as well as fish and other invertebrates in Hawai‘i.

7.1.1.5. Shallow Coral Reefs and Reef Slope

Reef flats are generally nearshore and relatively shallow (0-100 feet or 0-30 m). They are mainly constructed of calcium carbonate skeletons of coral and coralline algae and support a diversity of algae, fish, coral and other invertebrates. Reefs generally slope down from the reef flat and reef crest to depths about 80-100 feet (25-30 m). The reef slope (fore reef) provides habitat for a variety of communities because light, currents and other physical parameters vary by depth, and are often more or less optimal for different benthic communities. The most common coral species in Hawai‘i are the endemic Finger coral (*Porites compressa*), Rice coral (*Montipora capitata*), Lobe coral (*Porites lobata*), and Cauliflower Coral (*Pocillopora meandrina*; Friedlander et al. 2008).

7.1.1.6. Banks, Drowned Reefs, and Seamounts

Banks, drowned reefs, and seamounts are generally found at depths of 100-500 feet (30-150 m) and provide a variety of fish habitats, sustain ecological communities, and enhance ocean mixing. Banks are undersea hills, separated from the major land masses, like islands during rifting, compression, and other geological events. Drowned reefs are coral reefs that could not maintain vertical growth to keep up with rising sea levels, and die as a result of lack of sunlight. Seamounts are underwater volcanic mountains, rising from submerged lands, and occur throughout all ocean basins (Wessel et al. 2010).

Fish distribution across these habitats is affected by depth, substrate type, and composition. Deep-slope fisheries typically occur between 328 feet (100 m) and 1640 feet (500 m), with a rapid decrease in species richness typically occurring between 656 feet (200 m) and 1312 feet (400 m). Most bottomfish are associated with hard substrates, holes, ledges, or caves (Chave and Mundy 1994) and are not believed to migrate between isolated seamounts. Taylor column eddies (eddies that form above seamounts) are believed to retain pelagic larvae, though seamount populations of snappers and groupers apparently rely on inputs of larvae from external sources (WPFMC 2009).

Surface irradiance is much reduced at these depths but the small amount of sunlight is sufficient to support some photosynthetic organisms. While most reef-building corals live within 100 feet (30 m) of depth, some assemblages of reef-building coral species are known to thrive at mesophotic depths of generally 100-500 feet (30-150 m). The coral that grows at these depths can form extensive reef ecosystems such as in the Auʻau Channel and at Penguin Bank in the populated Hawaiian Islands. In addition black and precious corals also grow at these depths. In the ʻAuʻau Channel area there are also extensive meadows of green seaweed (*Halimeda sp*.) which serve as habitat for small fish (Friedlander et al. 2008). These habitats are just starting to be explored within the mesophotic waters of the Hawaiian Islands.

7.1.1.7. Pelagic and Deep Ocean

Deep water habitats (>500 feet or 150 m) are generally too deep for light to penetrate and have either basalt or carbonate hard bottom substrate on slopes and assemblages of sediment on flat surfaces. There are few or no plants other than phytoplankton in deep ocean habitats. Deep sea animals include zooplankton, fish, squid, precious coral and other invertebrates. Pelagic organisms include phytoplankton, zooplankton, fish, squid, marine mammals, and sea turtles. While humpback whales may explore these depths, they are generally found in waters less than 600 feet (200 m) deep.

7.1.2. Marine Species

The sanctuary is home to a variety of marine species including invertebrates, fishes, turtles, and marine mammals. Although the sanctuary currently only protects humpback whales and their habitat, the sanctuary is proposing an ecosystem-based management approach that would seek to support and conserve all marine species and their habitats. The following section provides an overview of some of the marine species that could benefit from additional protection either through sanctuary management actions or additional regulations under the National Marine Sanctuaries Act (NMSA).

7.1.2.1. Protected Marine Species

Protected marine species include those afforded special protection by the state and federal governments. Federal protection for protected marine species is afforded primarily through the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). The ESA provides measures to conserve and recover a designated list of species. NOAA's National Marine Fisheries Service (NOAA Fisheries) is charged with implementation of the ESA for all marine animals in Hawaiʻi, and shares responsibility with the U.S. Fish & Wildlife Service (USFWS) for sea turtles. The ESA defines endangered species as "any species which is in danger of extinction throughout all or a significant portion of its range" and threatened species as "any

species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (ESA; 7 U.S.C. § 136, 16 U.S.C. § 1531 *et seq*.).

The State of Hawai'i automatically lists any species that is listed on the federal Endangered Species List on the State Endangered Species List and provides these species with state protection in addition to federal protection (ESA; 7 U.S.C. § 136, 16 U.S.C. § 1531 *et seq*.). Currently there are no additional species protected under state law. The ranges of 13 threatened and endangered marine species overlap with the Hawaiian Islands Exclusive Economic Zone (EEZ), which extends to 200 nautical miles offshore. These include the endangered Hawaiian monk seal ('īlioholoikauaua, *Neomonachus schauinslandi*), five endangered baleen whale species (blue-*Balaenoptera musculus*, fin-*Balaenoptera physalus*, humpback, sei-*Balaenoptera borealis*, right- *Eubalaena japonica*), two endangered toothed whale species (insular false killer and sperm whale), three endangered turtle species (hawksbill-*Eretmochelys imbricata*, leatherback-*Dermochelys coriacea*, and olive ridley-*Lepidochelys Belolivacea*), and two threatened turtle species (green- *Chelonia mydas,* and loggerhead-*Caretta caretta*).

Three coral species with ranges overlapping the Hawaiian Islands EEZ have been proposed for "threatened" status under the ESA. Two of the three species are found in the Hawaiian Islands Humpback Whale National Marine Sanctuary: ringed rice coral (puna kea) and Hawaiian reef coral. These are groiupings of several previously recognized species including *Montipora patula/verrili* and *Montipora dilitata/flabellata/turgescens* respectively. The third species proposed for listing, staghorn coral (*Acropora paniculata*)*,* is found only at French Frigate Shoals, in the northwestern Hawaiian Islands.

Additional ESA petitions are at various stages of review by NOAA, including petitions to list scalloped hammerhead sharks (mano kihikihi, *Sphyrna lewini*), great white sharks (*Carcharodon carcharias*, blue-green damselfish (*Chromis viridis*), and Hawaiian damselfish (*Dascyllus albisella*). These are candidate species whose range also overlaps the Hawaiian Islands EEZ. The ESA defines a candidate species as "any species being considered by the Secretary for listing as an endangered or threatened species, but not yet the subject of a proposed rule" (ESA; 7 U.S.C. § 136, 16 U.S.C. § 1531 *et seq*.). Petitions are also under review to delist the green sea turtle and the humpback whale.

All marine mammals are protected under the Marine Mammal Protection Act (MMPA) administered by NOAA Fisheries and USFWS (see Appendix A). The MMPA exempts incidental take of marine mammals for commercial fisheries operations except when fisheries are

regulated by Take Reduction Team or take ESA-listed marine mammals. Fisheries regulated by Take Reduction Team must follow the applicable Take Reduction Plan regulations. Fishermen must also report any incidental take of marine mammals and accomodate any required observers. NOAA Fisheries issues permits to take ESA-listed marine mammals for commercial fisheries interacting with ESA-listed marine mammals. NOAA Fisheries also issues scientific research permits and certain exemptions under the MMPA.

In addition to the ESA-listed marine mammal species listed in Appendix A, additional species of marine mammals may occur within the Hawaiian Islands EEZ and are protected under the MMPA including Bryde's whale (*Balaenoptera edeni*), Minke Whale (*Balaenoptera acutorostrata*), Blainsville beaked whale (*Mesoplodon densirostris*), Common bottlenose dolphin (*Tursiops truncatus*), Cuvier's beaked whale (*Ziphius cavirostris*), Fraser's dolphin (*Lagenodelphis hosei*), Longman's beaked whale (*Indopacetus pacificus*), Melon-headed whale (*Peponocephala electra*), Pygmy sperm whale (*Kogia breviceps*), Dwarf sperm whale (*Kogia sima*), Risso's dolphin (*Grampus griseus*), Rough-toothed dolphin (*Steno bredanensis*), Short-finned pilot whale (*Globicephala macrorhynchus*), Spinner dolphin, Pantropical spotted dolphin, Pygmy killer whale (*Feresa attenuata*), Killer whale (*Orcinus orcus*), and the Striped dolphin (*Stenella coeruleoalba).*

The Migratory Bird Treaty Act (MBTA) prohibits the killing or taking of migratory birds. USFWS is responsible for implementing this federal prohibition, which protects seabirds, their eggs, and their nests. However, NOAA's National Marine Fisheries Service also has statutory authority and responsibilities to reduce the effects of fisheries bycatch and manage seabird habitat within the U.S. EEZ (Rivera et al. 2009).

7.1.2.2. Humpback Whales (koholā, koholā kuapiʻo, palaoa)

Sanctuary management has always focused on the protection of humpback whales. Under the proposed ecosystem-based management approach, humpback whales would continue to be a focus of sanctuary conservation and management activities. Humpback whales occur throughout the world in both coastal and open ocean areas. They typically migrate between tropical and sub-tropical latitudes to temperate and polar latitudes. Tropical areas are occupied during winter

months when the humpback whales engage in mating and the females bear their young. Humpback whales are not known to extensively feed in wintering grounds, although opportunistic feeding has been observed (*e.g.* Salden 1990). Polar areas are occupied in the spring, summer, and fall months when feeding occurs.

History and Culture of Koholā (whale)

The Koholā (whale) was well known to the early Hawaiians. In the Kumulipo chant, the Hawaiian chant of creation, the Second Era speaks of the birth of the whale:

Hanau ka palaoa noho I kai
Born is the whale living in the ocean

The pauku, or poetic passages, address the familiar scene in native Hawaiian culture of whales travelling through the 'Alalakeiki Channel between Maui and Kahoʻolawe. The whale is the largest ocean form, and a majestic manifestation of Kanaloa. From the ivory of this creature, the highly prized niho palaoa was worn by the aliʻi (chiefs) of high rank. The scarcity and beauty of the niho lei palaoa and its connection to Kanaloa brought mana (spiritual power) to the carver, to the pendant itself, and eventually to the wearer of the pendant. The Aliʻi who possessed this kinolau or body form of the great god, would themselves acquire the characteristics, intelligence, and knowledge of the god. Therefore, it would be advantageous for any Aliʻi to secure the ivory whale tooth of this Kanaloa body form (Maxwell 1996).

Prior to commercial whaling, the worldwide population of humpback whales is thought to have been in excess of 125,000 (US DOC NOAA 1991). Between 1905 and 1960, intense commercial whaling operations targeted humpback whales worldwide. In 1966, treaties under the International Whaling Commission protected humpback whales from further harvesting by whaling operations. Based on whaling records, Rice (1977) estimated that abundance of humpback whales in the North Pacific was approximately 15,000 prior to 1905. However, the Russian President for Ecology and Health confirmed that the Soviet Union was illegally killing thousands of endangered humpback whales and other great whales in the southern Hemisphere and perhaps the North Pacific and North Atlantic during the 1960's after the ban had been in effect (Yablokov 1994).

Humpback whale abundance near the Hawaiian Islands was estimated to be as low as 895 in 1977-1979 (Darling et al. 1983). Abundance estimates continued to increase in additional studies over time to the most recent 2004-2006 estimate of 10,000 humpback whales breeding near the Hawaiian Islands (Barlow et al. 2011). The current population of humpback whales (central North Pacific stock) that use Hawaiʻi's waters as their principle wintering ground currently likely lies between 10,000 and 15,000 animals, although not all of these animals are in Hawaiʻi at the same time during the season. Although collecting scientific information about abundance, distribution, and trends can be expensive and difficult, new studies are beginning to find ways to use citizen monitoring and other methods to address these kinds of questions while accounting for the biases inherent in such approaches (*e.g.* Tonachella et al. 2013).

Koholā (whale)

The people of Hawaiʻi had many names for different rains, oceans, environments, and animals. One traditional name for whale is "palaoa", but it is not the only name given to whales. The Hawaiian language is very descriptive and over time, new names can arise through different descriptions. The word "kohola" is used to describe reef flats. The wave action on reef flats is similar to a whale's blow, so "kohola" or "koholā" also means whale. Recently, an additional descriptive word "kuapiʻo" has been identified to mean humpback or arched back, so "koholā kuapiʻo" is another name for humpback whales (Komike Huaʻolelo 1998).

NOAA Fisheries is currently conducting a world-wide status review of humpback whales to evaluate abundance and potential for downlisting or delisting under the Endangered Species Act. Downlisting or delisting humpback whales would not impact their protection under the Marine Mammal Protection Act or in the Hawaiian Islands Humpback Whale National Marine Sanctuary.

7.1.2.3. Hawaiian Spinner Dolphins (nai‘a)

The spinner dolphin (*Stenella longirostris*) is a small cetacean species found in tropical waters worldwide. Named for their impressive aerial acrobatics, adult spinner dolphins generally grow to 6-7 feet in length and weigh approximately 120-170 pounds (NMFS Office of Protected Resources 2010). Throughout tropical waters, spinner dolphins are associated with inshore waters, islands, or banks (Hammond et al. 2008). The Hawaiian spinner dolphin is recognized within the subspecies *Stenella longirostris longirostris* and is considered a separate race of spinner dolphins (Perrin 1998).

History & Culture of Nai‘a (dolphins)

Nai‘a appear in the Hawaiian cosmology, specifically in a mele (song) recounting the genealogy of the main Hawaiian Islands. In this cosmology, the first nai‘a (dolphin) resulted from a mating between Papa, or Papahānaumoku (Earth Mother) and Kanaloa, the god of the ocean (Ka Hae Hawaii 1860):

Kahea o Papa ia Kanaloa,
Papa calls upon Kanaloa
I hanau ia he punua he naia,
Born is a fledgling, a porpoise
He keiki ia na Papa i hahanau,
A child indeed given birth by Papa
Haalele o Papa, hoi i Kahiki,
Papa departs, returning to the ancient homelands of Kahiki
Hoowawa, wawaka, nihoniho,
The murmuring and chatter about her departure prevail, they
Hoia Kahiki, hoia Kahiki, Kapakapa kaua,
chide and chastise Papa
Moe o Wakea, Moe ia Kaulawahine,
She returns to Kahiki, Kahiki in the unceasing patter of the rain
Hanau o Lāna‘i, Keiki makahiapo a ia wahine,
Wakea continues his quest and sleeps with Kaulawahine
Hoi ae o Wakea, Loaa o Hina,
Born is Lāna‘i, firstborn of this woman (Kaulawahine)
He wahine moe na Wakea,
Wakea retreats momentarily, unti Hina is foud
Hapai o Hina ia Molokai, he moku,
She is for the pleasure of Wakea
O Molokai a Hina ke keiki moku,
Hina conceives Molokai, an island

Hawaiian spinner dolphins are common throughout the Hawaiian Archipelago and within the Hawaiian Islands Humpback Whale National Marine Sanctuary waters. High density areas of Hawaiian spinner dolphins include the waters along the Kona coast of the island of Hawai‘i and the southern and western shores of O‘ahu (Lammers 2004). During the day, Hawaiian spinner dolphins are typically found close to shore in shallow wind-sheltered coves and bays. Shallow coves and bays near the shore provide safe habitat for spinner dolphins to rest during the day. Hawaiian spinner dolphins feed primarily at night by foraging on small mesopelagic fish, shrimp, and squid (Lammers 2004).

There are approximately 1,500 Hawaiian spinner dolphins in the populated Hawaiian Islands and an estimated 3,350 in Hawaiian waters (Barlow 2006). Research suggests that Hawaiian spinner dolphins may consist of smaller subpopulations associated with different islands. In particular, a population genetics study suggests that limited exchange occurs between the spinner dolphin populations that inhabit the waters of each of the populated Hawaiian Islands (Andrews et al.

2006). The study demonstrates that there is little gene flow between spinner dolphin populations associated with each island, which allows for the possibility to divide the Hawaiian spinner dolphin population into distinct population segments. Further support for this distinction of populations comes from a study that demonstrates great site fidelity for at least some Hawaiian spinner dolphins in nearshore habitats (Marten et al. 2006) and a study that demonstrates different social behaviors in different regions in the Hawaiian Archipelago (Andrews et al. 2010).

Spinner dolphins, as a species, are not considered endangered or threatened under the Endangered Species Act and are not considered depleted under the Marine Mammal Protection Act. One exception, however, is the subspecies of eastern spinner dolphins (*Stenella longirostris orientalis*), which is considered a depleted stock under the MMPA due to frequent takes by the eastern tropical Pacific purse-seine tuna fishing industry (Southwest Fisheries Science Center 2002). While Hawaiian spinner dolphins, like most spinner dolphins, are not considered endangered, threatened, or depleted, it may be the case that one or more of the island-associated subpopulations of Hawaiian spinner dolphins suffer greater threats than the entire population of Hawaiian spinner dolphins (*e.g.* from wildlife viewing tours).

7.1.2.4. Hawaiian Monk Seal (ʻīlioholoikauaua)

The Hawaiian monk seal (ʻīlioholoikauaua, *Neomonachus schauinslandi*) is a critically endangered species that is endemic to the Hawaiian Islands. Only one other species of monk seal still exists today, the Mediterranean monk seal. The Caribbean monk seal was last sighted in 1952 and is believed to be extinct. Hawaiian monk seals are pinnipeds that typically grow to 7 feet in length and weigh 400-600 pounds. Individuals generally live between 20 and 25 years and consume a diet consisting of bottom-dwelling and reef fish, eels, octopus, squid and crustaceans (HIHWNMS 2010).

According to studies on the diet of Hawaiian monk seals in the Northwestern Hawaiian Islands, Hawaiian monk seals are opportunistic predators that feed on a variety of prey, including coastal, benthic, and offshore-mesopelagic species (Goodman-Lowe 1998). Hawaiian monk seals inhabit the waters and beaches of the populated Hawaiian Islands and the Northwestern Hawaiian Islands. In total, the population is estimated to be only 1100-1200 individuals with a little over 10% of individuals inhabiting the populated Hawaiian Islands. The overall species decline is being driven by extremely poor junvenile survival in the Northwestern Hawaiian Islands due to food competition with large apex predatory fish (e.g., sharks and ulua), entanglement in marine debris, unusual shark predation at one sub-population, and other factors. However, a small population of Hawaiian monk seals has been slowly increasing in the main Hawaiian Islands,

including in the waters of the Hawaiian Islands Humpback Whale National Marine Sanctuary, especially the islands of Kaua‘i, Moloka‘i and O‘ahu. Less competition with large predatory fish, like sharks and ulua (both hunted down by humans), and a higher survival rate of pups make the shores of the populated Hawaiian Islands ideal habitat for monk seals, with some terrestrial and marine areas likely to be designated as critical habitat for monk seals in the near future (Endangered and Threatened Species 2009). However, habitats in the populated Hawaiian Islands may also pose several threats to Hawaiian monk seals, particularly disease transmission from humans, pets, livestock, and feral animals (Littnan et al. 2006).

As a critically endangered species, the Hawaiian monk seal suffers from a variety of threats that have collectively undermined population recovery efforts. The major threats to Hawaiian monk seals include entanglement in marine debris, effects from human interaction, death or injury from vessel strikes, death from infectious disease, genetic effects of small population size, fitness loss due to food limitation, death by predators, and effects of climate change.

7.1.2.5. Sea Turtles (honu, ea)

Sea turtles are commonly found in the waters surrounding the populated Hawaiian Islands as well as the Northwestern Hawaiian Islands. The most commonly found species of sea turtles are the green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricate*), leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), and olive ridley turtle (*Lepidochelys olivacea*). Of these species that inhabit the populated Hawaiian Islands, the loggerhead turtle, leatherback turtle, and hawksbill turtle are endangered while the green turtle and olive ridley turtle are listed as threatened under the Endangered Species Act.

Green turtles are the most common of the sea turtles that inhabit the populated Hawaiian Islands. The

History and Culture of Honu (sea turtles)

When exploring the role of sea turtles in Hawaiian culture, we find Hawaiians possessed significant knowledge of the varieties of sea turtles that are found in Hawai‘i, including native and foreign species. Sea turtles are mentioned in the fourth wā, the fourth era of the Kumulipo.

Hānau ka pō
The darkness of the sea gives birth
Hānau ka pō ia mili nanea
The darkness of the sea gives birth to the cherished ones
Kuka‘a ka pō ia ki‘i nana‘a
The darkness of the sea is swollen as if a protruding statue
Hānau ka pōia honu kua nanaka
The darkness of the sea gives birth to the green sea turle
Kūlia ka pō ia ‘ea kua neneke
The darkness of the sea sets forth the hawkbill turtle

Honu or Hawaiian sea turtles played many roles in traditional Hawaiian culture. Hawaiian language resources reveal that turtles were used as a source for food and medicine. Sea turtles also influenced social behavior and cultural activities. References to honu appear in hula, traditional dance, and recreation activities.

green turtle inhabits the nearshore waters of the populated Hawaiian Islands with important foraging areas along the coastlines of Oʻahu, Molokaʻi, Maui, Lānaʻi, and Hawaiʻi Island (HIHWNMS 2007). Green turtles occur in the coastal waters surrounding the populated Hawaiian Islands, primarily from shore to the 55-fathom isobaths. They are found here throughout the year and also migrate seasonally to the Northwestern Hawaiian Islands to reproduce. Specific habitat includes convergence zones in the ocean, oceanic beaches for nesting, and benthic feeding grounds in coastal areas.

The green turtle feeds primarily on macroalgae and sea grasses, though specific diet varies depending on an individual turtle's life history stage (Arthur et al. 2008). The coastlines of Oʻahu, Molokaʻi, Maui, Lānaʻi, and Hawaiʻi Island and the Johnston Atoll in the Northwestern Hawaiian Islands are especially important foraging areas for green sea turtles, as these areas are rich in algae pastures (HIHWNMS 2007). Specific foraging grounds in the populated Hawaiian Islands include Kāneʻohe Bay, Palaʻau, Kiholo Bay, and Punaluʻu Bay (Dutton et al. 2008).

Research of green sea turtles in the populated Hawaiian Islands suggests that Hawaiian green sea turtles are genetically distinct from other populations of green sea turtles in the Pacific Ocean. Green sea turtles that forage in the Hawaiian Archipelago comprise one genetic stock primarily derived from the nesting population at French Frigate Shoals. Only three of the turtles sampled from the French Frigate Shoals contained unique haplotypes, which indicates that the Hawaiian population is rarely visited by turtles from rookeries outside the Hawaiian Archipelago.

The hawksbill turtle is less commonly sighted in the populated Hawaiian Islands, as it is a highly migratory species and nesting areas are widely distributed. Hawksbill turtles are small to medium-sized compared to other sea turtle species, but can weigh up to 200 pounds. The diet of hawksbill turtles consists of a combination of plant and animal material, including primarily sponges and other invertebrates. Hawksbill turtles typically find their food by foraging at or near the sea floor and in coral reefs.

Hawksbill turtles may have important habitat in the populated Hawaiian Islands even they are not commonly sighted there. Hawksbill turtles are not known to inhabit the Northwestern Hawaiian Islands. Hawksbill turtles typically inhabit healthy coral reefs, though their main habitat depends on their life history stage. Over the life history of a hawksbill turtle, individuals occupy a range of habitats including coral reefs, hard bottom habitats, sea grass, and algal beds. Kamehame, a small island on the southeastern coast of the island of Hawaiʻi, is an important nesting habitat for hawksbill turtles and hosts a major portion of all hawksbill nesting in the Hawaiian Archipelago (Balazs et al. 1996). Other nesting areas on the islands of Hawaiʻi, Maui, Molokaʻi, and Oʻahu have been identified (HIHWNMS 2007).

The leatherback, loggerhead, and olive ridley turtles are less commonly sighted in the populated Hawaiian Islands but still inhabit the offshore areas. The leatherback turtle is an offshore species of turtle that is typically found in deep waters off the Hawaiian Islands. As individuals can weigh up to 2,000 lbs., the leatherback turtle is the world's largest turtle. Leatherback turtles do not nest in the Hawaiian Archipelago, but individuals inhabit the offshore waters of the populated Hawaiian Islands (HIHWNMS 2007).

Loggerhead turtles characteristically have large heads and powerful jaws. The habitat of loggerhead turtles depends on its life history stage, as loggerhead turtles occupy the terrestrial, oceanic, and neritic zones at different points during their lives. Loggerhead turtles do not nest in the Hawaiian Islands, but frequent the waters surrounding the populated Hawaiian Islands. Significant numbers of loggerhead turtles have been caught by the Hawai'i-based longline fishery (FWS and NOAA 2010).

Olive ridley turtles are a highly migratory species of sea turtle that are rarely found in Hawaiian coastal waters. However, olive ridley turtles are the most commonly caught turtle species in offshore fishing operations in the Hawaiian Archipelago (NMFS 2007). The olive ridley turtle is relatively small and is considered the most abundant sea turtle in the world. Despite its abundance, all populations of the olive ridley turtle are either threatened or endangered under the Endangered Species Act. Olive ridley turtles are omnivores and typically consume algae, lobster, crabs, mollusks, and fish. Research on olive ridley turtles caught in the Hawai'i-based longline fishery indicates that their most common prey are pyrosomes and salps (Polovina et al. 2004).

7.1.2.6. Seabirds

While not always considered part of the ocean environment, seabirds are true marine organisms, as they are completely reliant on the sea for food and only come to land to breed. As the most visible marine species, seabirds are ideal ecosystem indicators because they are easy to monitor and indicate oceanographic variability at multiple spatial and temporal scales (Ballance 2007, Piatt et al. 2007). Seabirds are an established component of NOAA's ecosystem-based management approach because they reflect changes in ecosystem structure and function (Rivera et al. 2014).

In the populated Hawaiian Islands, there are 22 species of breeding seabirds (Harrison 1990). Tropical seabirds are opportunistic and feed on a wide variety of fish, squid, and crustaceans (Harrison 1990). Hawaiian seabirds are comprised of a diverse group of families including albatrosses, shearwaters, petrels, storm-petrels, frigatebirds, boobies, tropicbirds, terns, and noddies. They vary greatly in terms of abundance, with some species such as sooty terns being very numerous and widely distributed, whereas the listed species exhibit low numbers and limited distributions. The Hawaiian petrel (also known as dark-rumped petrel) (*Pterodroma sandwichensis*), was once the most abundant seabird on the populated Hawaiian Islands, and is now listed as endangered under

the Endangered Species Act (USFWS 2005). The other listed breeding seabird is the threatened Newell's shearwater (*Puffinus newelli*). Additionally, the short-tailed albatross is endangered, although it does not nest in the populated Hawaiian Islands, this species occurs within Hawaiian waters. A complete list of seabirds protected under the ESA and the MBTA can be found in Appendix A.

7.1.3. Water Quality

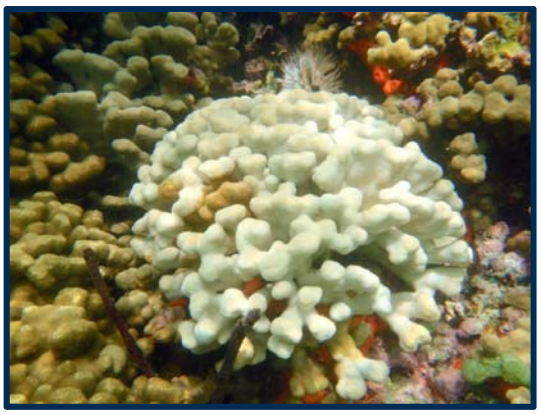
While water offshore around Hawaiʻi is remarkably clean, nearshore localized concentrations of pollutants occur near populated areas due to storm water discharges and permitted sanitary outfalls. A report on water quality monitoring and assessment is prepared annually by the Hawaiʻi Department of Health. In the 2012 report, a total of 225 impaired marine segments were listed. For these 225 marine segments, the breakdown per island (and the percent listed waters per island/per total number listed waters) is: Kauaʻi 23 (10%), Oʻahu 73 (32%), Molokaʻi 3 (1%), Lānaʻi 7 (3%), Maui 76 (34%), and Hawaiʻi 43 (19%) (Hawaiʻi Department of Health 2012). With 150 occurrences in the 2012 Integrated Report, turbidity is the most common pollutant in triggering a marine water listing for impairment, possibly due to polluted runoff. The Hawaiʻi Department of Health aims to make measurable improvements to its polluted runoff control program by focusing on selected watersheds (Hawaiʻi Department of Health 2012).

Hawaii's overall coastal water quality is rated "good" through the Water Quality Index (Environmental Protection Agency 2012) and Sediment Quality Index is rated "poor" by 2006 surveys. Overall the condition of waters including water quality and sediment quality is rated "fair." Overall there has been a decline in "good" water quality between 2002 and 2008 (Environmental Protection Agency 2012).

7.1.4. Threats to the Biological Environment

7.1.4.1. Coral Bleaching

When corals are stressed by changes in conditions such as temperature, light, or nutrients, they expel the symbiotic algae living in their tissues, causing them to turn white. This phenomenon is referred to as coral bleaching. When a coral bleaches, it is not dead. Corals can survive a bleaching event, but when they are highly impacted by other stressors, in addition to bleaching, they are subject to potential mortality. Usually, mass bleaching is associated with increased sea surface temperature (State of Hawaiʻi 2010). The first large-scale coral bleaching in the Hawaiʻi region occurred in 1996 predominantly in Kāneʻohe Bay on



the island of O‘ahu (Jokiel and Brown 2004). This bleaching event was attributed to increases in sea-surface temperature and high light during a cloudless period (Jokiel and Brown 2004). Mass bleaching was also documented in the Northwestern Hawaiian Islands in both 2002 and 2004 (Kenyon and Brainard 2006).

7.1.4.2. Coral Disease

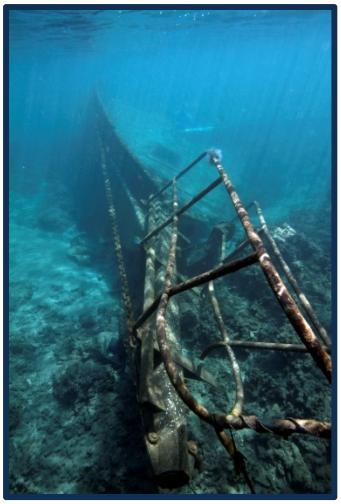
Infectious disease in coral, observed in the field as lesions or distinct bands of tissue loss, can be caused by bacteria, viruses, protozoa, or fungi (Harvell et al. 2007). Outbreaks of disease in corals may be aggravated or caused by the introduction of novel pathogens to an environment or shifts in environmental conditions. Water quality and habitat deterioration have also been identified as potential environmental drivers of coral disease (Harvell et al. 2007). As a natural aspect of populations, background levels of disease exist in all healthy reef ecosystems (Barnard and Scheske 2010).

Coral disease outbreaks have been documented in the Northwestern Hawaiian Islands (*e.g*. Aeby 2005). Variation in antibacterial activity in Hawaiian coral reefs may partly explain differences in disease susceptibility (Gochfeld and Aeby 2008). In a study of factors that may affect coral disease in Hawai‘i, Williams et al. (2010) found that environmental predictors showing the strongest overall associations with four coral diseases were both biotic and abiotic, including turbidity, declines in butterfly fish and juvenile parrotfish, and coral host cover. Different factors were predictive of different diseases, suggesting diseases need to be considered independently of one another. Aeby et al. (2011) conducted disease surveys at 78 sites near five of the populated Hawaiian Islands in 2004 and 2005. They found eight diseases in two genera (*Porites* and *Montipora*). Overall prevalence of disease in each coral genus was less than 2%.

A disease outbreak at Makua and Anini near Kaua‘i was reported in 2012. In investigating this outbreak, Work (2012a) reported that the reef at Anini had unusually low coral cover compared to a healthy reef, and 10-80% of *Montipora capitata* colonies included disease infected corals. The disease was co-incident with indicators of chronic stress, and cyanobacteria were commonly associated with lesions, with some corals suffering fungal infection. According to the Work (2012a) report, this was the first time a cyanobacterial/fungal disease on this scale has been documented in Hawaiian corals. Work (2012b) reported that, at the area on North Kaua‘i referred to as Tunnels, the same disease was found in both *Montipora capitata* and *Montipora patula* with cyanobacteria and fungus again associated with the disease. Work (2012b) goes on to state that understanding the factors precipitating this disease outbreak would require longitudinal studies and more systematic sampling over time.

7.1.4.3. Vessel Grounding

The nature and degree of the impacts and subsequent recovery of vessels grounded on coral reefs are not well understood (Schroeder et al. 2008). They can break and crush reef structure, reduce habitat complexity, kill corals and other benthic organisms, provide bare surfaces for colonization and can lead to discharge of oil, debris, and other point source pollutants (Precht et al. 2001). Benthic and associated fish assemblages may take years to decades to recover from groundings (Schroeder et al. 2008). Groundings at archaeological sites can destroy or bury historical and cultural artifacts under tons of steel and debris. Vessel fuel can smother and damage resources.



In 2000, the U.S. Coral Reef Task Force (CRTF) issued Resolution 5-1, recommending several actions including (1) requiring bonds from fishing vessels that transact business at U.S. ports adjacent to coral reefs; (2) developing legislation and a funding mechanism for vessel removal; (3) establishing national legislation for coral reef damage assessment to serve as a guideline for fines and restoration costs; and (4) developing federal assistance protocols for vessel damage assessment and removal. NOAA initiated several actions in response to this resolution, including collaborating with the U.S. Department of Justice, the USCG and Pacific Island jurisdiction through a Grounded and Abandoned Vessel Working Group to review legal and financial mechanisms for vessel removal from coral reef ecosystems, conducting two workshops on vessel grounding issues in U.S. Flag Pacific Islands and developing a database of grounded and abandoned vessels in coral reef ecosystems. Similar to impacts from grounding events, hazardous cargos, fuel, and possible unexploded ordinance inside metal hulls of slowly deteriorating shipwrecks may threaten marine resources.

An example of a serious grounding event in Hawai‘i was the grounding of the USS Port Royal Navy vessel near O‘ahu in 2009. Laura Thielen, chairwoman of the Hawai‘i State Board of Land and Natural Resources at that time, informed the United States Navy in a letter in April 2009 that the grounding had damaged six to ten acres (4.0 ha) of the reef and that the "main injury scar" covered about 9,600 square feet (890 m^2). Much smaller boats have also run aground on Hawai‘i’s reefs. For example, a 65 foot catamaran ran aground during a dinner cruise near Lahaina, Maui in December 2010. It is difficult to assess the full impact of these and other grounded vessels on Hawaii’s coral reef habitats. Approximately 160 groundings (including self-extractions and sunken vessels) are reported annually island-wide, and this is likely an underestimate because groundings for which boat operators are able to get the vessel free at high tide or with mechanical assistance often go unreported.

7.1.4.4. Climate Change

Climate change refers to variability in the climate of the earth. While climate change has occurred naturally for thousands of years, recent changes have been attributed to observed increases in human induced greenhouse gas concentrations (Crowley 2000). Global and regional changes to the marine environment may have significant consequences for biological and cultural resources. For example, Hawai‘i is expected to experience sea-level rise of one foot by 2050 and three feet by the end of the century, which poses significant economic, social, and environmental challenges (Codiga and Wager 2011). Increased sea level, extreme weather, changes in ocean salinity and oxygen levels, changes in precipitation, and marine organism range shifts are all potential effects of climate change (Bernstein et al. 2007). Increased greenhouse gases induce ocean acidification, which may negatively impact calcifying species, such as coral and coralline algae (Jokiel et al. 2008). Changing ocean temperature and ocean acidification are expected to have significant impacts on many marine species, food webs, and ocean ecosystem structure and function, and the many benefits they provide (National Ocean Council 2011). Sea-level rise, increased severe storm events, rapid erosion, changing ocean temperature, and saltwater intrusion present serious and growing threats (National Ocean Council 2011).

In the Hawaiian Islands, climate change has been identified as an important area of research and policy making. In July 2012, the Governor of Hawai‘i signed Act 286 that states that there is a significant need for sustained and enhanced climate monitoring and assessment. At the University of Hawai‘i, the Center for Island Climate Adaptation and Policy (ICAP) was formed to facilitate a sustainable, climate-conscious future for Hawai‘i, the Pacific, and global island communities (Codiga and Wager 2011). There are a wide variety of policy documents at federal, state, and local levels to address climate change adaptation, resiliency, and mitigation (e.g. Ocean Resources Management Plan Working Group 2009, Office of Environmental Quality 2010, U.S. Department of Commerce. National Oceanic and Atmospheric Adminstration 2010, Codiga and Wager 2011).

In Hawai‘i, climate change has begun to cause air temperatures to rise, sea level and sea surface temperatures to increase, and the ocean to become more acidic (Fletcher 2010). Overall rainfall has decreased resulting in a decrease of stream flow; however the intensity of individual rainfall events has increased which can result in flooding in some areas. Because these trends are likely to continue, scientists anticipate growing impacts to Hawai‘i’s water resources and forests, coastal communities, and marine ecology (Fletcher 2010). Carpenter et al. (2008) report that one-third of reef building corals worldwide face an elevated extinction risk from climate change and other impacts today, but they also state that Hawai‘i’s coral reefs have been less impacted by disease and bleaching than in many other areas. They point out that Hawai‘i is a very isolated archipelago with many rare and endemic coral species with potentially varying levels of adaptability and resilience. Pandolfi et al. (2011) suggest that although coral response to climate change thus far has been interpreted as indicating the extinction of coral reefs as we know them, there is variability in response and adaptability to climate change. They predict that reef degradation will occur with temporal and spatial heterogeneity, creating opportunity for building resiliency for reefs in the face of climate change by reducing other stressors.

The effect of climate change on the marine environment may also include changes in abundance, distribution, timing and range of migration, community structure, the presence and species composition of competitors and/or predators, prey availability and distribution, timing of breeding, reproductive success and, ultimately, survival of a variety of species (*e.g.* Heide-Jørgensen et al. 2011).

7.1.4.5. Entanglement

Marine mammals and sea turtles can become entangled in fishing gear and other marine debris, which can result in injury and even death (Mazzuca et al. 1998). From 2003 to 2007, there were 86 reports of human-related mortalities or injuries of humpback whales in the Central North Pacific stock that includes the approximately 10,000 humpback whales that breed in the Hawaiian Islands (Allen and Angliss 2012). Of these, 54 involved commercial fishing gear and 23 were considered lethal or likely to be lethal. The sanctuary participates in a collaborative

effort to study and respond to humpback whale entanglement. This effort, the Hawaiian Islands Large Whale Entanglement Response Network, includes state, federal, and local agencies, as well as whale researchers, tour operators, fishermen, and other citizens. The network was established in the 2001-2002 humpback whale season and has grown to over 230 members with various levels of training. Over 11 seasons, the network received 109 confirmed reports of humpback whales entangled in gear and three reports of other entangled large whales. This represents as many as 70 different animals (Lyman 2012).

7.1.4.6. Wildlife Approach & Interaction

Wildlife approach and interaction can lead to behavioral harassment or physical injury. Behavioral harassment refers to human activities that can affect the behavior of wildlife, thereby potentially affecting energy budgets and habitat use patterns, cause displacement from preferred habitats, and affect individual and population health and fitness. For example, swimmers and vessels have been documented harassing spinner dolphins in bays in Hawai‘i while dolphins are attempting to rest during the day (*e.g.* Danil et al. 2005, Courbis 2007, Courbis and Timmel 2009). The potential impacts of spinner dolphin harassment are considered serious enough that NOAA Fisheries published an intent to make regulations to reduce these impacts (US DOC NOAA 2005). It can be difficult to document physiological and population level responses to harassment that does not result in immediate or obvious injury. However, increases in human contact with dolphins has been shown to lead to habituation that can cause changes in dolphin behavior that potentially results in death (*e.g.* Stone and Yoshinaga 2000), and causes as much as double the normal rate of calf mortality in the first year of life (*e.g.* Mann et al. 2000). In the Hawaiian Islands, studies indicate that spinner dolphin behavior patterns may have changed over time as a result of increased swimmer and vessel activity in bays (Courbis and Timmel 2009). As a response to concern regarding harassment, the federal government prohibits approaching within 100 yards of humpback whales, but no such regulations are in effect for spinner dolphins and other Hawaiian wildlife.

Feeding wildlife is a type of harassment. Feeding can habituate animals, increase aggressive behavior, provide poor quality food compared to natural foraging foods, and make animals vulnerable to being fed inedible objects or approaching dangerous objects (like boat propellers). As a result of such concerns, shark feeding as part of commercial operations has been prohibited by the State of Hawai‘i (Haw. Rev. Stat. §188-40.6). Fish feeding for purposes other than fishing is prohibited in Marine Life Conservation Districts in the State of Hawai‘i (Haw. Adm. Rul. §13.4-60.3).

Attitudes toward wildlife can impact human behavior with respect to approach and interactions. Wiener et al. (2009) found that many visitors and commercial tour boat operators in the Hawaiian Islands dump food scraps, feed fish, trample coral, and harass marine life. However, Needham (2010) concluded that, based on surveys of 2,821 reef users in the Hawaiian Islands,

most reef users have a protectionist attitude toward reefs and want to conserve these ecosystems. Another recent survey conducted collaboratively by Honua Consulting, Department of Land & Natural Resources, and University of Hawai‘i indicated that visitors who want to experience the closest approaches to wildlife consider themselves to be the most environmentally oriented, suggesting that positive attitudes toward wildlife and the environment may actually encourage harassment (Jennifer Bernstein, University of Hawai‘i pers. comm.). In some cases, people consider harassment to be acceptable if animals have a “choice” to avoid harassment. This assumes that animals always make good “choices” with respect to their health and fitness, which is likely not the case, as evidenced by studies such as the ones described above indicating instances of increased dolphin calf mortality, as well as injury and adult death associated with interactions with humans. Although ecotourism and resident enjoyment of wildlife in the Hawaiian Islands is a valuable ecosystem service that provides aesthetic, cultural, and economic benefit, it is important to consider the impacts of these uses. As wildlife in Hawai‘i is one of the attractions for a large number of visitors, as well as Hawai‘i’s residents, it is important to develop sustainable wildlife viewing practices to minimize wildlife harassment.

7.1.4.7. Vessel Strike

Historical records indicate ship strikes fatal to whales first occurred in the late 1800’s as ships began to reach speeds of 13-15 kn (Laist et al. 2001). As number and speed of ships increased, so did the frequency of lethal ship strikes. They stated that humpback whales are commonly struck by vessels. From reviewing the literature on ship strikes, Laist et al. (2001) concluded that most lethal or severe ship strike injuries to large whales are caused by ships 80 m or longer and travelling 14 kn or faster. Based on literature review and modeling, Vanderlaan and Taggart (2007) found the greatest rate of change in probability of lethal injury to a large whale is at vessel speeds between 8.6 and 15 kn. The probability of a lethal injury drops to below 0.5 at 11.8kn and asymptotically approaches one at above 15 kn. A study conducted in the Stellwagen Bank National Marine Sanctuary indicated that vessel speed restriction would reduce lethality of right whale collisions with vessels (Wiley et al. 2011). Modeling indicated that speed limits of 12kn would reduce lethality by 29.4% and of 10kn would reduce lethality by 56.7%. Likewise, Conn & Silber (2013) found that reduced vessel speeds of commercial vessels reduced the risk of mortality in North Atlantic right whale vessel strikes. Lammers et al. (2013) found that most whale-vessel collisions in Hawaii were from boats that ranged between 7.9m and 19.8m in length. This size is typical of touring vessels which also suggests that incidents occur more frequently based on the vessels interactions with the whales and increased traffic in known whale environments (Lammers et al. 2013).

Gende et al. (2011) studied the distance between cruise ships and humpback whales in Alaska with respect to ship speed. They found that the relationship between whale distance and ship speed changed at 11.8 kn such that humpback whales were first encountered 114 m closer when ship speed exceeded 11.8 kn. This study shows that ship speed is linked to encounter distance, and encounter distance can affect likelihood of ship strike. Although these studies all indicate that vessel speed influences the lethality of ship strike, it should be noted that Wiley et al. (2008) found that in the Northeastern U.S., whale watching operations had a high level of non-compliance (mean 0.78) with NOAA recommended speed zone limits, with compliance diminishing with increased proximity to whales. Based on this study, this voluntary program did not achieve the goal of significantly reducing vessel speed near whales. McKenna et al. (2012) also found that voluntary speed restrictions were ineffective near the California coast. It should be noted that these voluntary programs were focused on large commercial vessels only.

In 2008, NOAA enacted a rule to implement speed restrictions to reduce the threat of collisions with North Atlantic right whales (78 FR 73726).This rule requires that vessels 65 ft and larger must travel at 10 kn or less near key port entrances and certain areas of right whale aggregation known as Seasonal Management Areas. Although this rule applies to areas within Stellwagen Bank National Marine Sanctuary, it was promulgated by NOAA Fisheries, not ONMS. With respect to humpback whales, Glacier National Park in Alaska has restrictions on vessel speed and location of transit in what are defined as "whale waters" from May 15 to September 30 (36 C.F.R. § 13.1174 & 13.1176(a)) to protect humpback whales from ship strikes. Silber and Bettridge (2012) recommend vessel speed restrictions as a means to reduce ship strikes, but also caution that strong consideration must be given to economic and other impacts to maritime communities. From 2003 to 2007, eight ship strikes that were considered lethal or likely to be lethal were recorded for whales in the Central Pacific stock in Alaska (Allen and Angliss 2012). There were a total of 44 confirmed vessel strikes to humpback whales in Hawaiian waters from 2008-2013. It should be noted that speed restrictions have been focused on large commercial vessels rather than individual boaters or tour operations.

In 2003, the Hawaiian Islands Humpback Whale National Marine Sanctuary convened a workshop to evaluate vessel strike of humpback whales in Hawai‘i (US DOC NOAA 2003). The workshop concluded that vessel strike was not a critical issue at that time but encouraged continued research and education about the issue. The International Whaling Commission held a workshop in 2010 to develop strategies to reduce the risk of collisions between cetaceans and vessels (International Whaling Commission 2011). This workshop reviewed existing information, risk assessment, and mitigation measures and made recommendations for data collection, conservation measures, and reporting. Mitigation measures for reducing risk included routing options, speed restrictions, reporting systems, observers, and technological approaches.

7.1.4.8. Introduced Species

An introduced species is any species (including but not limited to any of its biological matter capable of propagation) that is non-native to the ecosystems of the sanctuary; or any organism into which altered matter, or genetic matter from another species, has been transferred in order that the host organism acquires the genetic traits of the transferred gene. Species can be introduced to the marine ecosystem via a variety of mechanisms including vessel hulls, rudders, propellers, live-well tanks or sea chests, intake screens, ballast pumps, ballast water, and

seawater piping systems. As many as 3,000 introduced species have been transported by ships around the world (MIT Sea Grant 2004). Similarly, they may be transported by dredging and drilling equipment, dry docks, buoys, seaplanes, canals, marine debris, and recreational equipment (Carlton 2001). They may also be introduced through attachment to an intended introduced species; intended introduction for commercial and sport fishery, mariculture, or biocontrol efforts; release of unwanted organisms by aquarists or bait fishermen; intentional or accidental release during transport for research, restoration, education and aquarium activities; and natural spread from original point of introduction.

Exotic species can have a number of impacts on native coastal marine species including replacement of a functionally similar native species through competition; reduction in abundance or elimination of an entire population of a native species, which can affect native species richness; and inhibition of normal growth or increased mortality of the host and associated species. Other impacts include increased intra- or interspecies competition with native species; creation or alteration of original substrate and habitat; hybridization with native species and other genetic effects; transfer of new parasites and diseases; and direct or indirect toxicity (*e.g.*, toxic diatoms).

7.1.4.9. Ocean Noise

Underwater sound in the ocean can come from a variety of natural and anthropogenic sources. Anthropogenic sources include shipping, general vessel traffic, tour boats, aircraft, research, energy and mineral exploration, underwater construction, seismic devices, pingers, and navy activities, such as use of sonar and underwater explosions. Potential impacts of sound on marine organisms can range from no or very little effect to various levels of behavioral reactions, physiological stress, threshold shifts, auditory masking, and direct trauma. Responses to sound generally fall into three categories: behavioral, acoustic, and physiological (Nowacek et al. 2007). Noise pollution can be intense and acute or less intense and chronic (Hildebrand 2004). Hildebrand (2004) states that estimates suggest noise levels in the ocean were at least ten times higher in the early 2000's than a few decades prior.

Commercial shipping is considered to be the major contributor to low frequency noise in the world's oceans (Hildebrand 2004). Pirotta et al.(2012) investigated the effects of vessel noise on beaked whales (Ziphiidae) and found that broadband ship noise caused a significant change in beaked whale behavior up to at least 3.2 miles (5.2 km) away from the vessel. Rolland et al. (2012) found that reduction in shipping noise in the Bay of Fundy led to a significant reduction in stress-related fecal metabolites in North Atlantic right whales (*Eubalaena glacialis*). Visual observations of bowhead (*Balaena mysticetus*) and other baleen whales have indicated that individuals can be displaced when exposed to continuous industrial sound that exceeds approximately 120 dB or 1µPa (microPascal; a unit of pressure; Richardson et al. 1995).

In addition to commercial shipping, smaller commercial vessels and recreational watercraft add noise to the ocean environment. Erbe (2013) reports that personal watercraft like jet skis are quieter underwater than boats but sound pressure level might not be a good indicator of bioacoustic impacts. Personal watercraft produce underwater noise between 100Hz and 1kHz

(Erbe 2013). Personal watercraft operators in Hawai‘i are required to take a safety course that includes information about protected species in Hawai‘i (Haw. Adm. Rul. § 13-256-16), and permits are required for commercial personal watercraft operation (Haw. Adm. Rul. § 13-256-18). Personal watercraft are banned in certain areas and at certain times of year in Hawai‘i to protect humpback whales and other marine wildlife (Haw. Adm. Rul. § 13-256-16).

Active sonar, as is used by the Navy in Hawai‘i’s waters, emits high-intensity acoustic energy and can be categorized as low-frequency (<1000Hz), mid-frequency (1-20kHz), and high frequency (>20kHz) (Hildebrand 2004). Hildebrand (2004) suggests that low-frequency active sonars have long ping lengths and nearly continuous duty cycles that increase the likelihood they will impact marine mammal populations. Humpback whales in the Atlantic have been found to sing longer songs during low frequency active sonar transmissions by the Navy, and it has been suggested that this indicates that whales are compensating for acoustic interference (Miller et al. 2000). Fristrup et al. (2003) found a similar result and documented a delayed response to low frequency active sonar, with humpback whales showing effects up to two hours after the final sonar signal. Humpback whales near the Hawaiian Islands displayed avoidance behavior in playback experiments to assess the effects of low-frequency sonar on whales (Maybaum 1993).

There is growing evidence of a potential link between military sonar exercises and cetacean strandings, particularly with respect to beaked whales (Ziphiidae). Reports of such strandings include events in the Canary Islands, Bahamas, and Greece (Simmonds and Lopez-Jurado 1991, Frantzis 1998, Cox et al. 2006). In Hawai‘i, a mass stranding of more than 150 melon-headed whales occurred in Hanalei Bay in 2004 (ultimately resulting in one melon-headed whale death) during Rim of the Pacific Exercises, which Southall et al. (2006) considered a plausible, if not likely, contributing factor in the stranding. However, others suggested this stranding event could have been related to lunar influences (Mobley Jr. et al. 2007). Faerber and Baird (2010) conclude that a lack of mass strandings on the Hawaiian Islands cannot be considered evidence of a lack of impact from anthropogenic activities because the likelihood of finding carcasses is low as a result of factors such as local currents, scavenging sharks, deep water, and varied density of humans in areas where carcasses could wash ashore. Jepson et al. (2003) has suggested that behavioral reactions to sonar may contribute to strandings and decompression-like symptoms found in stranded cetaceans. Nowacek et al. (2007) provides an extensive overview of research on the effects of sounds on marine mammals.

7.1.4.10. Marine Debris

Marine debris is defined by NOAA as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment (Morishige and McElwee 2012). Marine debris is an ongoing problem worldwide. In Hawai‘i, derelict fishing gear and trash may be found strewn along the beaches. Much of this debris in Hawai‘i is generated at distant sources and Hawai‘i is a hotspot for aggregation of marine debris, particularly along its windward shores. Various wildlife, including protected species, become entangled, injured, and killed as a result of marine debris (Morishige and McElwee 2012). NOAA and its partners have developed a *Hawai‘i Marine Debris Action Plan: 2012-2013* (HI-MDAP 2012) based on ongoing and past efforts. The overall purpose of the HI-MDAP is to establish a comprehensive framework for strategic action to reduce the ecological, health and safety, and economic impacts of marine debris in Hawai‘i by 2020.

Ribic et al. (2012) evaluated marine debris loads along the U.S. Pacific Coast and Hawai‘i. They found that Hawai‘i had the largest marine debris load of the regions studied and most of this debris was ocean-based (~2/3) rather than land-based or general source. In addition to other sources, the tsunami that occurred in Japan in 2011 has and is predicted to continue to result in marine debris in the Hawaiian Islands. Lebreton and Borrero (2013) modeled floating debris generated by the tsunami and predicted that the majority of debris from the tsunami will accumulate in the eastern North Pacific between Hawai‘i and California. Further, it is likely that items will accumulate as relatively isolated objects rather than as a large scale beaching of debris. This individual deposition of debris may result in as much as 1kg of material per meter of coastline in western North America and Hawai‘i. They also report that a significant proportion of this debris consists of plastics that will degrade into small particles and be eaten by marine organisms, causing organic pollutants to enter the food supply in much higher quantities than prior to the influx of this debris. As of May 2013, there were eight confirmed items of Japanese tsunami debris found near the Hawaiian Islands.

Large floating marine debris has served as a vector of introduced species (Zabin et al. 2004). Marine debris also causes physical abrasion, breakage, and shading of coral reef habitat. The few studies conducted on reefs indicate that impacts to sessile marine invertebrates include damage and death (Chiappone et al. 2005). Additionally, entanglement with derelict monofilament fishing line has been shown to cause significant coral mortality (Asoh et al. 2004). These effects have been shown to create long-lasting changes to the reefs they impact (Precht et al. 2001). Plastics and other marine debris have been found in the gastrointestinal tracts of cetaceans, including instances in which enough debris was found that it likely caused impairment of digestive processes or even death (Simmonds 2012). Large whale entanglement can occur in derelict fishing gear. Sea turtles are particularly prone to eating plastic scraps and other buoyant marine debris and to tangle themselves in derelict lines and netting (Carr 1987). In the early 2000’s, Boland and Donohue (2003) reported that marine debris was undermining population recovery efforts for the Hawaiian monk seal.

From small beach cleanups to the multi-partner *Hawai‘i Nets to Energy Program*, many activities and entities are addressing marine debris in Hawai‘i. Despite extensive efforts over the past ten years, marine debris continues to be a chronic threat to Hawai‘i’s marine ecosystem as well as human health, navigation safety, and the economy (Morishige and McElwee 2012).

7.1.4.11. Pollution

Pollution can be introduced into the sanctuary via a variety of mechanisms that include point and non-point sources. Pollution can be generated in the ocean, on the ocean, nearshore and inland.

Sessile organisms (fixed in one place) can be especially vulnerable to pollution as they cannot move to avoid it. State of Hawai‘i (2010) reports that while Hawai‘i’s reefs are still in fair to good condition, many urban areas and popular destinations have suffered from land-based sources of pollution. This report goes on to state that land-based sources of pollutants, such as sediments and nutrients, threaten the quality of coral reef ecosystems. These pollutants are often transported in surface-water runoff and by groundwater seepage into coastal waters. While the complex interrelationship between land-based sources of pollution, water quality, and the health and integrity of coral reef ecosystems is not well understood, enough is known to require management policies that minimize polluted surface-water runoff (State of Hawai‘i 2010). Some significant pollutants include pesticides, petroleum hydrocarbons, pharmaceuticals, heavy metals, pathogens, and excess nutrients (State of Hawai‘i 2010). Impacts from toxic pollutants are poorly understood but potentially severe (State of Hawai‘i 2010). Persistent organic pollutants can build up in organisms, particularly apex predators. For example, false killer whales near the populated Hawaiian Islands have been found to have contaminant loads of persistent organic pollutants that could potentially affect their health (Ylitalo et al. 2009).

In addition to chemical and biological pollutants from run-off and development, sediment can pollute nearshore waters, potentially damaging coral reefs and causing stress to nearshore organisms that reduce their resiliency to other threats, such as climate change. The Department of Land & Natural Resources (2011) states in its *Rain Follows the Forest Plan* that sedimentation from erosion harms the once-pristine nearshore marine waters and coral reef ecosystems of Hawai‘i, and Friedlander et al. (2008) report that sediment is likely the leading land-based pollutant causing alteration of reef community structure.

The Clean Water Act (CWA) (33 U.S.C. §1251 *et seq*.) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. The Hawai‘i Department of Health’s (DOH) *Water Resource Protection Plan* and *Water Quality Plan* provide the overall legal and policy framework that guides the development, conservation, and use of water resources in Hawai‘i. The DOH has also promulgated rules to reduce pollution into coastal waters (Haw. Adm. Rul. § 11-54 and Haw. Adm. Rul. § 11-55). The Division of Boating and Recreation limits the types of discharge allowed from vessels into marine waters (Haw. Adm. Rul. § 13-342D). However, pollution continues to be a concern and a threat to Hawai‘i’s marine organisms and habitats.

7.2. Human Environment

7.2.1. Human and Economic Setting

The human environment includes human socioeconomic and demographic indicators including human population size and change, along with employment, labor force, unemployment trends, and industrial earnings, to describe the economic health of the region. The protection of children and environmental justice populations are also identified.

7.2.1.1. Population

The estimated resident population of the State of Hawai‘i as of 2012 was 1,392,313 (US Census 2012).[6] Demographic data for the State of Hawai‘i is based on the 2010 U.S. Census population when the state population was estimated to be 1,360,301. O‘ahu is the most populated island in the Hawaiian Archipelago with 953,207 residents in 2010, followed by Hawai‘i Island (185,079) and Maui (144,444). Ni‘ihau has the smallest resident population of the populated Hawaiian Islands with only 170 residents (Table 13). By county, approximately seven out of every ten residents in the State of Hawai‘i live in the City and County of Honolulu (Table 14). Kaua‘i County has the smallest population with only 69,512 residents (5.0% of the population of the State of Hawai‘i).

Island	Population (2010)	% State
State	1,360,301	
Hawai‘i	185,079	13.6%
Kaho‘olawe	-	
Maui	144,444	10.6%
Lāna‘i	3,135	0.2%
Moloka‘i	7,345	0.5%
O‘ahu	953,207	70.1%
Kaua‘i	66,921	4.9%
Ni’ihau	170	0.0%

Table 13. Population distribution by island for the State of Hawai‘i (2010).
Source: *Hawai‘i State Data Book, 2011.*

County	Population (2013)	% State
State of Hawai‘i	1,404,054	
City and County of Honolulu	983,429	70.0%
Hawai‘i County	190,821	13.6%
Kaua‘i County	69,512	5.0%
Maui County[7]	160,292	11.4%

Table 14. Population distribution by county for the State of Hawai‘i.
Source: *Hawai‘i State Data Book, 2013.*

[6] The resident population is defined as the number of persons whose usual place of residence is in an area, regardless of physical location on the estimate or census date. It includes military personnel stationed or home ported in the area and residents temporarily absent, but excludes visitors present (Hawai‘i State Data Book 2011).
[7] Maui County includes Kalawao County (Kalaupapa Settlement). Kalawao had 147 in 2000 and 90 in 2010.

The population of Hawai‘i has increased significantly since 1900. At the turn of the century, the population of the State of Hawai‘i was approximately 154,000 (Hawai‘i State Data Book 2011). Population grew steadily throughout the century but the growth rate has declined since the 1990s. Population growth has occurred primarily in the City and County of Honolulu. In 1900, only 58,504 residents lived in the county of Honolulu. By 1960, the population had boomed to over half a million. Today the population is just under one million residents and population in the county continues to grow at a steady rate. The percent of the population born in Hawai‘i grew throughout the first half of the twentieth century from 38.3% in 1900 to 71.1% in 1950. However it has steadily declined since then, dropping to 56.9% in 2000.

7.2.1.2. Employment

The average size of the civilian labor force in the State of Hawai‘i in 2013 was 648,850, of which approximately 30,900 (4.8%) were unemployed (Hawai‘i State Department of Labor & Industrial Relations 3013). The average annual wage in Hawai‘i in 2012 was $44,767 slightly above the U.S. average annual wage of $43,735 (Hawai‘i State Data Book 2013). Per capita annual income was highest in the City and County of Honolulu $48,529; Table 15), over $15,000 higher than in Hawai‘i County, which had the lowest per capita annual income ($33,398). It follows that the City and County of Honolulu had the lowest unemployment rate (4.3%) while Hawai‘i County had the highest unemployment rate (6.8%).

County	Civilian Labor Force	Employed	% Unemployed	Per Capita Income (2012)
State of Hawai‘i	648,850	617,950	4.8%	$44,767
City and County of Honolulu	456,800	437,250	4.3%	$48,529
Hawai‘i County	82,150	76,600	6.8%	$33,398
Kaua‘i County	32,400	30,550	5.7%	$38,392
Maui County[8]	77,500	73,550	5.1%	$37,909

Table 15. Employment status and per capita personal income by county (2013).
Source: *Hawai‘i State Data Book, 2013.*

The unemployment rate in Hawai‘i has shown no long-term trends from 1976 through 2011. The unemployment rate increased from 2.7% in 2007 to 4.1% in 2008 and 6.9% in 2009 where it remained for the next two years. The government (20%), trade, transportation and utilities sectors (18.7%), and leisure and hospitality sectors (17.8%) are the largest employers in the State of Hawai‘i (Table 16).

[8] Maui County includes Kalawao County (Kalaupapa Settlement). Kalawao had 147 in 2000 and 90 in 2010.

Industry	State Total	% State	City & County of Honolulu	Hawa'i County	Kaua'i County	Maui County
Natural resources, mining, construction	30,800	4.9%	23,000	3,500	1,300	3,100
Manufacturing	13,500	2.2%	10,900	1,300	300	1,100
Trade, transportation & utilities	117,000	18.7%	83,500	13,300	5,800	14,400
Information	8,500	1.4%	7,100	600	200	600
Finance, Real Estate & Insurance	27,100	4.3%	20,400	2,700	1,400	2,600
Professional & business services	79,400	12.7%	64,000	6,100	2,700	6,600
Education services	15,100	2.4%	12,600	1,300	200	1,200
Health care & social assistance	63,900	10.2%	49,500	6,800	2,500	5,200
Leisure and hospitality	110,800	17.8%	66,100	13,000	9,100	22,700
Other services	26,700	4.3%	20,900	2,100	900	2,700
Federal, State & Local Government	124,800	20.0%	97,800	12,700	4,500	9,700

Table 16. Occupation by industry and county (2010).
Source: *Hawai'i State Department of Labor and Industrial Relations (Hawai'i State Data Book 2013).*

7.2.1.3. Ocean Economy

In 2009, the Hawai'i ocean economy supported 92,160 jobs or 15.6% of all jobs in Hawai'i.[9] Furthermore, ocean activities generated $5.2 billion in GDP (8.0% of the GDP produced in the Hawai'i State economy (ENOW Final Economic Report 2012). From 2005 to 2009, employment in the Hawai'i ocean economy fell 6.3%, driven largely by employment losses in the tourism and recreation, living resources, and marine transportation sectors. Employment in the overall Hawai'i state economy fell 1.9% (compared to 2.3% in the United States). However, the Hawai'i ocean economy real GDP grew by 5.8% over the same period. This growth was driven primarily by gains in ship and boat building, marine construction, and marine transportation. In 2009, wages per employee in the Hawai'i ocean economy averaged $28,069 (32% below the state average GDP). This is largely due to the low average annual wage per employee in the tourism and recreation resources sectors. Four of the other ocean sectors (marine construction, offshore mineral extraction, ship and boat building, and marine transportation) had wages per employee above the state average in 2009 (ENOW Final Economic Report 2012).

7.2.1.4. Value of Coral Reefs

Coral reefs are considered particularly valuable in Hawai'i. A 2011 study found that individuals value coral reef ecosystems in Hawai'i both for their personal use and consumption (*direct use*) as well as for reasons that are not related to use (*passive use*). For example, many people across the United States believe that coral reefs are part of our collective legacy to future generations and therefore have value to society (Bishop 2011). Since passive uses, and many direct uses, do

[9] Ocean economy includes tourism and recreation, offshore mineral extraction, living resources (fishing, aquaculture, and seafood processing), marine construction, ship and boat building, and marine transportation.

not involve the exchange of money, researchers conducted a nation-wide survey to determine individual willingness to pay to protect and restore coral reef ecosystems. The study considered two scenarios:

- Potential value of increasing the size of no-fishing zones around the populated Hawaiian Islands from 1% of reefs to 25% (threshold where substantial benefits to fish and the larger ecosystems would start being achieved).
- Potential value of repairing 5 acres of reefs per year damaged by ship accidents (rough, current estimate of average annual damage from ship accidents). Restoration of ship-damaged reefs would reduce recovery time by 40 years compared to natural recovery.

The results suggest that the protection and restoration of degraded ecosystems, as exemplified by increasing marine protected areas in the populated Hawaiian Islands to 25% is worth about $224.81 per year to the average U.S. household (Table 17). Restoration of coral reefs after localized injuries, as exemplified by repairing 5 acres of reef per year after ship strikes, is worth about $62.82 per year (Table 17). This makes the estimated value of doing both about $34 billion per year when aggregated over the entire number of households in the United States (Table 18).

Value	Estimated Willingness to Pay (WTP)	Standard Error	95 %Confidence Interval
Ecosystem-wide protection and restoration	$224.81	$32.19	$161.72 - $287.89
Restoration after localized injuries	$62.82	$21.73	$20.23 - $105.40
Total	$287.62	$48.04	$193.46 - $381.78

Table 17. Mean willingness to pay (WTP).
Sample size (N=3,183)
Source: *Bishop 2011.*

Value	Estimated Willingness to Pay (Billions $)	95% Confidence Interval (Billions $)
Ecosystem-wide protection and restoration	$26.24	$18.88 - $33.60
Restoration after localized injuries	$7.33	$2.36 - $12.30
Total	$33.57	$22.58 - $44.56

Table 18. Estimated annual willingness to pay.
Source: *Bishop 2011.*

7.2.2. Cultural and Historic Setting

7.2.2.1. Cultural Resources

Cultural resources include material remains of past human activities, both from historic and Pre-European contact. In addition, cultural resources include traditional cultural properties, such as areas used for ceremonies or other cultural activities that may leave no material traces, and may have on-going use important to the maintenance of cultural practices. For cultural resources qualifying as historic properties, protection is afforded under the National Historic Preservation Act (NHPA). NHPA defines a historic property as "any Pre-European contact or historic district, site, building, structure, or object included in, or eligible for listing on the National register, including artifacts, records, and material remains related to such a property or resources (46 C.F.R. § 800, as amended 2006, Title III, Section 301, #5). The criteria for evaluating eligibility for listing on the National Register of Historic Places are as follows:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling the association and:

- That are associated with events that have made a significant contribution to the broad patterns of our history; or
- That are associated with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That have yielded, or may be likely to yield, information important in prehistory or history (Monk Seal PEIS 2014; National Park Service 1997).

If a cultural resource can be demonstrated to meet the criteria for listing on NHRP, it qualifies as an historic property, and direct and indirect impacts to that historic property must be avoided and mitigated appropriately.

7.2.2.2. Cultural History and Uses

The core of Hawaiian culture, philosophy, religion and worldview is founded in ʻāina/kai dualism, the inseparable relationship between the land and sea. Kumulipo, meaning "source from the depths," is a cosmogenic genealogy and historical account of the emergence of life forms. From the first corals to the birth of man and woman, and the birth of gods that followed, each stanza brings two entities to life: one from the kai and one from the moana. It is this vast, boundless relationship between man and nature found throughout the Hawaiian culture that makes the evolution to an ecosystem based management approach consistent with Hawaiian cultural practices and traditions.

Further, within each area may be found a vast array of sites that support cultural practices, accesses, traditions and usage that support ecosystem and culturally based management. These activities also serve as the foundations of the three forms of Hawaiian cultural heritage: tangible cultural heritage, intangible cultural heritage and natural cultural heritage. The list below, based on an original list developed by the Hawaiʻi State Office of Planning in 2002, is the result of a

statewide community assessment conducted in 1992. The following is a list of both tangible and natural heritage resources. Intangible heritage resources include: hula (dance), mele (song), oli (chant), moʻolelo (stories), moʻokūʻauhau (genealogies) and other oral histories and traditions.

Cultural Heritage Resource	Definition
Ahu	Heap, pile, collection, mound, mass; altar, shrine, cairn; a traplike stone enclosure made by fishermen for fish to enter; laid, as the earth oven.
Ana (Karst)	Cave, grotto, cavern.
Bathing pools	Areas revered for ritualistic bathing.
Heiau	Pre-Christian place of worship, shrine.
Historic Walls	Historic Walls.
Hōʻailona	Symbol, sign, as in math.
Holua slides	Sled, especially the ancient sled used on grassy slopes; the sled course.
ʻAla Hele	Pathway, route, road, way to go, itinerary, trail, highway, means of transportation.
ʻAumakua	Family or personal gods, deified ancestors who might assume the shape of sharks, owls, hawks, ʻelepaio, ʻiwi, mudhens, octopuses, eels, mice, rats, dogs, caterpillars, rocks, cowries, clouds, or plants.
ʻAuwai	Irrigation ditch.
Kahawai	Stream, creek, river; valley, ravine, gulch, whether wet or dry.
Kāheka	Pool, especially a rock basin where the sea washes in through an opening and salt forms; salt pond.
Kāhekaheka	Plural and diminutive of kāheka; small sea pool or pools; artificial salt pan.
Kiʻi Pōhaku	Stone statue; petroglyph.
Kilo iʻa	A man who observes fish movements from a high place and directs fishermen; to so act.
Koʻa	Coral, coral head.
Kula	Plain, field, open country, pasture.
Leina	Spring, leap, bound; place to leap from.
Loʻi	Irrigated terrace, especially for taro, but also for rice; paddy.
Loko Wai / Loko Iʻa	Fresh-water pond or lake; fountain. Fishpond system.
Lua Pō	Grave.
Mala	Garden, plantation, patch, cultivated field, as māla ʻai, māla kalo, māla kō, māla kūlina.
Mea Ulu	Native plants.
Muliwai	River, river mouth; estuary.
Omo ʻā	Natural conduits through which lava travels beneath the surface of a lava flow.
Poʻina Nalu	Where a wave breaks; surf break.
Poʻo Wai	Water source or head, dam.
Puʻe One	Sand dune, sand bar.
Puʻuhonua	Place of refuge, sanctuary, asylum, place of peace and safety.
Punawai or Waipuna	Water spring.
Uapo (bridge)	Wharf pier, quay, dock, bridge.
Wahi Kapu	Sacred place.
Wahi Lawaiʻa	Place of fishing
Wahi Pana	Legendary place.
Wells	Source of water.

Table 19. List of cultural heritage resources in HawaiʻI
Soure: *McGregor et al. 2002; Honua Consulting 2014.*

Koholā, the humpback whale, is revered as a body form of Kanaloa, the supreme ocean deity. The ocean itself is a form of Kanaloa, known as kai, moana and moananuiākea (vast ocean). The current sanctuary boundaries are not known to the koholā. Wherever koholā are seen, a deity is seen. Beyond the current sanctuary zones, tradition mele (poetic texts) and wind names memorialize areas where koholā breach. Koholālele, meaning leaping whale, is a wind offshore of Hāna, Maui. ʻO ka pā mai a ka makani Koholālele, kai hālulu i ke alo aʻo Kaʻuiki. The Koholālele wind blows, the sea roars in the presence of Kaʻuiki hill (Song: Ka Uakea). When and where koholā are seen, a deity is seen.

Table 19 illustrates the wide range of cultural resources and uses that could occur within or adjacent to sanctuary boundaries. While many may not rise unto themselves as being discrete properties eligible for NRHP, cultural resources are nonetheless protected under NHPA and NEPA and should be documented, treated and any adverse impacted mitigated accordingly.

There are cultural resources that have been identified as significant within sanctuary boundaries. These include traditoanal Hawaiian fishponds, surfing site and navigation sites. The Office of Hawaiian Affair's Kipuka Database is a geographical information system (GIS) that provides the location of and basic information on historic and culturally important sites in Hawaii, which are searchable by traditional Hawaiian land divisions (http://www.kipukadatabase.com).

Traditional Hawaiian Fishpond System (loko iʻa)

Hawaiian fishpond systems, loko iʻa, are some of Hawaiʻi's most significant traditional cultural resources. They are biocultural articulations of Hawaiian innovation in the areas of engineering, education, hydrology, aquaculture and biology. Further, they demonstrate traditional Hawaiʻi's excellence in sustainability, food sovereignty and natural resource management (Watson 2012).

The history of loko iʻa is rich and extensive. According to oral histories, Hinapukuiʻa, whose name translates to "Hina gathering seafood," is the goddess of fishermen. She is the wahine (wife or mate) of Kūʻulakai, and she is the sister of Hinapukuʻai, Hina gathering vegetative foods. She is also the mother to ʻAiʻai. Hinapukuiʻa's kane (husband or mate), Kūʻulakai, is the god and kupuna of fishermen and is said to have built the first fishpond at Lehoʻula on the island of Maui. Kūʻula, as he was also known, was said to be kino lua, dual bodied. He was said to be empowered with mana kupua, supernatural powers. He could control all the fish in the sea. Kūʻulakai and Hinapukuiʻa lived in Alea-mai on East Maui. They made their residence near Kaiwiopele, the cinder hill names for "the bones of Pele", named for the place where Pele left some of her iwi (bones) after a battle with her sister, Nā-maka-o-Kahaʻi. It was near Kaiwiopele that Kūʻulakai built the first traditional Hawaiian fishpond in Hāna. Kūʻulakai would share his knowledge of fishing and fishing practices with makaʻāinānā (common citizens) across Hawaiʻi through his son, ʻAiʻai, identified also as a god of fishermen. Written sources and oral traditions tell of ʻAiʻai's extensive travels throughout Hawaiʻi during which he established fishing alters, called kūʻula after his father, and fishing areas, known as koʻa (Watson 2012).

Loko iʻa (traditional Hawaiian fishpond systems) were an important part of Hawaiʻi's complex and sustainable natural resource management system. The full-scale development of loko iʻa from mauka (the mountains) to makai (the ocean) dates back over half a millennium. Cultivation and propagation centered on many different fresh and salt-water plants and animals, with the

primary species being the prized ‘ama‘ama (mullet) and ‘awa (milkfish). An inventory in the early 1900s found 360 loko i‘a in the islands and identified 99 active ponds with an estimated annual production total of about 680,000 pounds, including 486,000 pounds of ‘ama‘ama and 194,000 pounds of ‘awa. Loko i‘a were extensive operating systems that produced an average of 400–600 pounds per acre per year, a significant amount considering the minimal amount of fishpond “input” and maintenance effort apparent by that time. Increasing immigration and western influences during the nineteenth and twentieth centuries, coupled with industrialization, and urbanization had a devastating impact on the traditional Hawaiian resource management systems in Hawai‘i (Watson 2012).

In the past decade, there has been a renewed interest in the repair and operation of traditional Hawaiian fishponds, for their cultural, economic and ecological value. Community organizations and traditional fishpond practitioners face the challenge of maintaining and restoring fishpond systems. Government regulations often restrict activities in the near shore area and the process to obtain permits can be complicated. The difficulty of Hawaiian fishpond revitalization is compounded by the unique, fragile, and sometimes rugged environments in which they exist. Due to their geographic locations, unique ecosystems, engineering and complex biological functioning, Hawaiian fishponds are subject to a myriad of regulations and oversight by a host of different agencies. The end result is that obtaining the necessary permits and approvals to restore, repair, maintain and reconstruction fishponds is both costly and time-consuming.

The sanctuary is committed to supporting local community efforts to restore fishponds in Hawai‘i. The sanctuary has been instrumental in establishing a Regional General Permit (RGP) with the U.S Army Corps of Engineers Honolulu District Office that will allow the State to streamline the permitting process by utilizing a single application process for restoration activities. The objective of the RGP is the restoration, repair, maintenance and reconstruction of loko i‘a across the pae‘āina of Hawai‘i (Hawaiian Archipelago). This action will stimulate traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services.

Surfing Sites

Hawaiians practiced six different traditional surf sports: *he‘e nalu*, or board surfing; *pākākā nalu*, or outrigger canoe surfing; *kaha nalu*, or body-surfing; *pae po‘o*, or bodyboarding; *he‘e one*, or sand sliding; and *he‘e pu‘e wai*, or river surfing (Clark 2011). ‘Ōlelo Hawai‘i use the word *au*, or “swim” to describe the manner in which surfers would head out into the lineup by holding onto

the backs of their boards and kicking out to sea with the rest of the board extending in front of them (Clark 2011).

During the 1800s both Hawaiian and non-Hawaiian writers described surfing as a "national pastime," implying that the activity was both beloved and widely practiced. There are numerous mentions of surfing's prominence in Hawaiian nūpepa, such as:

> Na paani kahiko o Hawaiʻi nei, oia hoi ka heenalu, lelekawa, heeholua, piliwaiwai a me ka mokomoko. He nui a lehulehu wale na hana o Hawaiʻi nei, e pili ana I nei mea he lealea, a ua kapaia mai lakou, na paani kahiko o Hawaiʻi nei. O ka heenalu, oia kekahi paani nui loa o Hawaiʻi nei, mai naʻlii a na makaainana
>
> *The traditional past-time sports of Hawaiʻi were surfing, cliff jumping, hōlua sledding, and boxing. There were a great many things done here in Hawaiʻi for pleasure and they were all called the ancient sports of Hawaiʻi. Surfing was a very popular sport in Hawaiʻi from the chiefs to the commoners*
>
> - Ka Nupepa Kuokoa, Dec 23, 1865. P. 1. (Clark 2011).

Men and women both traditionally engaged in surfing activities in Hawaiʻi. One woman who displayed exceptional surfing abilities was the goddess Hiʻiaka, as observed in *Ka Moʻolelo ʻO Hiʻiakaikapoliopele*:

> ʻO ia hele ia o lākou nei a kāʻalo pono ma waho aku o Kahakaʻaulana, i ia wā i ʻike mai ai ʻo Hiʻiaka iā Peleʻulu e heʻe nalu ana i kai. ʻO kona nalu e heʻe ana, ʻo ia ka nalu a Kapuʻuiki. ʻIke pū maila nō hoʻi ia i nā kāne a me nā wāhine e heʻe nalu ana, a hū maila kona aloha iā Hilo i "ka heʻe puʻewai" o nā kāne a me nā wāhine. I ia wā kēia i hoʻohālike iho ai iā Peleʻula mā me ka poʻe heʻe puʻewai o Hilo, a kau aʻela ʻo ia i kēia kau. -Nogelmeier. *Ka Moʻolelo*. P. 298
>
> *They sailed until passing just outside of Kahakaʻaulana, when Hiʻiaka saw Peleʻula surfing down at the beach. She rode the waves of Kapuʻuiki, Hiʻiaka also saw men and women surfing, and was filled with fond recollections of Hilo, remembrances of the men and women "surfing the river mouth." As she was comparing Peleʻula and the others to the surfers of Hilo, she began this chant.*
>
> -Nogelmeier. *The Epic Tale*, P. 278. (Clark 2011)

Various chants and rituals surround the practice of surfing. The best known of the traditional surfing chants are kū mai chants, which were used to beckon the surf. Although there are several versions, each chant beings "Kū mai. Kū mai," which is usually translated as "Arise. Arise" (Clark 2011). Shorelines vines called Pōhuehue, or beach morning glory (*Ipomoea pes-caprae*), were integrated into these rituals. Surfing chants were also composed in honor of Hawaiian royalty, such as Queen Emma and Queen Liliʻuokalani, whose surfing chant was named "Halehale ke aloha" (Clark 2011).

A list of primary surf locations in Hawaiʻi was compiled from the writings of Hawaiian scholars John PapaʻĪʻī and Samuel Kamakau, and from the personal notes of noted Hawaiian scholar and linguist Mary Kawena Pukui in *Surfing: A History of the Ancient Hawaiian Sport* (See box; Clark 2011).

Traditional Surfing Spots in the Populated Hawaiian Islands.

Hawai'i Island: Not all traditional sites still exist on Hawai'i Island. The Pu'u 'Ō'ō-Kupaianaha eruption of Kīlauea destroyed many surf sites at the bays of Kalapana and Kaimū. In *Hawaiian Surfing: Traditions from the Past*, John R.K. Clark lists 85 sites on Hawai'i Island that have been mentioned a variety of texts (Clark 2011).

Maui: The most famous surf spot in Maui was 'Uo, a site off the town of Lahaina. Although the reef that creates the waves at 'Uo was altered with the dredging of a small boat harbor and channel, the spot is still one of the most popular in Lahaina today. Contemporary surfers know it as Lahaina Breakwater or Lahaina Lefts. Clark lists 29 surf sites on Maui (Clark 2011).

Moloka'i: Surfing spots exist on each side of the island that are still visited by residents today. Hawaiian scholar Samuel Kamakau writes that the chiefs of Moloka'i considered the surf sites at Hālawa and Kalaupapa as two of the best on the island. The only other site listed by Clark is Kalamaula (Clark 2011).

Lāna'i: The most popular spot on Lāna'i is at the southeastern end of Hūlōpoe Beach. Although there are no written accounts of Hawaiians surfing on the island, a kanikau published in 1878 names the surf spot at Hūlōpoe as 'Uolokeahi. This is the only surf spot on Lāna'i that Clark mentions (Clark 2011).

Kaho'olawe: Although there are no written accounts of Hawaiians surfing on Kaho'olawe, during the summer months waves break along the south end of the island at several surf spots. Clark mentions that there were about 80 men, women, and children living on Kaho'olawe who likely partook in surfing (Clark 2011).

O'ahu: Has more surf spots than any other Hawaiian Island and some of the best spots in the world on its North Shore. Clark lists 46 sites on O'ahu (Clark 2011).

Kaua'i: One of the most popular traditional surf sites was an offshore reef break in Kapa'a called Makaīwa or Kamakaīwa. Clark lists 12 sites on Kaua'i (Clark 2011).

Ni'ihau: Clark lists 21 sites and references *Ni'ihau: Traditions of an Hawaiian Island* by Reriotera'I Tava and Moses Keale, Sr. (Clark 2011).

Traditional Navigation and Voyaging Sites

It is estimated that kanaka maoli (Native Hawaiians) began to slowly migrate to and populate the Hawaiian Islands in the year 450 A.D. It is believed that this migration, most likely from the Marquesas, was accomplished by many small groups of Polynesians setting out to sea in 80-100 foot canoes (wa'a). Voyaging required technologically sound vessels as well as advanced knowledge of open sea navigation. These double hulled canoes were fastened with sails and carved from a single log, often measuring longer than 100 feet. The tree would be selected by a kahuna kalai wa'a and then cut, dragged and hollowed out by a group of men until it was ready for lashing. The wa'a used to migrate through the pacific were very large, made specifically for transporting people, plants, and livestock.

Once the canoe was prepared and loaded it would set out to sea. Traditional navigators could identify and name up to 150 stars, and knew the proper procedures of crossing from the northern to the southern hemisphere. Navigators used all elements and senses available to them to lead their voyage, paying close attention to stars, wind, waves and currents in order to calculate the proper heading. After populating Hawai‘i, there is no record of subsequent long ocean voyages and it is believed that navigation subsided for nearly five centuries. In 1970, the Pacific Voyaging Society constructed the *Hokule‘a* to demonstrate traditional navigation techniques (Handy et al. 1999). The *Hokule‘a*, star of gladness, is an ancient navigating replica built to demonstrate that Hawaiians skillfully navigated the Pacific Ocean in order to finally settle in Hawai‘i. The wa‘a was used for a long open voyage, without modern-day instruments, from Hawai‘i to Tahiti. Returning to this practice sparked an intense interest in Hawaiian culture in Hawai‘i. Nainoa Thomson exemplified the way that embarking on this oceanic journey revived a deep pride and reverence for all things Hawaiian (Harden and Brickman 1999).

7.2.2.3. Maritime Heritage Resources

Maritime heritage resources refer to cultural, archeological, and historical properties associated with coastal and marine areas and seafaring activities and traditions. These include shipwreck sites, historic aircraft sites, the remains of landings and dock facilities, prehistoric archaeological sites, and other types of materials. The existing maritime heritage resource inventory for resources within the sanctuary’s boundaries is comprised of vessels and historic aircraft reported lost within the sanctuary, and vessels and historic aircraft wreck sites confirmed by surveys within the sanctuary. The inventory has been compiled from various sources, such as historical documents (Thrum’s *Hawaiian Annual*, Thomas’ *Hawaiian Registered Vessels*, *Pacific Commercial Advertiser*); federal databases (Naval Historical Center aviation and shipwreck databases, inventory report *US Navy Shipwrecks in Hawaiian Waters: an Inventory of Submerged Naval Properties*); non-agency researchers (Bob Lewis, Rick Rogers); and field site investigations (University of Hawai‘i Marine Option Program, Hawai‘i Undersea Research Laboratory, Smithsonian Institute).

Historic documents indicate at least 195 ships and aircraft have been lost within the current sanctuary boundaries (including proposed boundaries for Ni‘ihau). Of these losses, some have been salvaged and some completely broken up and lost over time. Approximately 33 sites have been confirmed by known location, and 18 have been archaeologically surveyed and assessed. It is highly probable that many more

sites have been found by sport divers and fishermen, but information regarding shipwreck locations is not always publically disclosed.

Maritime heritage resources in the Hawaiian Islands are representative of important phases in Hawai‘i’s history. Nineteenth century whaling shipwrecks represent some of the earliest sites in the Hawaiian Islands. These sites are the physical record from a critical contact period when British, French, and American whalers substantially influenced the social, economic, and political climate of the Hawaiian Kingdom. Whaling shipwrecks are exceedingly rare worldwide and may possess data about the technological advancement of the industry as well as the personal histories and effects of the sailors.

Nineteenth and early twentieth century interisland commercial vessels, both sail and steam, make up most of the vessel losses, many from the formative days of Hawai‘i’s plantation period. A variety of vessel types reflect the Hawaiian, American, and Pacific/Asian multicultural setting among the islands. Provisioning ships crossing the Pacific necessitated increased commercial trade among Hawai‘i’s landings. Sandalwood was also exported in large quantities. Local shipping concentrated on a variety of agricultural products: potatoes, rice, sugar cane, and pineapple. Cattle ranching became popular in the 1860’s, and special vessels transported herds between the islands. Locally built sampans, originally designed in Japan, opened the tuna industry beginning in 1900. The variety of sailing brigs (sandalwood), sailing schooners (agricultural products), inter-island steamers (sugar and plantation building supplies), and fishing vessels reflect the changing nature of Hawaiian economy and society.

The U.S. Navy has an important history in the Hawaiian Islands. Of the many types of military properties lost in Hawaiian waters (approximately 80 U.S. Navy ships and submarines), two types highlight critical innovations in naval strategy: amphibious vessels and naval aircraft. Landing craft, a whole new class of vessels, mark the locations of training areas used during the 1930’s and 1940’s to refine tactics and methods for the island-hopping campaign in the Pacific. And of the many aircraft lost in Hawaiian waters, more than 70 historic civilian, army, and navy aircraft were lost within the current sanctuary boundaries alone. The technical development of flying boats in Hawai‘i dates back to the 1920’s and 1930’s as do the oldest located submerged aviation crash sites. Many of these wrecks and aircraft crash sites are also grave sites that deserve appropriate respect and protection.

7.2.3. Human Uses

Human uses of the marine environment in Hawai‘i include recreational and commercial fishing, offshore development, vessel traffic and harbors, and recreation and tourism. Cultural use of the marine environment is discussed above in this section.

7.2.3.1. Fishing Activity

Recreational Fishing

Fishing is a common recreational activity in Hawai‘i. A quarter of the population participates in some form of recreational fishing at least one time per year (U.S. Department of the Navy 2008). In addition, fishing is very popular with tourists visiting Hawai‘i. Data on recreational fishing in Hawai‘i is very limited because no license is required for non-commercial, saltwater fishing. Hawai‘i has a well developed recreational fishing infrastructure with approximately 25 small boat harbors and 20 boat ramps. NOAA Fisheries suggests that the number of boats that participate in recreational fishing in Hawai‘i is likely between 5,000-6,000 (NMFS 2007). Residents and visitors spend approximately $450 million on recreational fishing in Hawai‘i every year (Steinbeck et al. 2004). Common target species for recreational fishermen include marlin (blue and striped), tuna, wahoo, and mahimahi (NMFS 2007).

The Hawai‘i Marine Recreational Fishing Survey (HMRFS) estimate that in 2006, approximately 396,413 recreational fishermen brought in 17.6 million pounds of fish (HIPA 2009). The USFWS estimates the total number of recreational fishermen in Hawai’i at 158,000 in 2006, a significantly lower number compared to HMRFS. The discrepancy between the two sources of data may be due to different survey methodologies and accuracy of data, as well as the lack of licensing and reporting requirements.

Commercial Fishing

Commercial fisheries in Hawai‘i are extensive and include fish caught for sale, as well as charter fishing services. All commercial fishermen are required to acquire an annual renewable commercial marine license (CML). In 2013 there were 3,970 licensed commercial fishermen in the State of Hawai‘i (State of Hawai‘i 2012). In 2011, over 29 million pounds of fish were caught for commercial purposes in the State, worth over $71 million (WPacFIN 2011). The overall price per pound (based on amount paid to commercial fishermen by dealers) for all commercial fish in 2009 was approximately $3.12, an increase from $0.13 from the previous year.

Year	Number of Commercial Fishermen	Pounds Landed
2003	3,434	24,054,939
2004	2,971	22,230,489
2005	3,248	24,876,316
2006	3,137	24,636,892
2007	3,220	26,563,127
2008	3,196	33,310,542
2009	3,557	28,065,282
2010	3,373	29,164,222
2011	3,691	33,032,579
2012	3,992	31,786,440
2013	3,970	33,137,716

Table 20. Number of fishermen and pounds landed in Hawai‘i (2003-2013).
Source: *Commercial Marine Landings Summary Trend Report 2013.*

Total commercial landings vary between islands. An overwhelming majority of commercial fish landed between 2001 and 2013 came into O‘ahu. 2-4 million pounds of commercial fish were landed annually on Hawai‘i Island throughout the decade with the highest catch landed in 2007 (approximately 3.5 million lbs landed).

Year	O‘ahu	Hawai‘i	Kaua‘i & Ni‘ihau	Maui County
2001	16,332,445	3,206,429	588,460	537,833
2002	18,524,895	3,348,816	569,250	463,948
2003	19,289,833	2,717,512	663,914	609,991
2004	18,321,652	2,766,497	617,976	783,934
2005	20,887,310	3,693,069	579,603	611,085
2006	18,827,011	3,085,746	554,203	516,486
2007	26,290,499	3,560,404	791,542	608,345
2008	28,331,757	2,400,633	594,863	765,315
2009	24,123,239	2,719,908	767,019	763,733
2010	25,325,284	2,734,198	799,710	805,148
2011	28,827,042	2,642,718	771,101	738,961
2012	27,339,527	2,685,704	835,979	874,622
2013	28,045,235	3,255,962	971,686	813,935

Table 21. Commercial fish landings by port in Hawai‘i (2001-2013).
Source: *Commercial Marine Landings Summary Trend Report 2013.*

There are several methods and gear types used to fish commercially in Hawai‘i. In 2013, longline fishing landed over 25 million pounds or 76.2% of all commercial fish landed that year. Trolling and tuna handline are the other common fishing methods used in the Hawaiian Islands over the past decade.

Year	Aku Pole and Line	Longline	Handline	Trolling	Net	Trap	All Other Methods
2011	(N/A)	26,351,386	2,143,751	2,858,373	651,744	89,040	938,285
2012	369,116	24,558,662	2,211,202	3,390,318	483,258	40,461	733,423
2013	(N/A)	25,278,607	2,927,627	3,374,073	435,010	93,749	1,028,650

Table 22. Connercial and sea landings by fishing method in Hawai‘i (2011-2013).
Source: *Commercial Marine Landings Summary Trend Report 2013.*

A wide variety of species are landed commercially in Hawai‘i. The pelagic fishing industry is the largest and most valuable in Hawai‘i, accounting for approximately 27.5 million pounds (92.5%) of commercial landings in 2010. The tuna fishing industry accounted for over half (58.1%) of all commercial fish landed in Hawai‘i and approximately 62.7% of all pelagic fish landed in Hawai‘i that year. Bigeye tuna and billfish (particularly blue marlin, striped marlin, and swordfish) are the main target species for pelagic fishing but other species such as mahimahi, ono (wahoo), and moonfish are also important (NMFS 2005 in Monk Seal PEIS 2014).

In 2010, deep bottom fish made up about 1.5% of commercial landings (447,016 lbs). Target species include snappers, jacks, and a single species of grouper that is concentrated at depths of 30 to 150 fathoms (NMFS 2005 in Monk Seal PEIS 2014). The most desirable species are seven deepwater species known as the Deep 7 (opkapaka, onaga, hapuupuu, ehu, kalekale, gindai, and lehi). Inshore fish made up 1.6% of commercial landings (471, 391). With presently no active commercial coral reef fisheries in the Northwestern Hawaiian Islands, the commercial catch primarily comes from nearshore reef areas around the populated Hawaiian Islands (NMFS 2005 in Monk Seal PEIS 2014). Inshore fish species popular for commercial purposes include akule (which dominates nearshore commercial landings), soldierfish, surgeonfish, goatfish, squirrelfish, unicornfish, and parrotfish (Monk Seal PEIS 2014).

7.2.3.2. Offshore Development

Offshore Energy Production

Renewable energy production is expanding throughout the Hawaiian Islands. In 2008, the State of Hawai‘i and the Department of Energy established the Hawai‘i Clean Energy Initiative (HCEI). The HCEI seeks to increase the use of renewable energy in Hawai‘i to 70% by 2030. In 2011 only 12% of the electricity used in Hawai‘i was generated from renewable sources. The primary renewable energy sources in Hawai‘i are geothermal, Ocean Thermal Energy Conversion (OTEC), wind, solar, and biofuels, with solar power. The Bureau of Ocean Energy Management (BOEM) is currently exploring opportunities to expand renewable energy opportunities in Hawai‘i.

Hawai‘i has one geothermal power plant, Puna Geothermal Venture, located on Hawai‘i Island. The facility began operating in 1993 and produces both base load and dispatchable electricity. In 2011, the facility produced 233 gigawatt-hours (GWh) or approximately 20% of the total electricity used on Hawai‘i Island. The plant also produced 20% of all renewable electricity generated statewide.

Ocean thermal energy converts renewable solar energy stored in the ocean into electrical energy. A 1-MW floating OTEC pilot plant was completed and a 1-MW OTEC demonstration facility is in the planning stages and power plants up to 100-MW in capacity have been proposed for

locations off O‘ahu. Wind energy has been a success in Hawai‘i producing almost 31% of the state’s total renewable energy. Currently there are seven utility scale wind generation projects in Hawai‘i: two on O‘ahu, two on Hawai‘i Island, and three on Maui. In 2011, solar energy provided eight percent of Hawai‘i’s renewable energy generation.

The University of Hawai‘i-Mānoa hosts the Hawai‘i National Marine Renewable Energy Center (HINMREC). HINMREC, in collaboration with the Department of Defense, aims to establish a multiple-berth wave energy test center at Kāne‘ohe Bay, O‘ahu. The first ocean wave-generated electricity (hydrokinetic) ever transmitted to the grid in the U.S. was developed by an Ocean Power Technologies PowerBuoy® at Kāne‘ohe Bay in 2010. In a cooperative program with the Navy, three Ocean Power Technologies PowerBuoys® were deployed from 2004 to 2011. On the north shore of Kaua‘i, developers are exploring the potential for wave energy. However there is likely to be public opposition due to the scenic beauty of the coastline and the potential for impact to that scenery (E21 EPRI Survey and Characteristics of Potential Offshore Wave Energy Sites in Hawai‘i 2004). Developers are also considering the potential for a wave energy site on the northeast coast of O‘ahu (between Kahuku and Makapu‘u Points).

The HCEI proposes to establish an undersea cable system between the Hawaiian Islands. The cables would connect transmission systems throughout the islands with the intention of promoting renewable energy projects, increasing energy independence, and degreasing energy costs. In December 2010, the U.S. Department of Energy (DOE), with the State of Hawai‘i acting as a joint lead agency, announced its intent to prepare a Programmatic Environmental Impact Statement (PEIS) to assess the potential effects of the proposed Hawai’i interisland renewable energy program. The possible locations of the proposed cable will be determined during the design, environmental review, and permitting phases with full public input.

The Hawai‘i Clean Energy Programmatic Environmental Impact Statement (PEIS), produced by the US Department of Energy and the State of Hawai‘i, along with several other federal and state agencies, evaluates the potential impacts of clean energy technologies on Hawai‘i’s environment. The analysis in this PEIS is intended to guide the implementation of clean energy technologies to achieve the Hawai‘i Clean Energy Initiative (HCEI) goal of sourcing 70% of the state’s energy needs through clean energy by 2030. The PEIS analyzed technologies that fell into the following five categories: energy efficiency, distributed renewables, utility-scale renewables, alternative transportation fuels and modes, and electrical transmission and distribution. The PEIS determined whether the potential activities within these categories would affect various environmental resources in Hawai‘i including:

- Geology and Soils
- Recreation Resources
- Climate and Air Quality
- Land and Marine Transportation
- Water Resources
- Airspace Management
- Biological Resources
- Noise and Vibration
- Land and Submerged Land Use
- Utilities and Infrastructure
- Cultural and Historic Resources
- Hazardous Materials and
- Coastal Zone Management
- Waste Management
- Scenic and Visual Resources
- Socioeconomics
- Environmental Justice
- Health and Safety

Among these environmental resources, the PEIS outlines four areas of particular concern: biological resources, especially endangered and threatened species, land and submerged land due to limited land availability in Hawai‘i, cultural and historic resources, especially those of significance to native Hawaiian culture, and scenery important to culture and tourism.

Aquaculture

NOAA works collaboratively with federal, state, regional, local, academic and business partners to support the development of sustainable aquaculture in locations compatible with other uses. Additionally, the University of Hawai‘i, Hawai‘i’s Pacific University Affiliate Oceanic Institute, and private firms are engaged in aquaculture research and demonstration projects. In July 2008 Hawai‘i enacted legislation (HB 2261) which created a loan program for agriculture and aquaculture renewable energy projects. Aquaculture loans are available for persons who devote most of their time to aquaculture or derive a major portion of their income from aquaculture farming operations. In 2011 the sanctuary partnered with the Univeristy of Hawai‘i to host “Ho‘olālā i ka mahii‘a o kēla mua aku”, a workshop focused on visioning the future of aquaculture in Hawai‘i.

There are two aquaculture projects that have been located within sanctuary boundaries (Crecco 2013). In 1999, Cates International launched a biconical sea cage, the SeaStation 3000 that produced 70,000 Pacific threadfin fingerlings (aka moi) for sport fishing (Davidson 2006). Currently, Blue Ocean Mariculture supports an active aquaculture farm near Kona, Hawai‘i. Their hatchery facility is located at the Natural Energy Laboratory of Hawaii Authority (NELHA). They produce Hawaiian Kampachi™ for distribution in Hawai‘i and the U.S. mainland. Blue Ocean claims to maintin a very low fish biomass levels relative to the rate of water exchange in an effort to preserve good water quality (Blue Ocean 2013). They also report conducting comprehensive testing of the local benthos based on protocols set by the U.S. Environmental Protection Agency and the State of Hawaii Department of Health (Blue Ocean 2013).

7.2.3.3. Tourism and Recreation

The tourism and recreation sector is the largest industry in the Hawai‘i ocean economy. In 2009 it employed 93.5% of all ocean workers and produced 87.6% of the Hawai‘i ocean economy’s GDP (ENOW Final Economic Report 2012).

Tourism

The economy of Hawai‘i has been dependent on tourism and tourism-related activities since statehood in 1959 (Monk Seal PEIS 2014). In 2011, visitor-related expenditures reached nearly 14 billion dollars to the local economy in Hawai‘i and contributed over a billion dollars in state tax revenue. An estimated 121,800 jobs in the State are in industries related to tourism (**Table 23**).

Year	Visitor-related expenditures (million dollars)	Gross domestic product (million dollars)	Household income (million dollars)	State tax revenues (million dollars)	Jobs (1,000)
2002	11,045.5	8,789.0	5,432.0	879.7	159.6
2003	11,468.3	9,139.4	5,600.8	876.5	161.9
2004	12,406.8	9,800.3	5,967.3	919.9	163.1
2005	13,554.6	10,675.9	6,427.6	1,007.5	171.4
2006	14,198.4	11,348.9	6,484.5	1,104.2	167.1
2007	14,568.0	11,505.0	6,567.9	1,171.7	163.4
2008	13,090.4	10,696.1	5,779.3	986.1	141.5
2009	11,587.5	1/ 8,898.0	5,436.8	890.7	125.3
2010	12,618.1	9,689.4	5,148.2	971.6	114.8
2011	13,839.3	10,627.2	5,646.5	1,065.6	121.8
2012	16,109.2	12,370.2	6,572.5	1,260.3	136.9
2013	16,367.4	12,568.5	6,677.9	1,260.3	134.2

Table 23. Economic activity generated by visitor-related expenditures (2002-2013).
Source: *Hawai'i State Data Book 2013.*

Year	Visitor Arrivals (staying overnight or longer)	Average Number of Visitors/Day	Estimate Visitor Expenditures (millions of dollars)
1993	6,070,995	100,430	7,808
1994	6,364,674	107,904	9,544
1995	6,546,759	105,649	10,067
1996	6,723,141	106,404	9,569
1997	6,761,135	108,019	10,102
1998	6,595,790	112,068	9,910
1999	6,741,037	117,998	9,844
2000	6,948,595	123,441	10,396
2001	6,303,791	118,106	8,916
2002	6,389,058	121,030	9,465
2003	6,380,439	123,389	9,889
2004	6,912,094	132,355	10,702
2005	7,416,574	144,396	11,696
2006	7,528,106	149,545	12,301
2007	7,496,820	150,960	12,626
2008	6,713,436	135,239	11,220
2009	6,420,448	129,100	9,819
2010	6,916,894	136,407	10,889
2011	7,174,397	142,027	12,070
2012	7,867,143	201,267	14,365
2013	8,003,474	202,976	14,521

Table 24. Select tourism statistics for the State of Hawai'i (2013).
Source: *Hawai'i State Data Book 2013.*

Approximately 8 million people visited Hawai‘i in 2013. This is a 1.7% increase from 2012, however it is still lower than 2006 when total visitor arrivals reached over 7.5 million. Tourism in the State declined from 2006 through 2009 but visitor arrivals have steadily increased since then. In 2013, the average number of visitors per day averaged 202,976 with a majority of visitors on O‘ahu (88,980), followed by Maui (48,054). Fewer visitors travel to Hawai‘i (26,550) or Kaua‘i (20,816) with the least number of visitors arriving in Lāna‘i (723) and Moloka‘i (701). Visitors who arrive by air stayed an average of nine days in Hawai‘i. Total spending by visitors in Hawai‘i in 2013 was just over $14 billion, nearly 23% greater than 2009 (approximately $9.8 billion). Tourism expenditure peaked in 2006 at $2.7 billion but then declined in 2008 and 2009.

Hawai‘i is a popular destination for both domestic and international tourists. A majority of visitors to Hawai‘i travel from the United States (65%). Japanese and Canadian tourists are the top two international tourist groups. Other major market areas include Oceania (particularly Australia), Europe, and Latin America (Hawai‘i State Data Book 2011).

The travel and tourism industry has been recognized as a key driver for economic recovery and reinvestment in the United States. In 2012, President Obama signed an executive order establishing a Task Force on Travel and Competitiveness as part of a comprehensive effort to spur job creation across the country (Executive Order 13597, 2012). The Task Force developed a National Travel and Tourism Strategy to promote domestic and international travel throughout the United States. The strategy further proposes to attract 100 million international visitors annually by the end of 2021, more than a 50 percent increase over the number expected in 2012. This could have significant impacts on the State of Hawai‘i, which currently welcomes 7.8% of all international visitors to the United States (DOC Office of Travel & Tourism Industries). The National Travel and Tourism Strategy suggests that National Marine Sanctuaries and National Parks are central to attracting new visitors.

The Hawaiian Islands Humpback Whale National Marine Sanctuary is actively contributing to the President’s goal and National Travel and Tourism Strategy. Turtle Bay Resort, LLC, signed a Memorandum of Agreement (MOA) with the sanctuary in August 2012 to work together to increase public awareness about sanctuary programs and its special places. Turtle Bay Resort is located on the north shore of O‘ahu and provides humpback whale watching and learning opportunities to 75,000 visitors annually. Turtle Bay Resort and sanctuary staff jointly provide educational opportunities to learn about marine conservation to reach broader audiences including the north shore communities, residents of Hawai‘i, and local, national, and international visitors.

The sanctuary also entered into an MOA with Oceanology, LLC (2012). The purpose of the MOA is to provide marine conservation information to residents of Hawai‘i, local, national, and international visitors, with a focus on the communities of Lahaina and Ka‘anapali, Maui. Sanctuary staff will support Oceanology to educate and inform residents and visitors on the

importance of the sanctuary, the role it plays to generate revenue, and develop opportunities for the business community to support the sanctuary, in addition to outreach opportunities for Whalers Village and Whalers Village Museum and a number of other tourist, visitor, and community initiatives as identified in the MOA.

Recreation

Recreation activities in Hawai‘i are primarily centered on the ocean. Ocean based recreation includes surfing, pleasure boating, fishing, swimming, snorkeling, SCUBA-diving, whale-watching, water-skiing, kite-boarding, kayaking, relaxing at beaches, and cruises, among others (Monk Seal PEIS 2014). There are an estimated 52 scuba dive shops in Hawai‘i with 22 on O‘ahu, 21 on Maui, six on Kaua‘i, two on Hawai‘i Island and one on Lāna‘i.

Recreation activities contribute significantly to the local economy in Hawai‘i. Ocean recreation in Hawai‘i supports an $800 million industry (DOBOR 2011). As a result of population growth and demand for new products and destinations, ocean recreation in the State is increasing (DOBOR 2009). In 1999, the direct revenues from the ocean tour boat industry in the State were approximately $132 million (Utech 2002).

The State of Hawai‘i has nearly 185 miles of sandy shoreline. Over 24 miles of this shoreline is safe, clean, accessible, and generally considered suitable for swimming. There are also 1,600 surf sites throughout the State.

Area	State total	Hawai‘i	Maui	Lāna‘i	Moloka‘i	O‘ahu	Kaua‘i
Miles of sandy shoreline:	184.9	19.4	32.6	18.2	23.2	50.3	41.2
- Safe, clean, accessible	24.4	1.2	7.9	-	-	12.5	2.8
- Other	160.5	18.2	24.7	18.2	23.2	37.8	38.4
Numbers of surfing sites (4)	1,600	185	212	99	180	594	330

Table 25. Surfing sites in Hawai‘i.[10]
Source: *Hawai‘i State Data Book 2013.*

The tour boat industry includes whale watching, snorkeling, dinner cruises, and sunset cruises, and is a growing segment of Hawai‘i’s economy. In 1999, the largest share of the revenue is from snorkeling tours (approximately $67 million) and dinner cruises (approximately $47 million). Tours in Maui brought in the highest revenue followed by those in O‘ahu. The total economic impact, including direct, indirect, and induced revenues was estimated to be $225 million. The industry supported 3,232 jobs in 1999. Between 1990 and 1999, revenues from this industry in the Hawai‘i Island, Maui and Kaua’i increased by 25% in real terms (Utech 2002).

The whale watching industry in Hawai‘i plays a strong role in the state’s economy contributing $11 million in total revenues annually, with a total economic contribution of up to $74 million

[10] A surfing site is defined as “specific wave-breaking zone caused by a shoal and having sufficient consistency to be identified as a surfable riding area, either seasonally or in a combination of seasons.

per year. Approximately 50 operators statewide hosted whale watching tours to an estimated 330,000 people during the 120-day migration season in 2008 (ONMS Socioeconomic Fact Sheet 2011).

The Hawai‘i Tourism Authority has established a number of portfolio sporting events with partners that include professional surfing competitions, transpacific yacht races, world championship triathlons, the NFL Pro Bowl, the PGA Tour, and international fishing tournaments, to enhance the economy and quality of life. A few notable major sporting events include the Hawaiian Iron Man Triathlon, XTERRA Trail Running World Championship, Diamondhead Basketball Classic, the Sheraton Hawai‘i Bowl, and several premier golf championships.

There are seven major National Parks in Hawai‘i. Hawai‘i Volcanoes National Park is the largest (323,431 acres), and the most visited park is the U.S.S. Arizona Memorial which received nearly 1.7 million visitors in 2011.

National Park	Acreage	Visits
Hawai‘i Volcanoes National Park	323,431	1,583,209
Haleakalā	33,264	785,300
Pu‘uhonua o Honaunau National Historic Park	420	363,282
Kaloko-Honokohau National Historic Park	1,163	158,124
Pu‘ukoholā Heiau National Historic Park	86	125,645
U.S.S. Arizona Memorial	59	1,786,024
Kalaupapa National Historic Park	10,779	101,112

Table 26. Visitors and acreage of National Parks in Hawai‘i (2013).
Source: *Hawai‘i State Data Book 2013.*

Hawai‘i also has seven State managed parks that offer recreational opportunities. Wailua River State Park is the smallest however the park welcomes the most visitors.

State Park	Acreage	Visits
Nāpali Coast State Wilderness Park	6,175.0	423,100
Ahupua`a `O Kahana State Park	5,256.5	88,200
Kōke‘e State Park	4,345.0	303,900
Waimea Canyon State Park	1,866.4	430,700
Kekaha Kai State Park	1,642.5	235,000
Sacred Falls (Kaluanui) State Park	1,375.9	(NA)
Wailua River State Park	1,093.0	888,100

Table 27. Visitors and acreage of State Parks (2013).
Updates to visitation have not been conducted since 2007.
Source: *Hawai‘i State Data Book 2011.*

7.2.3.4. Education

Sanctuary education programs seek to enhance public awareness, understanding, appreciation, and wise and sustainable use of the marine environment, and the natural, historical, cultural and

archeological resources of the National Marine Sanctuary System (16 U.S.C. §1431(b)(4)). They are designed to enhance public awareness, understanding and appreciation of the sanctuary and its resources, and to inspire and support stewardship activities. In Hawai‘i, the sanctuary offices provide education programs that have focused on making constituents aware of humpback whales and the ocean they live in, with the understanding that ocean-literate citizens will help protect not only endangered humpback whales, but also all natural resources. Sanctuary education staff on O‘ahu, Kaua‘i, and Maui coordinate with non-profit organizations and the local communities to further promote messages of sustainable use and marine conservation. Between 2008 and 2013, the sanctuary participated in over 150 community events, reaching over 100,000 people. Events included naturalist trainings, public lecture series, and trainings for different user groups, citizen scientist projects, teacher workshops, student presentations, field studies, and community outreach events. The sanctuary offices also offer education cruises for high school students on NOAA ships.

The Sanctuary Ocean Count project aims to increase public awareness of the sanctuary to protect species, and current ocean issues, including threats to humpback whales while also promoting responsible viewing of all marine wildlife. The project was initiated as a means to provide Hawai‘i residents and visitors (national and international) with the opportunity to observe humpback whales in their breeding grounds by conducting a yearly shore-based census during the peak-breeding season. Although the census does not claim to provide scientifically accurate results, it serves as a tool to supplement scientific information gathered from other research activities. The count also provides snapshot data as well as information on how whales use inshore waters on an average peak season day.

7.2.3.5. Research and Monitoring

The sanctuary is an important partner in marine science research and education efforts in Hawai‘i. Monitoring the health of the humpback whale population is an ongoing research activity conducted in partnership with several collaborators. New methodologies to identify whales, improve disentanglement gear, collect biopsy tissues to assess body condition and potential diseases, stranding response protocols, and a variety of other projects, are a vital component of the research and monitoring program. A few ongoing research projects include underwater behavior and acoustic study of humpback whales, air photo identification to determine a number of traits, assessment of probability of vessel strikes, function of whale songs, and reproductive and calving characteristics.

The sanctuary initiated, helped coordinate, and was a key collaborator in a North Pacific wide humpback whale study called SPLASH (Structures of Population, Levels of Abundance and Status of Humpback Whales). The SPLASH was, and is still, one of the largest whale research projects to date, encompassing over 50 research groups and more than 400 researchers in 10 different countries, pooling resources towards gaining information on the humpback whales' numbers, population structure, and overall health throughout the entire North Pacific Ocean (Calambokidis 2010). In addition, since 2002, the sanctuary has been conducting its Large Whale Response Program within the broader framework of national and international programs aimed at gaining information toward understanding and reducing the threat of entanglement, whale-vessel collisions, and other threats for large whales in the North Pacific and elsewhere.

7.3. Institutional Environment

The Hawaiian Islands Humpback Whale National Marine Sanctuary staff work with numerous State of Hawai‘i government offices, federal agencies, and non-profit organizations. This section provides a description of these authorities and jurisdictions.

7.3.1. State Government

Office of Hawaiian Affairs

The Constitution of Hawai‘i established the Office of Hawaiian Affairs (OHA) under the terms of Article XII, Sections 4 through 7, in 1978. OHA is charged with the administration of 1.8 million acres of royal land held in trust for the benefit of Native Hawaiians. OHA functions both as a government agency with a strong degree of autonomy and as a trust, under the direction of nine trustees elected statewide. OHA manages a property and monetary trust, funded in part by a pro rata share of income derived from the ceded lands portion of the public land trust, for Native Hawaiians. The purpose of OHA is to provide the opportunity for a better life and future for all Hawaiians.

Department of Land and Natural Resources

The Department of Land and Natural Resources (DLNR), established under Hawai‘i’s Revised Statutes, section 26-15, is headed by the Board of Land and Natural Resources. The DLNR is responsible for the management of the State’s public lands and the water and mineral resources on those lands. The DLNR’s jurisdiction encompasses nearly 1.3 million acres of state lands, beaches, and coastal waters including 750 miles of coastlines, state parks, historical sites, forest and forest reserves, aquatic life and its sanctuaries, public fishing areas, ocean recreation and coastal programs, wildlife and game management areas, public hunting areas, and natural area reserves.

Administrative rules for the DLNR are found in the Hawai‘i Administrative Rules (HAR), Title 13, Chapters 1 and 8. The Divisions of Aquatic Resources, Boating and Ocean Recreation, Conservation and Resources Enforcement, State Parks, Forestry and Wildlife, State Historic Preservation, and Office of Conservation and Coastal Lands, are located within the DLNR. The administrative rules for each of these DLNR Divisions are mentioned in the respective section below and the details are available on the DLNR website.

Division of Aquatic Resources

The Division of Aquatic Resources (DAR) is responsible for managing Hawai‘i’s marine and freshwater resources. Management programs include commercial fisheries and resource enhancement, aquatic resources protection, habitat management, and recreational fisheries. The administrative rules for these programs are under Hawai‘i Administrative Rule § 13-4. Major program areas include projects to enhance long-term sustainability of the fisheries resources, protect and restore the aquatic environment, protect resident aquatic and native species and their habitat, and provide facilities and opportunities for recreational fishing.

No license is required for marine recreational fishing in Hawai‘i. The DAR issues permits and licenses for freshwater fishing, selling aquatic life and other aquatic resources activities. Most licenses and permits are available at DAR offices and information regarding commercial,

bottom, and freshwater fishing regulations and pertinent water and marine resources information is available on the DAR website.

The DAR is responsible for establishing Marine Life Conservation Districts (MLCD) as authorized by chapter 190, Hawai‘i Revised Statutes, to conserve and replenish marine resources of the State. MLCDs include Hanauma Bay, Pūpūkea, and Waikīkī on O‘ahu, Kealakekua Bay, Lapakahi, Old Kona Airport, Waialea Bay and Waiopae Tidepools on Hawai‘i Island, and Honolua-Mokule‘ia Bay, Manele-Hulopo‘e, and Molokini Shoal on Maui. MLCDs are designed to conserve and replenish marine resources, thus fishing and consumptive uses are limited or prohibited entirely within them.

The DAR is also responsible for the management of a number of other marine managed areas, including bottom restricted fishing areas, fishery management areas, fishery replenishment areas, other marine managed areas, and public fishing areas.

Division of Boating and Ocean Recreation
The Division of Boating and Ocean Recreation (DOBOR) is responsible for the management and administration of statewide ocean recreation and coastal areas programs which includes 21 small boat harbors, 54 launching ramps, 13 offshore mooring areas, 10 designated ocean water areas, 108 designated ocean recreation management areas, associated aids to navigation throughout the State, and beaches encumbered with easements in favor of the public. The DOBOR manages all harbors and boating facilities that are located within the sanctuary.

The DOBOR’s jurisdiction covers the “waters of the State.” According to Hawai‘i Revised Statue, Section 200-23, this means “any waters within the jurisdiction of the State, the marginal seas adjacent to the State, and the high seas when navigated as part of a journey to or from the shores of the State.” This includes all coastal waters out to 3 nautical miles and all interisland traffic. DOBOR shares water management responsibility with numerous other state and federal agencies, therefore many management decisions are determined on a case-by-case basis.

The DOBOR manages Designated Ocean Recreation Management Areas (ORMA). The purpose of ORMAs are to (1) provide for increased public access, (2) reduce user conflicts, (3) promote overall public safety, and (4) avoid possible adverse impacts to humpback whales or other marine life (Hawai‘i Administrative Rule § 13-256-16). Also, ORMAs are established to control certain commercial activities within designated locations and time periods as well as regulate equipment types. Both recreational and commercial vessels may operate within an ORMA when authorized. There are 28 ORMAs located within sanctuary waters.

Division of Conservation and Resources Enforcement
The Division of Conservation and Resource Enforcement (DOCARE) is responsible for enforcing all laws relating to conservation, natural, cultural, and historic resources in Hawai‘i. State law enforcement officers enforce all state laws involving state parks, historical sites, forest reserves, aquatic life and wildlife areas, coastal zones, conservation districts, shorelines, and small boat harbors. The DOCARE law enforcement personnel work in collaboration with NOAA Office of Law Enforcement and the U.S. Coast Guard on unauthorized activities within the sanctuary.

Division of State Parks
The Division of State Parks is responsible for the administration of the State Park System and the State's recreation planning program. The authorities and jurisdictions for the Hawai'i State Park System are in the Hawai'i Administrative Rules, Title 13, DLNR, chapter 146. The Division plans, constructs, operates, and maintains state park facilities and develops interpretive programs for park visitors in effort to promote resource protection. The Division manages and administers 52 state parks comprised of nearly 25,000 acres on the five major islands, with several parks located on shorelines within the sanctuary.

Division of Forestry and Wildlife
The Division of Forestry and Wildlife (DOFAW) is responsible for the management of state-owned forests, public hunting areas, plant and wildlife sanctuaries, and the natural area reserves. There are 47 coastal, offshore, wetlands, and mountain sanctuaries, which have either prohibited or restricted entry unless under permit. Program areas include introduced species control, pest management, forest management, fire management, trail system and camping management, watershed protection, and the Natural Area Reserves System.

The Natural Area Reserves (NAR) are managed by DOFAW, established by chapter 195 of the Hawai'i Revised Statutes. DOFAW is mandated to manage the NARs to remain as unmodified as possible and a special use permit is required for any activity to be conducted within a NAR. There are two NARs located in the mountains of Maui in an ahapua'a above the sanctuary.

State Historic Preservation Division
The State Historic Preservation Division (SHPD) is responsible for the management of cultural and historic sites throughout the islands. Administrative rules pertaining to historic preservation are found in Title 13, subtitle 8. Programs are administered through three branches: History and Culture, Archaeology, and Architecture. The statewide inventory of historic properties contains information on more than 38,000 sites in Hawai'i, many of which are in the sanctuary.

Office of Conservation and Coastal Lands
The Office of Conservation and Coastal Lands (OCCL) is responsible for ensuring environmentally responsible regulatory management of approximately 2 million acres of private and public lands within the State Land Use Conservation District. In 1961 the State Land Use Law (Act 187; codified as Hawai'i Revised Statute, chapter 205) established the State Land Use Commission (LUC) and granted the LUC the power to zone all State lands into three districts: agriculture, conservation, and urban, with rural district added in 1963. The OCCL acts as the zoning authority for proposed and ongoing activities on public and private lands in the conservation districts, and for coastal lands out to the seaward extent of the State's jurisdiction.

Office of Planning
The State of Hawai'i Office of Planning is responsible for assisting the Governor in the overall analysis and formulation of state policies and strategies. The Office operates with direction from (1) the Hawai'i State Planning Act, which is a broad policy document that sets the table for all activities, programs, and decisions made by the local and state agencies; and (2) the New Day Comprehensive Plan, which outlines the Administration priorities. The Office of Planning includes the Special Plans Branch, the Geographic Information Systems Program, and the Coastal Zone management Program.

Coastal Zone Management Program

The Coastal Zone Management (CZM) Program acts as the State's resource management policy umbrella for the design and implementation of land and water uses and activities throughout the State. The federal CZM Program was created through passage of the Coastal Zone Management Act (CZMA) of 1972 and codified in 1977 in the Hawai'i Revised Statutes, Chapter 205A. The purpose of this law is to provide for the effective management, beneficial use, protection, and development of the coastal zone. This federal-state partnership has served to facilitate responsible protection, restoration, and development of coastal communities in Hawai'i.

The CZM area of responsibility includes the entire State since there is no point of land more than 30 miles from the ocean. The Native Hawaiian ahupua'a land use system prevails in the CZM program with the land-sea connection throughout the State.

To assist with federal project planning, the CZM Program uses the Federal Consistency Review as established under the CZMA. The CZMA requires federal activities and development projects to be consistent with approved state and coastal programs to the maximum extent practicable. This federal consistency review process allows the State to coordinate and plan for integrated resource management with proposed federal actions in Hawai'i.

Hawai'i Ocean Resources Management Plan

The Hawai'i Ocean Resources Management Plan (ORMP) is a statewide plan that sets forth the State's ocean and coastal resource management priorities. The ORMP supports effective management, beneficial use, protection, and development of the State's coastal zone, which includes all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea. The ORMP is a requirement under Hawai'i Revised Statutes §205A-3 and is a major component of the State's Coastal Zone Management (CZM) Program.

The ORMP was updated in July 2013, and serves as a road map for managing ocean resources in the islands, based on recognition of the ecological connections between the land and sea, the link between human activities and its impacts on the environment, and the need for improved collaboration and stewardship in natural resources governance. The ORMP works by identifying eleven management priorities for the next five-year planning period, by identifying responsible agencies and resources, and by providing a method for performance measures and reporting.

Sanctuary staff participated in the update of the ORMP and the sanctuary is listed as a partner on seven of the eleven Management Priorities in the plan: Marine Resources, Coral Reefs, Ocean Economy, Cultural Heritage of the Ocean, Training, Education and Awareness, Collaboration and Conflict Resolution, Community and Place-Based Ocean Management Projects.

Aha Moku Advisory Council

The Aha Moku Advisory Committee was established within the Department of Land and Natural Resources to advise the Chairperson of the Board of Land and Natural Resources on issues related to land and natural resources management. In July, 2012, Governor Abercrombie signed into law H.B. 2808, Act 288, to formally recognize the Aha Moku system and establish the Committee. The Chairperson of the Board of Land and Natural Resources has oversight of the Aha Moku Avisory Committee.

The aha moku is a system of best practices based on the indigenous resource management practices of moku (regional) boundaries that take into account the natural contours of the land, the resources therein, and methodologies needed to sustain those resources and the community. The aha moku advisory committee serves to foster understanding and practical use of Native Hawaiian expertise and methodology to promote responsible stewardship throughout the 43 moku in Hawai‘i.

The aha moku advisory committee is made up of eight members appointed by the Governor and confirmed by the senate. The members are appointed from a list submitted by the aha moku councils of each island. Sanctuary staff recognize the expertise the aha moku advisory committee has to offer to the Hawaiian Islands and the sanctuary and look forward to their support and continued collaboration.

7.3.2. Federal Government

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

NOAA Fisheries is tasked with managing the marine resources in federal waters in the Pacific Region. The primary laws NOAA Fisheries is responsible for implementing within the region are the Magnuson- Stevens Fisheries Conservation and Management Act (MSFCMA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Presidential Proclamations for Pacific Marine National Monuments. The Pacific Islands Region is bound by the Mariana’s Archipelago in the west, the U.S. Pacific Remote Islands in the south, and the Hawaiian Archipelago in the north. The U.S. EEZ that lie within this region total about 1.5 million square nautical miles, roughly equal to all the U.S. EEZ waters surrounding the continental U.S., including Alaska.

NOAA Fisheries jurisdiction includes activities in both domestic and international waters with emphasis on managing fisheries stocks in the U.S. EEZs in American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Pacific Remote Islands (Kingman Reef, Howland, Baker, Jarvis, and Wake Islands, and Johnston, Midway, and Palmyra Atolls) and Hawai‘i.

The Pacific Islands Regional Office (PIRO) is responsible for drafting and implementing federal fishery regulations, issuing federal fishing permits, and monitoring fisheries through its Observer Program. Other major Fisheries Service responsibilities include the coordination with international organizations to implement and monitor fishery agreements and treaties, conservation and recovery of protected species, the preservation and restoration of marine habitat and co-management of four Marine National Monuments in the Pacific.

Sanctuary staff works closely with PIRO, primarily with the Sustainable Fisheries, Protected Resources, and Habitat Conservation Divisions.

Western Pacific Fisheries Management Council

The Western Pacific Fisheries Management Council (WPFMC) is one of eight regional fishery management councils established by the Magnuson Fishery Conservation and Management Act (MFCMA) of 1976. The most significant accomplishment of the Act was to guide development of the domestic fishing industry by phasing out foreign fishing in the U.S. EEZs. The MFMCA

was amended in 1996 with goals to rebuild overfished fisheries, protect essential fish habitat, and reduce bycatch. The Council is made up of 16 members representing a cross-section of the regional communities and several Council advisory groups to develop ecosystem-based fishery management plans. Management measures created by the Council and approved by the Secretary of Commerce are implemented by NOAA Fisheries PIRO and enforced by the NOAA Office of Law Enforcement, the U.S. Coast Guard and local enforcement agencies.The WPFMC area of responsibility includes American Samoa, Guam, Northern Mariana Islands and the State of Hawai‘i. Fishing activities in the sanctuary are managed by the WPFMC, NOAA Fisheries, and the State of Hawai‘i Department of Land and Natural Resources, Division of Aquatic Resources.

Office of Law Enforcement
As part of NOAA Fisheries, the NOAA Office of Law Enforcement (OLE) is responsible for the enforcement of NOAAs mandates, primarily the NMSA, MSFCMA, MMPA, and ESA, in the Pacific U.S. EEZs. To execute the enforcement functions within this vast region, the OLE has offices in Honolulu, Hawai‘i, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.

NOAA’s policy for enforcement within national marine sanctuaries is to prevent violations of the National Marine Sanctuaries Act through education, patrols, inspections, and investigations. Education is the primary tool to inform the public of the sanctuary regulations and guidelines to prevent unauthorized activities and threats to the humpback whales and associated marine resources. Sanctuary personnel assist the OLE with comprehensive forums and education and outreach materials to inform the public of the regulations and guidelines for long-term resource conservation and protection.

Enforcement of the sanctuary regulations and guidelines are also conducted through OLE patrols, inspections and investigations. To fulfill the enforcement mandates, OLE has secured the assistance of the U.S. Coast Guard (USCG) through an MOA for surveillance and enforcement in the sanctuary. In addition, OLE has entered into an agreement with the State of Hawai‘i DLNR to assist with enforcement, inspections, and investigations of unauthorized activities in sanctuary waters.

Pacific Islands Fisheries Science Center
The Pacific Islands Fisheries Science Center (Science Center), within NOAA Fisheries, administers scientific research and monitoring to support domestic and international conservation and management of the living marine resources within the NOAA Fisheries Pacific Islands Region of responsibility. The full suite of Science Center research themes and mandates that direct the key research and monitoring activities in the Pacific Region are identified in the Science Center 2013 Science Plan. The Science Center is responsible for research in ecosystems in the Western and Central Pacific Ocean including marine fisheries, protected species, such as the endangered Hawaiian monk seal, coral reefs, near island habitats and open ocean (pelagic) environments, and the human communities that depend on the natural marine environments. The Science Center research and monitoring mandates include the MSFCMA, MMPA, ESA, Coral Reef Conservation Act, international treaties, regional fishery management organizations related to the management of tuna fisheries, and U.S. government administrative and executive orders (i.e., presidential proclamations that created the Marine National Monuments). Within the

Science Center, the Coral Reef Ecosystem Division supports sanctuary personnel with coral reef monitoring and habitat mapping within the Hawaiian and sanctuary waters.

Office of Marine and Aviation Operations
NOAA's fleet of aircraft and ships is managed and operated by the Office of Marine and Aviation Operations (OMAO). Highly skilled NOAA Commissioned Corps officers and Wage Mariner civilians play a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data as well as ocean exploration, research, nautical charting, and ocean and climate studies from the aircraft and vessels. One NOAA Corps Officer is assigned to the sanctuary in the Maui office. The sanctuary staff relies on the support of the NOAA Corps Officer to use the NOAA small boats to conduct research and on-water responses. One NOAA Corps officer is also assigned to the ONMS Pacific Islands Region in Honolulu. OMAO staff also operate research vessels *Oscar Elton Sette*, *Ka'imimoana*, and *Hi'ialakai* in support of NOAA's mission.

National Centers for Coastal Ocean Science
NOAA's National Center for Coastal Ocean Science (NCCOS), within NOAA National Ocean Service, conducts and supports research, monitoring, assessment and provides technical assistance for managing coastal ecosystems and society's use of them. NCCOS' mandates include the National Coastal Monitoring Act, Coastal Ocean Program, Harmful Algal Bloom and Hypoxia Research and Control Act, National Contaminated Sediment Assessment and Management Act, Oceans and Human Health Act, NOAA Strategic Plan, Council on Environmental Quality Ocean Policy Task Force, Oceans and Human Health Act, and the Marine Pollution and Sanctuaries Act. NCCOS have conducted numerous research projects in the Hawaiian Islands and the sanctuary. The research reports and maps are available on the NCCOS website. Most notable and beneficial to sanctuary resource managers is the NCCOS benthic habitat classification manual, benthic habitat map for the nearshore waters of the populated Hawaiian Islands, and supplemental geospatial data.

Office for Coastal Management
NOAA's Office for Coastal Management was established in 2014 when NOAA combined two offices: the Coastal Services Center and the Office of Ocean and Coastal Resource Management. In addition to implementing specific initiatives, a top priority for NOAA's Office for Coastal Management is to unify efforts to make communities more resilient. Many organizations are involved, including the private sector, nonprofits, the scientific community, and all levels of government. The Office for Coastal Management works to be a unifying force in these efforts, providing unbiased NOAA data and tools and providing opportunities for the community to come together to define common goals and find ways to work smarter by working together. Issues run the gamut from protecting endangered species to erosion to generating better building codes for storm-resistant buildings.

Office of Response and Restoration
The Office of Response and Restoration (OR&R), within NOAA National Ocean Service, is responsible for protecting and restoring NOAA trust resources as mandated by the Marine Debris Act Amendments of 2012, the Clean Water Act, the Comprehensive Environmental Response, Compensation and Liability Act, the National Marine Sanctuaries Act, the Oil Pollution Act and other related laws. The OR&R provides expertise in preparing for, evaluating, and responding to

coastal ecosystem threats including oil and chemical spills, releases from hazardous waste sites and marine debris. The OR&R has three divisions; the Emergency Response Division (ERD), the Assessment and Restoration Division (ARD), and the Marine Debris Division.

Under the National Contingency Plan, NOAA ERD is responsible to provide scientific expertise to support the federal on-scene coordinator for hazardous material and oil spills. ERD supports scientists are available 24-hours, 7-days per week to respond to spill events. The ERD works to prevent and mitigate harm to coastal resources and is the primary NOAA office responding to oil spills and hazardous material releases. ERD provides scientific support to the U.S. Coast Guard for spills and technical assistance to other agencies for hazardous material releases.

Following a hazardous waste release, vessel grounding or oil spill, the ARD is responsible for evaluating and restoring coastal and estuarine habitats damaged. To assist with this, the ARD has joined with NOAA's General Counsel for Natural Resources and Office of Habitat Conservation to create the Damage Assessment, Remediation and Restoration Program (DARRP). In addition, the ARD may conduct Natural Resources Damage Assessment (NRDA) following an oil spill is warranted. Through the NRDA process, the ARD and the DARRP would work cooperatively with local communities, the State, private companies, and government agencies to restore sites where a hazardous waste, oil spill, for vessel grounding has occurred.

The NOAA Marine Debris Division has served to coordinate, strengthen, and promote marine debris activities within the agency and among partners and the public since 2005. Following the 9.0 earthquake and tsunami that struck Japan in 2011, the Marine Debris Act Amendments of 2012 were enacted by the Congress to reauthorize and amend the Marine Debris Research, Prevention, and Reduction Act. The 2012 Amendments direct NOAA Marine Debris Program to address the adverse impacts of marine debris on the U.S. economy, the marine environment, and navigation safety through identification, determination of sources, assessment, prevention, reduction, and removal of marine debris.

United States Coast Guard

The Department of Homeland Security's U.S. Coast Guard (USCG) has broad responsibility for enforcing all federal laws and regulations throughout the Pacific and assists NOAA Fisheries and the sanctuary with the enforcement of NOAA's mandates. The USCG provides on-scene coordination with Regional Response Center facilities under the National Contingency Plan for removal of oil and hazardous substances in the event of a spill threatening sanctuary resources. The USCG is responsible for regulating vessel traffic, maintaining aids to navigation, increasing boater safety, and coordinating search and rescue operations.

Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) is an agency within the Department of the Interior that monitors, regulates and permits offshore conventional and renewable energy projects. BOEM produces a Five Year Outer Continental Shelf (OCS) Oil and Gas Leasing Program, which outlines the scope and location of potential future energy production, although there are no lease areas around the Hawaiian Islands because of the absence of oil and gas resources. BOEM also grants leases for offshore renewable energy projects. In addition to leasing resources, BOEM evaluates national offshore resource reserves from a technical and economic perspective. The Office of Environmental Protection within BOEM conducts research on the environmental safety of ocean energy projects. BOEM established the Hawai'i OCS

Renewable Energy Task Force to evaluate and facilitate offshore energy development in Hawai‘i, particularly concerning the installation of power cables between islands. Members of the intergovernmental task force include representatives of federal, state and local government agencies, and offices that coordinate with Native Hawaiians. The sanctuary is an active member of this task force.

U.S. Army Corp of Engineers

The U.S. Army Corp of Engineers (USACE) is a division of the U.S. military that builds and maintains public infrastructure and military facilities. USACE undertakes public works projects such as dredging marinas, building levees, constructing military bases and more. With around 37,000 civilian and military employees, USACE works internationally in 130 countries. In the Honolulu District of USACE, civil works programs focus on water resource development including boating safety, coastal storm resilience and ecosystem restoration.

United States Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS), with the Department of Interior, works to conserve, protect and enhance fish, wildlife and plants and their habitats. USFWS aims to instill an environmental stewardship ethic, manage the nation's fish and wildlife resources and provide the public with opportunities to responsibly engage with those resources. USFWS enforces federal wildlife laws to protect endangered species and conserve and restore wildlife habitat. They manage a variety of natural resources from migratory birds and fisheries to wetlands and other refuges. USFWS manages the 150 million-acre National Wildlife Refuge System of more than 551 National Wildlife Refuges and thousands of small wetlands and other special management areas. Under the Fisheries program, USFWS also operates 70 National Fish Hatcheries, 65 fishery resource offices and 86 ecological services field stations. The vast majority of fish and wildlife habitat is on non-Federal lands so USFWS partners with state agencies, local organizations and private land-owners to foster aquatic conservation and assist voluntary habitat conservation and restoration. In the sanctuary, USFWS is responsible for protecting migratory seabirds pursuant to the ESA and Migratory Bird Treaty Act (MBTA).

National Sea Grant College

The National Sea Grant College Program, which is within NOAAs Office of Ocean Exploration and Research, encourages the wise stewardship of marine resources through research, education, outreach and technology transfer. Sea Grant is a grant program working in partnership between the nation’s universities and NOAA. It began in 1966, when the U.S. Congress passed the National Sea Grant College Program Act. Sea Grant specializes in synthesizing the latest developments in marine research and making it accessible to the public. The sanctuary works closely with the University of Hawai‘i Sea Grant College Program to guide scientific research, increase public awareness of sanctuary issues, and promote ocean literacy.

United States Department of Defense

The U.S. Pacific Command, one of nine Combatant Commands located across the Continental U.S. and in Germany, is responsible for the U.S. armed forces activities in the Pacific Ocean area. The Commander, Pacific Command (PACOM), based in Honolulu, is the military authority to the U.S. Army Pacific Command, U.S. Air Force Pacific Command, the Marine Forces Pacific, and the Commander, U.S. Pacific Fleet. The U.S. Pacific Fleet, Navy, is the primary

Department of Defense (DOD) service with potential to conduct training exercises in or proximate to the sanctuary.

The Navy has identified the need to conduct current, emerging, and future training, research, and test and evaluation activities in the Hawai‘i Range Complex (HRC). The mission of the HRC is to support naval operational readiness by providing realistic training environment for forces assigned to the Pacific Fleet, the Fleet Marine Force and other users. The HRC encompasses the open ocean, offshore waters, and onshore areas located on or around the Hawaiian Islands. The HRC includes Hawaii OPAREA, which is composed of 235,000 square nautical miles of ocean area and airspace along with land ranges. The HRC, the sole range complex in the mid-Pacific, is a key training and testing area for the Navy because of its unique geographical attributes and proximity to Pearl Harbor and the Western Pacific. The HRC’s Pacific Missile Range Facility provides electronic tracking ranges that enable forces to train with safety and flexibility across the Pacific, including operations out of military facilities in California, Alaska and the western Pacific.

The HRC is used for training and assessment of operational forces, missile testing, testing of military systems and equipment, and other military activities. HRC is home to a broad spectrum of underwater, surface, and airspace instrumented range facilities. Notable instrumented range facilities in the HRC include arrays of underwater hydrophones (listening devices) on the seafloor off Kaua‘i and ship acoustic and electronic measurement capabilities off O‘ahu. Training minefields, which provide servicemen with the opportunity to train in detecting, avoiding or disabling, and placing mines, are located in all Hawaiian littoral waters, including off shore of O‘ahu, Ni‘ihau, and Kaho‘olawe.

Special Use Airspace is established by the Federal Aviation Administration (FAA) and exists throughout airspace above the Hawaiian Islands. Restricted Airspace exists adjacent to PMRF on Kaua‘i, around Ka‘ula Islet, and over Pohakula Training Area on the Island of Hawaii. Maritime Danger Zones and Restricted Areas are established by the Army Corps of Engineers and/or the U.S. Coast Guard.

The following are examples of U.S. Navy programs, initiatives, compliance requirements that directly or indirectly benefit marine resources:

- The Navy funds marine mammal monitoring to increase understanding of how at-sea training and testing activities affect marine species. These surveys and the data obtained through these studies support the Navy’s Integrated Comprehensive Monitoring Program**.** The Navy also co-funded surveys that have been conducted by National Marine Fisheries’ Pacific Island Fisheries Science Center. The Navy’s monitoring program uses a combination of techniques so that detection and observation of marine animals is maximized for the Hawaii Range Complex, and meaningful information can be derived to address monitoring objectives. For example, the monitoring objectives include: (1) increased understanding of likely occurrence of marine mammals or species in vicinity of Navy activities (presence, abundance, distribution, density); (2) increased understanding of how individual marine mammals or species respond to specific stressors both behaviorally and physiologically; and (3) increased understanding of how anticipated individual responses to individual stressors may impact long term fitness and survival or the impact of a population of marine mammals or species.

- In coordination with NOAA Fisheries, the Navy has developed a stranding response plan associated with the authorizations for at-sea training and testing activities in the Hawai‘i Range Complex. Through agreement with NOAA Fisheries, Navy may provide coordinated services to NMFS during uncommon stranding event investigations. Navy also developed a Regional Stranding Investigation Assistance Plan, which was entered into by Commander, Navy Region Hawaii with Pacific Islands Region Office of NOAA Fisheries in April 2013. Through the logistical assistance these agreements outline, NOAA Fisheries may be better able to investigate and understand causal effects of marine mammal strandings.

- In addition to other mitigation measures that Navy implements during training and testing activities at sea, since 2009, the Navy has instituted a specific mitigation measure recognizing the significance of the Hawaiian Islands for humpback whales. The Navy has designated a humpback whale cautionary area which consists of a 3.1 mi. (5 km) mitigation zone that has been identified as having one of the highest concentrations of humpback whales during the critical winter months. Training exercises in the humpback whale cautionary area require a much higher level of clearance than is normal practice in planning and conducting mid-frequency active sonar training.

- The Navy’s Pacific Missile Range Facility (PMRF) 2010 and Joint Base Pearl Harbor-Hickam (JBPHH) Integrated Natural Resources Management Plans (INRMP) 2011 afford conservation benefits. The primary goal of the INRMPs are to support and sustain the military mission on Kaua‘i and O‘ahu installations while managing, protecting, and enhancing biological diversity and ecosystem integrity of military lands and waters and associated endangered species and their habitats. Additionally, Integrated Cultural Resources Management Plans (ICRMP) have been prepared for Commander, Navy Region Hawaii (CNRH) facilities on Kaua‘i, at PMRF and on O‘ahu, at JBPHH. An ICRMP is intended to provide procedural guidance for identifying, evaluating, and managing historic properties located within military facilities.

The Department of Defense (DOD) is one of the primary users of the marine environment in Hawai‘i. Military operations occur throughout the Hawaiian Islands Humpback Whale National Marine Sanctuary. The DOD is currently subject to the ESA, the MMPA, and other relevant federal and state environmental laws. In addition, the DOD operating procedures include special precautions to ensure the protection of humpback whales prior to any training exercise or testing which may occur during whale season. A full list of DOD activities that occur within the Hawai‘i Range Complex can be found in Appendix C.

National Historic Preservation Act

The National Historic Preservation Act (NHPA; 16 U.S.C. 470 et seq.) is intended to preserve historical and archaeological sites in the United States of America. The act created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices. Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP (36 CFR 800).

7.4. Operational Environment

7.4.1. Human Resources

Sanctuary Superintendent

The sanctuary superintendent oversees site-specific management functions, including revising and implementing the management plan. The superintendent is responsible for implementing specific programs or projects, establishing the administrative framework to ensure all resource management activities are coordinated, and maintains and manages an appropriate infrastructure to adequately support site operations. The superintendent reports to the Regional Director for the Pacific Islands Region of the Office of National Marine Sanctuaries (ONMS). General responsibilities of the sanctuary superintendent include:

- Serve as the primary liaison between ONMS and the State of Hawai‘i
- Submitting an annual operating plan that recommends priorities to ONMS for annual allocation of funds for site operations and resource protection;
- Formulating and directing research, education, marine resource management, cultural liaison programs and partnerships locally, nationally, and internationally;
- Determining staffing needs and requirements;
- Coordinating with ONMS in evaluating, processing, and issuing permits and conducting inter-agency consultations;
- Coordinate and consult with other resource management agencies, including regional, federal, state and local agencies;
- Working closely with constituents and the community; and
- Evaluating progress made toward achieving sanctuary goals and objectives.

State Co-Manager

The State co-manager is designated by the State of Hawai‘i to act as a liaison to the sanctuary. General responsibilities of the State co-manager include coordinating with the State on:

- State consultation on permit applications, enforcement activities, and use of recovered civil penalties;
- Communicating with DLNR and the Governor on federal sanctuary emergency regulations;
- State consultation on proposed changes to the management plan and regulations including approval of any substantive amendment or regulation by the Governor; and
- Any fishing regulations proposed to the State Board of Land and Natural Resources before those regulations may be promulgated as federal sanctuary regulations.

Sanctuary Staff

Basic staffing supports program activities in eight functional areas: (1) operations; (2) education and outreach; (3) policy; (4) resource protection; (5) science; (6) communications; (7) cultural resources; and (8) maritime heritage resources. Sanctuary staff have knowledge and expertise in policy, marine resource management, education and outreach, scientific research and monitoring program development, cultural and maritime resource protection and office administration.

7.4.2. Infrastructure

The sanctuary is comprised of five separate marine protected areas in the Hawaiian Islands adjacent to Kaua‘i, O‘ahu, Moloka‘i, Lāna‘i, Maui, and Hawai‘i Island. In order to effectively manage these areas and implement this management plan, NOAA has sanctuary offices in Līhu‘e on Kaua‘i, Honolulu on O‘ahu, and Kīhei on Maui. The function of these offices is to provide an effective means to coordinate and communicate with communities while managing the sanctuary’s resources. These offices range from housing a few staff to housing multiple staff, as well as visitor facilities, meeting rooms, and supporting field operations including the use of small boats.

Kaua‘i

The sanctuary is located on the north shore of Kaua‘i and includes the nearshore waters from Ha‘ena to past Kīlauea. The sanctuary office is centrally located in a business complex in Līhu‘e, where the staff can coordinate with local governments, organizations and communities around the island. There are efforts to expand the sanctuary’s facilities to include space for more staff, a large meeting room, and visitor center, in collaboration with Papahānaumokuākea Marine National Monument. If the sanctuary establishes new boundaries around Ni‘ihau, staff will provide support from the Kaua‘i and O‘ahu offices.

O‘ahu

There are two sections of the sanctuary on O‘ahu, one that includes the north shore from Hale‘iwa to Kahana Bay and one on the south shore from Makapu‘u to near Waikīkī. The main management office for sanctuary staff with NOAA is located at the NOAA Daniel K. Inouye Regional Center on Ford Island within Joint Base Pearl Harbor-Hickam. This facility houses the majority of NOAA offices in Honolulu and includes staff of the Papahānaumokuākea Marine National Monument, Pacific Islands Regional Office and Pacific Islands Fisheries Science Center, and Pacific Services Center among others who work collaboratively with the sanctuary. In addition, sanctuary staff with the State of Hawai‘i are located with the Department of Land and Natural Resources in the Kalanimoku Building in downtown Honolulu. They also have office space with their NOAA counterparts at the NOAA Inouye Regional Center.

Maui

The largest contiguous area of the sanctuary is found in Maui Nui. In 1994, the first sanctuary office was established on property owned by NOAA in Kīhei on Maui.This beachfront land was developed in the 1940's by the Navy who built two of the buildings on site. A new multipurpose building was built on the 1.17 acre property in 2006 to provide office space, storage and a large public meeting area. The two older buildings have recently been renovated with the two-story building housing the vistor center and offices on the second floor. In 2012, the sanctuary opened a visitor's center. The renovated facility provides educational opportunities for local, national, and international visitors. New exhibits are being developed to interpret marine and cultural resources, including the 500 year old Native Hawaiian fishpond located at the sanctuary's Kīhei property. The single story building now includes offices and a wet lab. Education and visitor programs are hosted from these facilities, which also provide support for humpback whale research and resource protection programs. The State collaborates with NOAA to provide slips for sanctuary vessels at Mā'alaea Harbor on Maui for the humpback whale research and disentanglement programs.

8. Site Specific Affected Environment

8.1. Ni‘ihau

Ni‘ihau is the seventh largest island in the Hawaiian Archipelago and is the westernmost island of the populated Hawaiian Islands. The island has an area of approximately 69.5 square miles (180 square km) and is estimated to be between 4.9 and 5.5 million years old (Ziegler 2002, Juvik & Juvik 1998). Ni‘ihau is located approximately 18 miles (29 km) west of the island of Kaua‘i across the Kaulakahi Channel. The maximum elevation is at Mt. Pānī‘au at 1,280 feet (390 m) high and the island has only 13 watersheds. The northeastern portion of the island forms steep cliffs that adjoin the ocean.

Ni‘ihau was formed by one shield volcano with volcanic peaks at Mt. Pānī‘au and remnants of a spatter cone at Kawaihoa point. The rest of the island’s land is composed of limestone that overlays original volcanic rock that was created during a former period of higher sea level (Stearns 1947). The arid climate is partially caused by the rain shadow of Kaua‘i (Juvik & Juvik 1998). Unique features of the island include several intermittent playa lakes, which exist both as seasonal dry sand flats and wet marshlands (Stearns 1947).

Lehua Island is a partially submerged volcanic tuff cone forming a crescent produced in the Pleistocene era and has an area of approximately 0.7 sq. miles (1.15 sq. km). The island is geologically part of the Ni‘ihau volcanic dome and lies 0.7 miles (1.1 km) directly north of Ni‘ihau. The uninhabited island is federal property administered by the U.S. Coast Guard. It is a designated seabird sanctuary managed by the Department of Forestry and Wildlife (DOFAW) under the State of Hawai‘i Department of Land and Natural Resources.

8.1.1. Biophysical Environment

8.1.1.1. Habitats

Few formal assessments have been conducted in the marine environment surrounding Ni‘ihau. The benthic habitats surrounding Ni‘ihau and Lehua are mostly volcanic basalt hard bottom, coral reef and sandy softbottom (Battista et al. 2007). Benthic studies suggest that coral cover around Ni‘ihau and Lehua is relatively low. Williams et al. (2008) estimate coral cover at 5.0 ± 4.4%, which is similar to the CRED Benthic data (2008) estimate of 4.2 ± 1.7% (n=5). Another report by Friedlander et al. (2008) estimate coral cover even lower (3.0 ± 1%). Figure 15 illustrates the relative coral cover estimated for the populated Hawaiian Islands (reproduced from

Friedlander et al. 2008). Coral cover was calculated from 1,682 transect sites surveyed between 2001 and 2010. The graph indicates that percent coral cover around Ni‘ihau is considerably lower than around the other islands shown.

Throughout the populated Hawaiian Islands, benthic cover of hard substrate is predominantly turf algae with a lower percentage of coral cover. On Ni‘ihau, the majority (53%) of benthic cover of shallow sites surveyed (from a 2010 survey) is turf algae and cyanobacteria (Figure 16; CRED Benthic Data 2010). The coral at Ni‘ihau and Lehua have been measured to have significantly lower prevalence of coral disease (0.02 ± 0.02%) then elsewhere in the populated Hawaiian Islands (Friedlander et al. 2008, Aeby et al. 2011). Lower incidence of coral disease could be the result of lower populations of coral to transmit infectious agents or a generally healthy disposition. Table 28 shows the percent disease prevalence for coral at different islands normalized by populations (Friedlander et al. 2008).

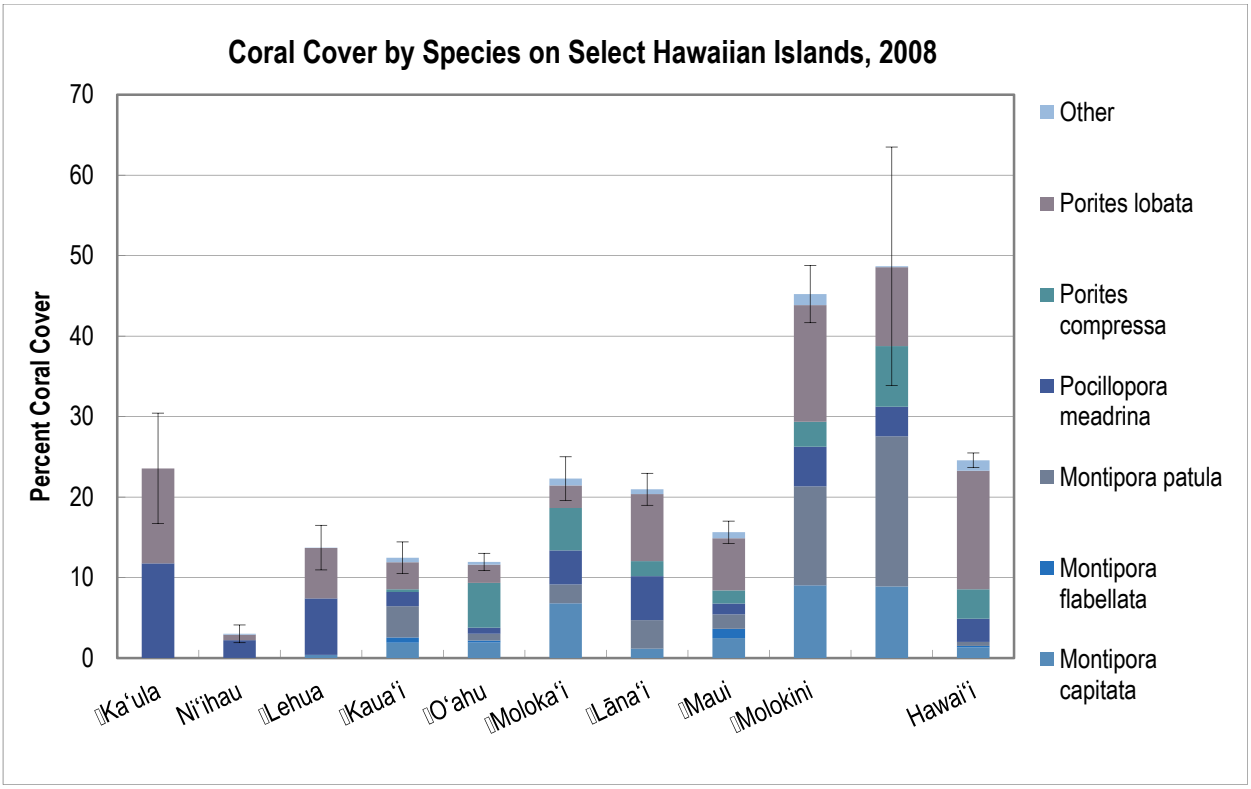


Figure 15. Mean percent coral cover in the populated Hawaiian Islands.
Source: *CRAMP/DAR (n=692), PIFSC-CRED (n=108), FHUS (n=859) and WHAP (n=23).*

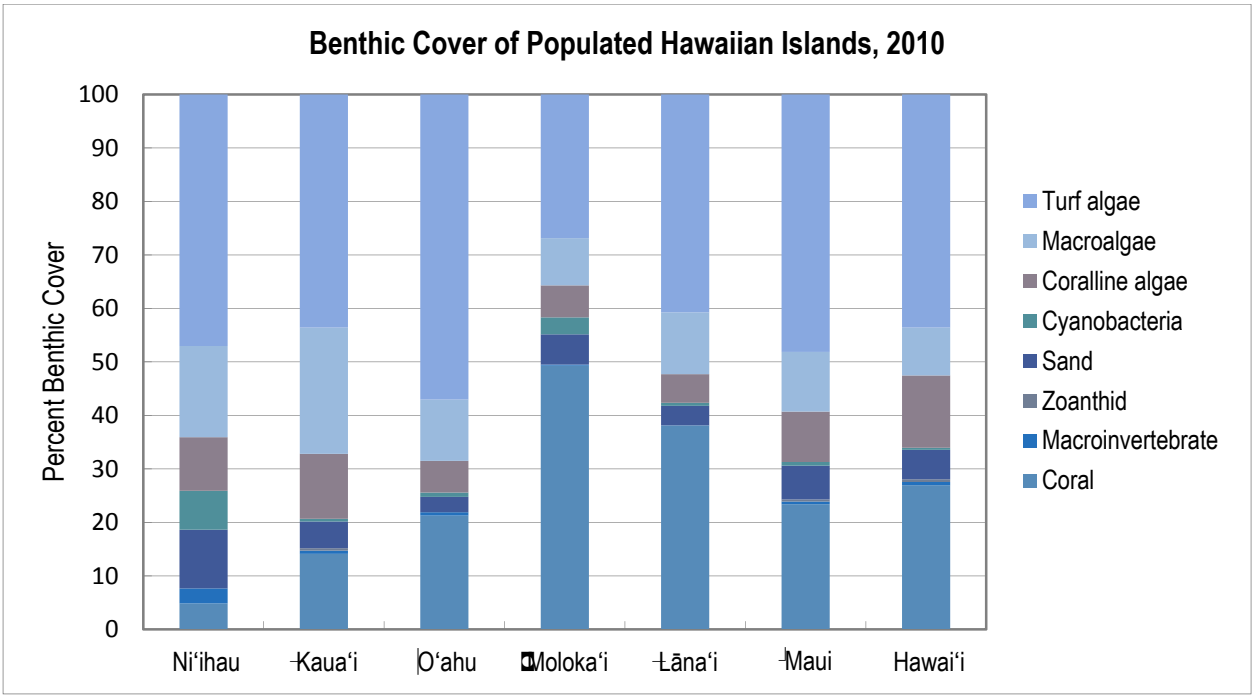


Figure 16. 2010 Benthic cover in the populated Hawaiian Islands.
Source: *NOAA NMFS PIFSC CRED.*

Island	Number of Sites Surveyed	Depth (ft)	Average Coral Cover (%)	Frequency of Disease Occurrence (%)	Average Disease Prevalence
Hawai‘i	19	24-50	29.2 ±± 3.2%	100.0	1.20 ± 0.44%
Maui	11	7-50	41.1 ± 7.5%	100.0	1.36 ± 0.37%
O‘ahu	27	5-60	23.6 ± 3.9%	100.0	1.03 ± 0.25%
Kaua‘i	12	21-56	7.5 ± 1.8%	83.3	0.39 ± 0.21%
Ni‘ihau	6	30-50	<1 (<1)	16.7	0.02 ± 0.02%
Lehua	3	38-50	<1 (<1)	33.3	0.02 ± 0.02%

Table 28. Percent coral disease for coral in the populated Hawaiian Islands.
Source: *Aeby in Friedlander et al. (2008).*

8.1.1.2. Marine Species

Fish

Fish biomass around Ni‘ihau and Lehua is higher than elsewhere in the populated Hawaiian Islands, though lower than for forereefs in the Northwestern Hawaiian Islands (Figure 17 and Figure 18; CRED 2013, Williams et al. 2013, Williams et al. 2011, Williams et al. 2008). Fish biomass surveys conducted in 2005, 2006, and 2008 estimated fish biomass at 66.49 ± 12.63 SE g m^{-2} for Ni‘ihau, and 68.37 ± 10.03 SE g m^{-2} when combined with data from Lehua (Williams et al. 2013). Fish biomass surveys conducted in 2013 using a different methodology estimated that fish biomass at Ni‘ihau is approximately 58.51 ± 9.29 SE g m^{-2} (Figure 19 and Figure 20; CRED Data 2013).

The total fish biomass of endemic species around Ni‘ihau is higher than around the other populated Hawaiian Islands (Figure 18). However, the proportion of all endemic fish to all fish species does not differ significantly between Ni‘ihau and the other populated Hawai‘i Islands. This could be a reflection of the overall higher fish biomass at Ni‘ihau. There is higher biomass of certain fish families (i.e., snappers, goatfish, and soldier fish) in the fore reef environments of Ni‘ihau when compared to entire forereefs of some populated Hawaiian Islands (and some forereefs in the Northwestern Hawaiian Islands). There is also higher biomass of jacks in fore reef environments of Ni‘ihau compared to most of the other populated Hawaiian Islands. There is also a higher biomass and proportion of introduced fish species around Ni‘ihau than the other populated Hawaiian Islands. The significance of this is not well understood although it suggests that the levels of invasive fish should be closely monitored.

There are several reasons that could explain why the fish biomass around Ni‘ihau is relatively higher than around the other populated Hawaiian Islands. Fish biomass could be the result of

lower levels of fishing pressure than elsewhere in the populated Hawaiian Islands. Throughout the populated Hawaiian Islands, fish biomass is generally highest on shallow reefs adjacent to areas with low human populations and fish biomass generally decreases as human populations increase (CRED 2013; Williams et al. 2008). Figure 21 shows total fish biomass (g m^2) by island human population and how fish biomass decreases as island human population increases. Additionally, high levels of fish biomass could be related to the high level of suitable fish habitat. However it is difficult to assess the latter because bathymetric resolution of data on submerged land structures at Ni‘ihau is relatively poor (at up to 50 square meters in some places) and there are significant bathymetric data gaps (up to 75 square km) in nearshore waters of Ni‘ihau (Battista pers. comm.). Resulting habitat maps and models use a minimum mapping unit of 1 acre (4,047 square meters), which makes these estimates quite coarse.

Deep water benthic habitats near Ni‘ihau have been understudied relative to the other populated Hawaiian Islands. A series of Tethered Optical Assessment Device (TOAD) surveys that took place in deep waters (generally 25-100 m) of Ni‘ihau revealed coral at mesophotic depths ranging between 25 – 100 m in 4 of 12 transects (PIBHMC 2005). The two most commercially valuable bottomfish species, Opakapaka Pink Snapper (*Pristipomoides filamentosus*) and Onaga Red Snapper (*Etelis coruscans*) were found to be significantly larger in size within the Bottomfish Restricted Fishing Area (BRFA) than outside the BRFA at Ni‘ihau (Moore et al. 2013). Furthermore, the relative abundance of the Kalekale Snapper (*Pristipomoides sieboldii*) was observed to be high relative to BRFAs at West and East O‘ahu (Moore et al. 2013). Hahalua (manta rays, *Mantus birostris*) and other large fish are also thought to be abundant near Ni‘ihau (Hollingworth 2008).

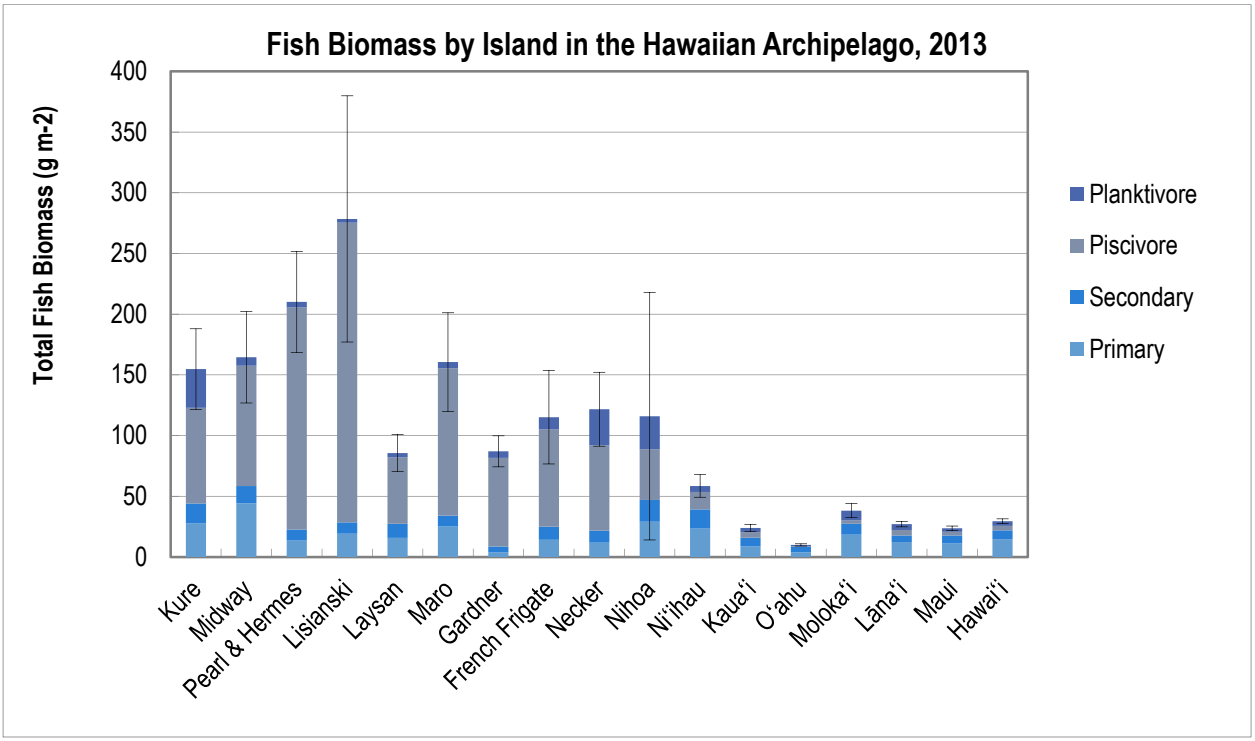


Figure 17. Fish biomass in the Hawaiian Archipelago.
Source*: NOAA Coral Reef Ecosystem Division (2013)*

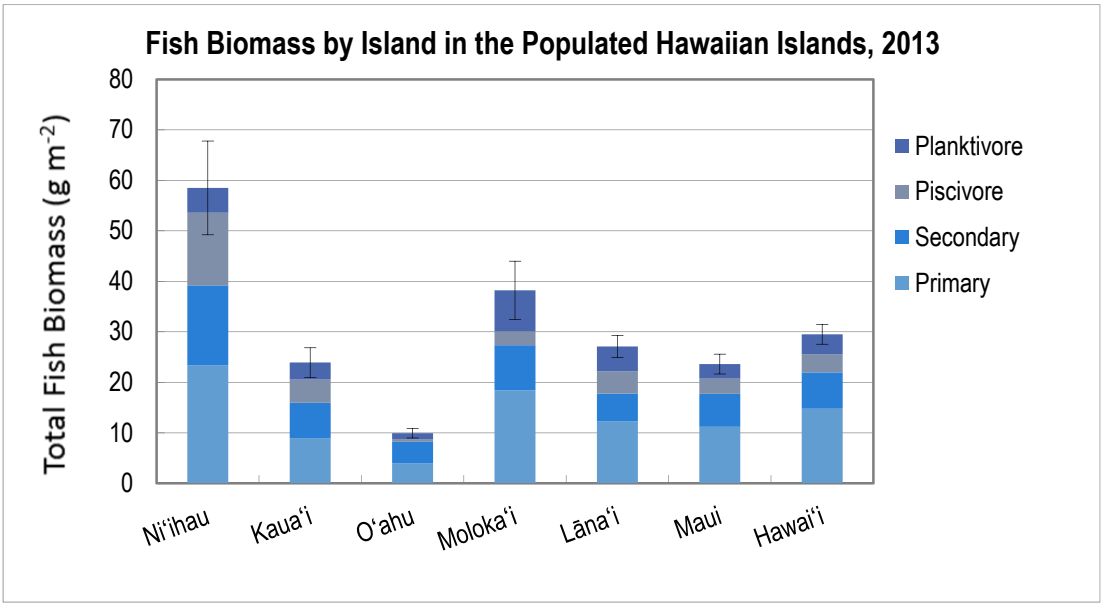


Figure 18. Fish biomass in the populated Hawaiian Islands.
Source*: NOAA Coral Reef Ecosystem Division (2013).*

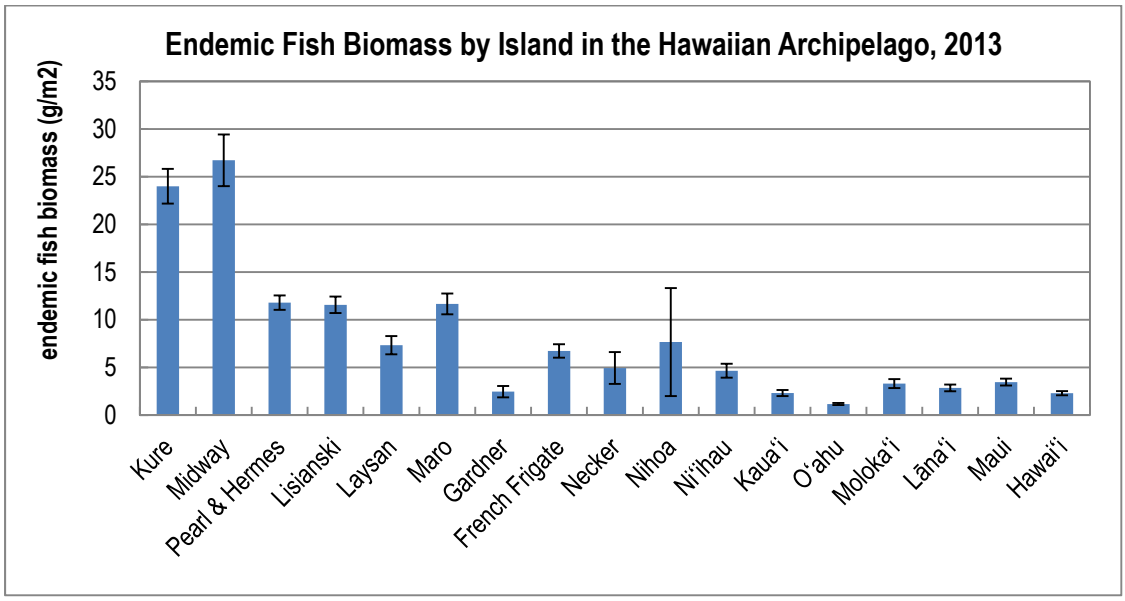


Figure 19. Endemic fish biomass in the Hawaiian Archipelago.
Source: *NOAA Coral Reef Ecosystem Division (2013).*

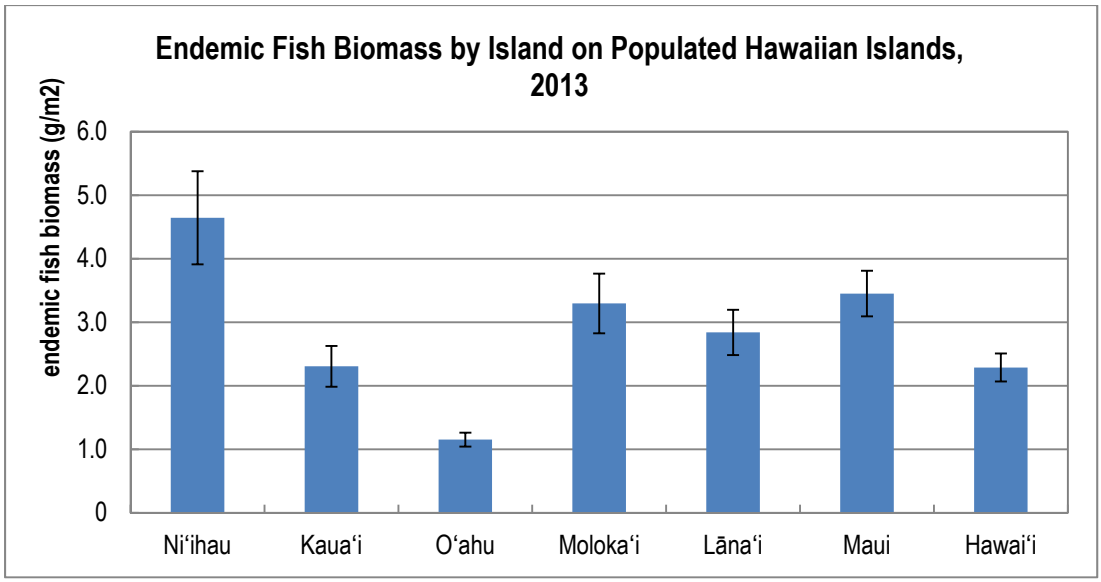


Figure 20. Endemic fish biomass in the populated Hawaiian Islands.
Source: *NOAA Coral Reef Ecosystem Division (2013).*

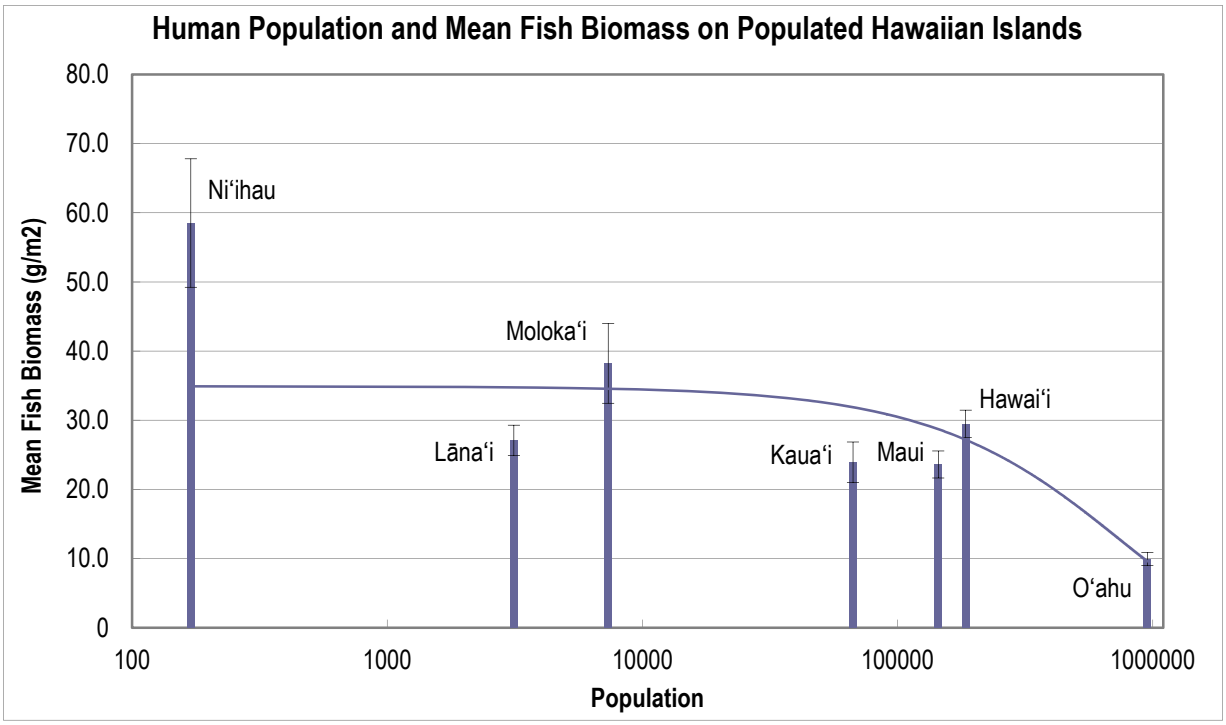


Figure 21. Relationship between human population and mean fish biomass.
Source: *Census Data (2010); NOAA Coral Reef Ecosystem Division (2013).*

Monk Seals

Hawaiian monk seals have a significant presence in Niʻihau and Lehua. Aerial surveys conducted in 2000, 2001, and 2008 documented approximately three times as many monk seals on the coastal areas of Niʻihau than other islands in the populated Hawaiian Islands (Figure 22).[11] Island-wide surveys of Niʻihau have observed between 17-69 monk seals at a particular time (Figure 23), higher than any other reported sightings on the populated Hawaiian Islands. There is also reason to believe that the population of monk seals at Niʻihau may be distinct. The NOAA Fisheries Monk Seal Research Program actively works to tag monk seals in the Northwestern Hawaiian Islands and often monk seals observed at Niʻihau do not have tags, which suggests that they may not frequently travel to the Northwestern Hawaiian Islands.

In 2011, at least six births were observed by NOAA personnel during on-site visits to Niʻihau (Tracy Wurth, NOAA, pers. comm.). In close partnership with the Robinson family and local residents, NOAA and partner agencies conducted three monk seal responses on Niʻihau in 2010 (NOAA 2011). In 2011, NOAA was invited to Niʻihau several times to treat an injured female and weaned pup and was given two monk seals carcasses for necropsy (Tracy Wurth, NOAA, pers. comm.).

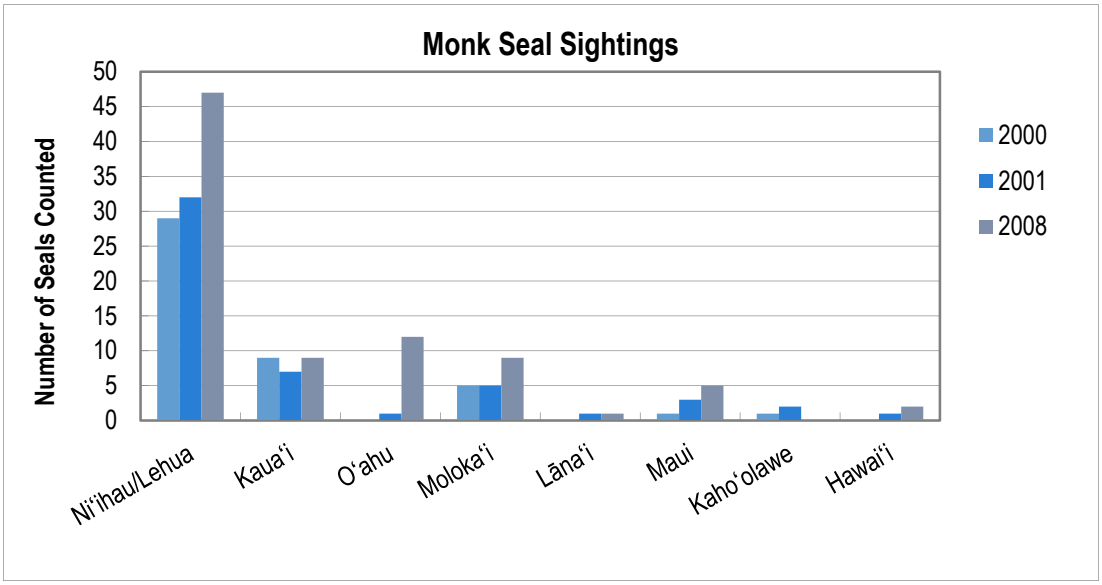


Figure 22. Monk seal counts from aerial surveys in the populated Hawaiian Islands.
Source: *NOAA PIFSC/Charles Littnan.*

[11] Aerial surveys give a small snapshot of information at only three time periods while they do not present enough information to assess island wide populations over time.

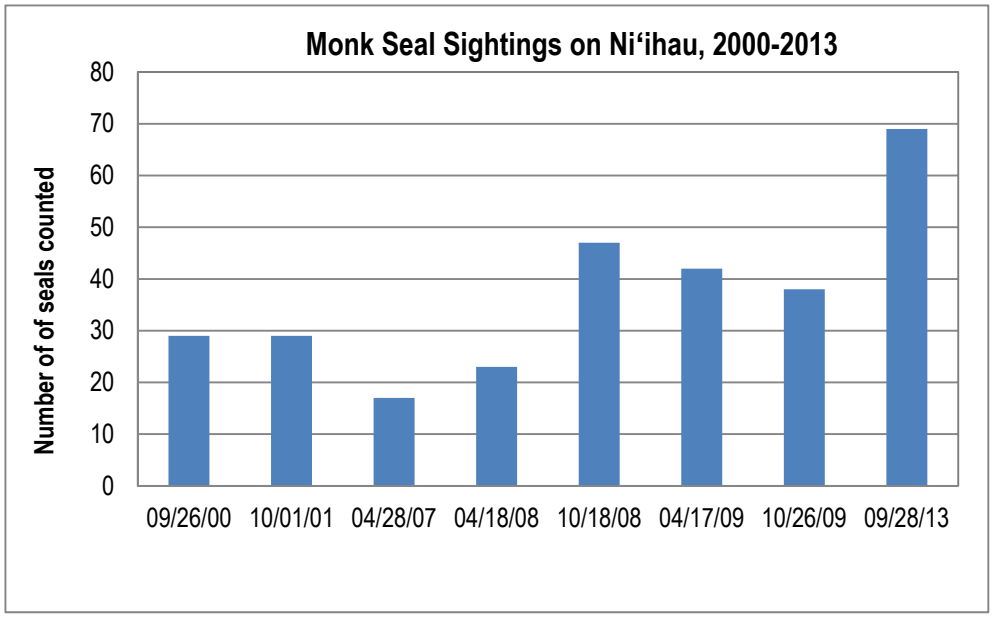
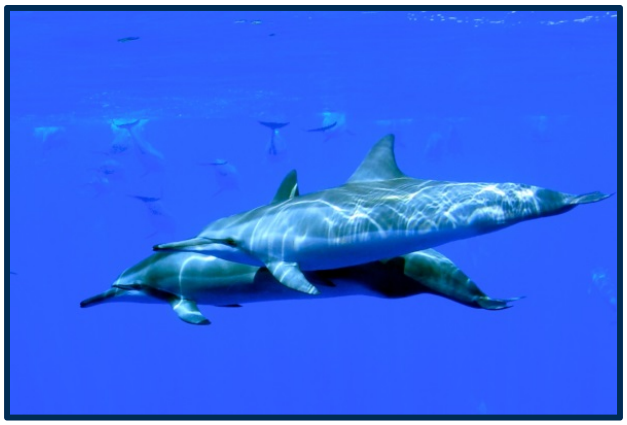


Figure 23. Monk seals counted during single-day aerial surveys of Ni‘ihau.
[2013 data obtained by surveying beaches by foot and horseback]
Source: *NOAA PIFSC/Charles Littnan.*

Humpback Whales

Humpback whales have been observed with greater frequency near Kaua‘i and Ni‘ihau during recent aerial survey period (1993-2000) than during earlier surveys (1976-1980) (Mobley et al. 2001). Additionally, humpbacks were observed in greater numbers near Ni‘ihau than near Hawai‘i Island and O‘ahu during 1993-2000 aerial surveys (Aki et al. 1994). The greatest population density of humpback whales is observed between one kilometer from shore to a 20 meter depth contour (Figure 24).

Dolphins



There are 18 species of odontocetes that may be found around the islands of Kaua‘i and Ni‘ihau. The common bottlenose dolphin *Tursiops truncatus* lives in demographically independent populations (island residents) between the islands of Ni‘ihau and Kaua‘i and is not believed to exchange with other islands (Baird et al. 2009, Martien et al. 2011). There is also a high-degree of site fidelity by rough-toothed dolphins in the channel between Kaua‘i and Ni‘ihau (*Steno bredanensis*) (Baird et al. 2008a in Baird et al 2012). False killer whales (*Pseudorca crassidens*) have insular and pelagic populations, and there is some evidence to suggest that insular false killer whales near Ni‘ihau and Kaua‘i constitute an overlap zone between two populations, one near the populated Hawaiian Islands and one near the Northwestern Hawaiian Islands (Martien et al. 2014).

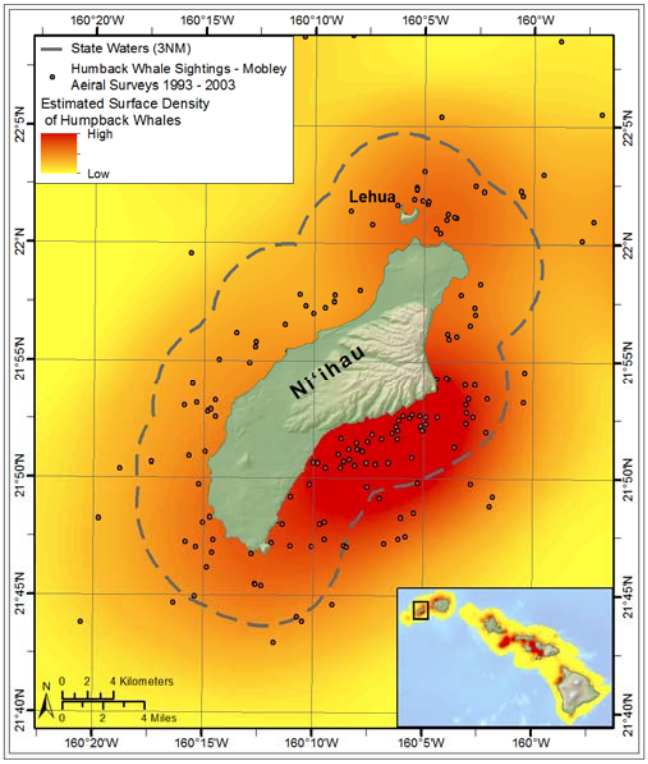


Figure 24. Humpback whale observations around Ni‘ihau and Lehua (1993-2003).
Source: *Mobley (2003).*

Seabirds

Lehua is an important seabird breeding habitat in the populated Hawaiian Islands. Recent research has documented eight breeding seabird species comprising over 25,000 pairs, including the largest breeding colonies of brown booby (*Sula leucogaster*) and red-footed booby (Sula *sula*) in the populated Hawaiian Islands (Vanderwerf et al. 2007). Additionally, Lehua is one of only two nesting sites for black-footed albatrosses in the populated Hawaiian Islands, and both the threatened Newell’s shearwater and endangered Hawaiian petrel have been sighted there. There are efforts to restore the island ecosystem including removal of introduced species and the re-introduction of native species (Duffy 2010).

Connectivity

Research on oceanographic current vectors, larval transport modeling and genetic connectivity suggest that marine species at Ni‘ihau are strongly connected with other nearby islands, especially between the islands of Kaua‘i, Nihoa and O‘ahu in the Hawaiian Archipelago. Currents originating near northern Ni‘ihau and Lehua moving east towards Kaua‘i, and other currents originating near southern Kaua‘i moving westward towards Ni‘ihau, suggest connectivity between Ni‘ihau and Kaua‘i.

An oceanographic larval transport modeling study predicted that larvae produced at Ni‘ihau may contribute larvae to reefs throughout the Hawaiian Archipelago, particularly Kaua‘i, and O‘ahu (Kobayashi 2008). Ni‘ihau may also receive larvae produced at islands throughout the Hawaiian Archipelago, particularly from Nihoa, Kaua‘i, and O‘ahu. Another study that modeled the larval transport of three bottomfish species predicted that larvae produced at Ni‘ihau are likely received throughout the archipelago. Ni‘ihau may also receive larvae from many islands, but particularly

Kaua‘i, and Ka‘ula. The study also identified strong connections between Ni‘ihau and Kaua‘i with a substantial connection of larvae exported from Ni‘ihau to Kaua‘i. The subregion between O‘ahu through Mokumanamana in the Northwestern Hawaiian Islands may constitute a discrete population and connectivity unit and the islands between O‘ahu and Mokumanamana may act as stepping stones for connectivity between the Northwestern Hawaiian Islands and the populated Hawaiian Islands (Vaz 2012).

Genetic studies suggest that species in the waters at Ni‘ihau are well connected with those at nearby Kaua‘i and parts of the Northwestern Hawaiian Islands, however all trends can be slightly different for different species and additional research is needed. There are four distinct genetic breaks and barriers that are common to various combinations of species (Toonen et al. 2011). They occur between Ni‘ihau and the Northwestern Hawaiian Islands and between Kaua‘i and the rest of the populated Hawaiian Islands (Figure 25). A genetic study on the spinner dolphin (*Stenella longirostris*), found that animals at Ni‘ihau are related to animals at French Frigate Shoals, Kaua‘i, O‘ahu, and Maui and are different from those at other islands (Andrews et al. 2010). A study on the crown of thorns starfish (*Acanthaster planci*) found that animals at Ni‘ihau are related to animals at Kaua‘i, O‘ahu, Moloka‘i, Lāna‘i, and Hawai‘i Island and are different from those at other islands (Timmers et al. 2011).

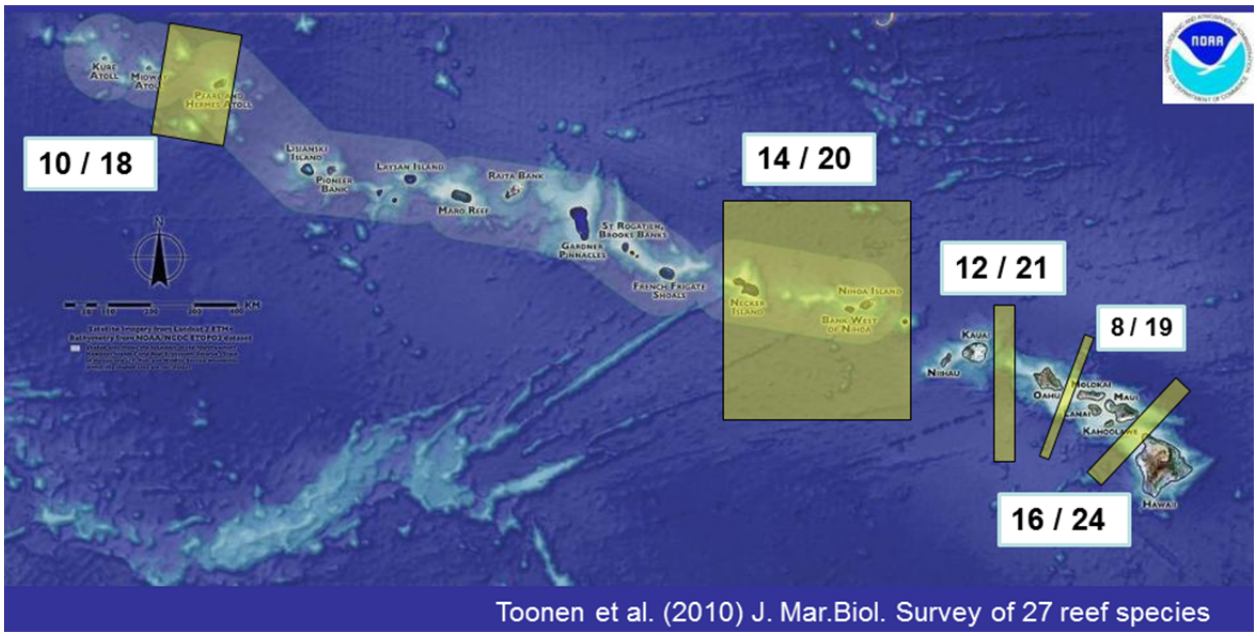


Figure 25. Genetic connectivity between marine species in the Hawaiian Archipelago.
Yellow boxes indicate breaks. Numbers indicate the number of species the break was detected for over the number of species analyzed. Based on a surveys of 27 reef species.
Source: *R. Toonen.*

8.1.2. Human Environment

8.1.2.1. Human and Economic Setting

Niʻihau is politically incorporated into Kauaʻi County. The island is privately owned by the Robinson family who have operated the Niʻihau Ranch continuously for nearly 150 years. The population of the island varies but the 2010 US Census recorded 170 residents on the island. Most of the Niihauan residents are Native Hawaiian and live in the main town of Puʻuwai on the western side of the island. Kiʻi Landing, located on the northeast side of the island, is the primary port for the transport of supplies to the island by private barge. Formerly there were landings at Nonopapa and Kiekie on the west shore of Niʻihau, but they are no longer in operation. Niʻihau is relatively undeveloped except for residential houses, some common buildings such as the schoolhouse, and former ranching facilities. There are several species of feral ungulates roaming the island from previous introductions, including: pigs, goats, eland, aoudad (Barbary Sheep) and oryx.

8.1.2.2. Cultural and Historic Setting

History

Hawaiian mythology says that Niʼihau was the first Hawaiian island on which *Pele*, the fire goddess, set foot (Tava 1984). According to moʻolelo regarding Niʻihauʼs history, "Pele left Bora Bora and journeyed to the Hawaiian Islands, stopping first at Nihoa and then Niʻihau. While there, she tried to dig her fire pits, only to hit water. After her unsuccessful digging on Niʻihau, she left for Puʻukapele, Kauaʻi, which also proved unsuitable, and so on down the Hawaiian chain to the island of Hawaiʻi." The place where Pele tried to dig her fire pits on Niʻihau is called Kaluakawila; at Motupapa, Pele stood overlooking Kauaʻi in hopes of finding a home there. When Pele visited her lover Lohiau on Kauaʻi, the pair took frequent trips together from Kauaʻi to Niʻihau. Other references to Pele and her family are contained in the place names of Paepaeohiiaka, Poliolehua, Kealahula, and Makaohina.

Negotiations for purchasing the island were initiated in September of 1863, and the Sinclair sons offered the government $6,000 for the island. In January of 1864 the government sold the island for $10,000, with the exception of the two ahupuaʻa, Halawela and Kahuku, which were sold to Iosia Koakanu, and 50 acres that had already been sold by the government to an individual named Papa. When Mrs. Sinclaire died her sole heir was her grandson, Aubry Robinson. The Koakanus had applied for a royal grant during the Great Mahele in 1848. Their ahupuaʻa was over 2,000 acres and ran across the island at two different locations. In 1864, the Sinclairs purchased the remaining land from the Koakanu family for $800. The Sinclairs then built a permanent house on a plateau at Kiekie. Presently, descendants Bruce and Keith Robinson, own 47,217 of the islandʼs 47,705 acres (Tabrah 1987, Tava 1984). Because of its private ownership, the island is rarely accessed by visitors and is often referred to as "The Forbidden Island." The relative isolation of the people on Niʻihau meant that traditional Hawaiian culture remained a stronger influence on Niʻihau than on other islands.

Residents

Ni‘ihau’s history shows a marked population island in 1778, when an estimated 10,000 people populated Ni‘ihau. Mass migration due to drought and other factors left Ni‘ihau with a population of 4,000 by the beginning of the nineteenth century. When the Sinclair family purchased most of the island in 1864, 1,000 residents lived on Ni‘ihau. Four years later, 300 Niihauans remained. The population has remained under 300 since then, with a population of 170 recorded in the 2010 census. Two-thirds of the population in 1980 was of pure Hawaiian descent, making it the largest colony of Hawaiians in the state (Tava 1984).

Niihauans reportedly use traditional fishing methods such as nets, and fish in particular fishing spots called *koa* (Tava 1984, Meyer 1998). They also use contemporary fishing gear including rods and reels and motorboats. Fish populations have been reserved for Ni‘ihau residents only, from the outer reefs inland, since 1839 when it decreed by King Kamehameha (Tava 1984). In the winter months, *pupu* shells wash up on Ni‘ihau beaches in abundance and Niihauans collect the shells to make *lei pupu o Ni’ihau* for which the island is known (Tava 1984).

Hula and Oli

The following chant was written for Kapiolani by the people of Ni‘ihau as she toured Kaua‘i. It tells of the love for the island and all its beauty:

E hoi ke aloha Niihau E
Our love gods out to you from Niihau
i ka Wai-huna-o-ka-paoo
of the hidden waters of the paoo,
Na-ulu-hua-i-ka-hapapa E
The breadfruit on the reef
mehe ko eli lima o Halalii E
like the cane dug by Halalii hands,
I ea Nihoa mahope E
Here is Nihoa behind
i ke lau hapapa ike kai E
the seaweed reef in the ocean
O ka la welawela ike kula E
The hot sun on the plains
huli aku kea lo i Kauai E
turn to face Kauai.
Haina ka inoa no ka Wahina E
This is the name of the lady,
no Kapiolani no, he inoa e
Kapiolani is the name.

Niihauans were diligent famers, producing sweet potatoes, sugar cane, yams, salt and some taro; at times producing more of these crops than neighboring Kaua‘i. When the Sinclairs purchased the island, they introduced cattle and sheep for ranching and eliminated dogs, which were traditionally raised for food by Niihauans. Other traditional practices that remained on Ni‘ihau were cooking in underground ovens (*imu*) and producing charcoal produced from kiawe trees (Tava 1984, Meyer 1998). An archeological survey of the northeast section of the island showed evidence of agriculture and temporary shelters but no permanent habitation (US Navy 1998).

Hawaiian language and many traditional cultural practices have flourished because of the relative isolation of Ni‘ihau. The prominence of manaleo, native speakers, and the information they provide about their unique dialect has informed an entire subset of linguistic experts on the history and future of ‘ōlelo Hawai‘i. The ‘ōlelo no‘eau gathered about Ni‘ihau reflect mystique, history, and lineal ties to the landscape and surrounding environment.

ʻŌlelo noʻeau	Translation	Interpretation
Pae mahu o Kauwai nei	Hermaphrodite of Kauaʻi	Mahu also meant sexless or without. This is from a string figure chant with references to Niʻihau.
Ekolu no pua lawa kuu lei	The three flowers (children). My lei is complete.	The three flowers are the islands of Niʻihau, Nihoa, and Kaʻula.
Ekolu lakou keiki	They are the three children.	This saying pertains to ancient times: these were triplets born to Hina, goddess of creation, on the same day. No other children were born. They were named Niʻihau, Kaʻula and Nihoa.
O kanaka o ka wai	The people of the water. This was used in reference to Kauaʻi.	
Ke hoi nei ko Niʻihau keiki I ka maluhia ka ulu hala o Halawela	When Niʻihau's children return, there will be peace in the hala grove of Halawela.	This is a 1865 lament for the return of the island to the natives.
Aahu ae i ka manu o Kaʻula	You then rule the birds of Kaula.	The ruling domain of hero Kawelo.
Ka ua lihau anu toetoe koou, ha ahi ka ke kapa o ka ua i lala ai	When the rain comes it is bitter cold. The fire is your blanket that will do away with the rain.	
I ka lani no ka ua wai e no ke pulu.	The rain is still in the clouds. It is time to prepare the mulch.	Months in advance, Niihauans prepared the land for planting, usually for uwala. Don't wait for the rain to come; you may find yourself with little or no crop.
Pua e aka manu o Kaula i ke kai	The birds of Kaula die at sea.	Do not wander too far from home lest you be destroyed.
Hanau Niʻihau he aina, he motu, he aina i kea a i ka mole o ta aina	Born the island of Niʻihau, the land that is the stem of all the islands.	Niʻihau is the oldest of the eight Hawaiian islands.
Au ka toae, he la malie	When the koae swims, it is a calm day.	Good fishing day.
Ma ka mole mai o Lehua	By the foundation of Lehua.	Lehua and Niʻihau are one, as they were one island before sinking.
Moku ka ili la	Sun-snatching island.	Referring to Lehua.
Ena aku la manu o Kaula	The birds of Kaula are wild.	Reference to a shy person.
Niʻihau o Manoopupaipai	Queen Manoopupaipai of Niʻihau, an ancient alii.	A second meaning is "Niʻihau, island of belly-slapping," referring to the heavy population on Niiʻhau. People made fun of the many births. In days of old, Niʻihau, Kauaʻi and Maui were the most heavily populated of the Hawaiian Islands.
Kauaʻi kaili la, o Niʻihau ka la kau	Kauaʻi steals the sun; Niʻihau is the sun.	
Hoona ke ola i ka malu hau o Halalii	Comfortable is the life in the shade of the tree at Halalii.	Reference to a person and place on Niʻihau.

Table 29. Wise sayings compiled about and attributed to Niʻihau.
Source: *Honua Consulting.*

8.1.2.3. Human Uses

Fishing Activity

Traditionally, Niihauans only catch certain fish species during different seasons. The resources of Ni‘ihau waters have always been for residents only and kapu (restricted) to others. The restricted fishing area reaches from the outer reefs to the sands of the island. Table 30 summarizes sayings about fishing attributed to Ni‘ihau’s traditions.

‘Ōlelo no‘eau	Translation	Interpretation
Nee kulo aka lawaia ua ma malie	When the fisherman crouches low it is calm.	This would signal that it is time to fish on the reef or at shore.
Kahi e no ka malie hoomakaukau ka makau	The calm is far off, make ready the fishhooks.	There might be rough waters now, but don’t wait for the calm. Be ready beforehand.
Kau ka iwa, he la makani	When the frigate bird flies, it will be a windy day.	
Au ka toae, he la malie	When the snapper swims, it is a calm day.	A good day for fishing.

Table 30. Wise sayings about fishing attributed to Ni‘ihau’s traditions
Source: *Honua Consulting*

In 2013, 32 commercial fishing licensees reported catching fish outside the reefs in the two reported fishing areas (505 and 506) that adjoin the shorelines of Ni‘ihau out to approximately two nautical miles (Table 31). Fishing catch varied considerably between 2007 and 2013 with highest numbers reported in 2007 and the lowest reporting number in 2009 and 2010. Since then, total catch biomass has generally increased while number of fish caught has varied. This may be due to the targeting of different species of fish, which can be a result of changes in fish abundance, changes in market demand, or changes in fishing behavior (e.g. fishing different areas because of difficult ocean or weather conditions or high gasoline prices). A majority of catch was reported in the reported fishing area on the leeward side of the island.

Fishing methods include troll, lay gill net, Kona crab net, inshore hand line, deep bottom fish hand line, casting, and spearing. Uku (46,688 lbs), Ono (39,653 lbs), Menpachi (15,766 lbs), and Kona Crab (7,771 lbs), are the top four species caught when considering a combination of mean number caught, mean weight caught, total number caught, and total weight caught. ‘Opihi were not commonly reported, although anecdotally it has been reported that commercial fishermen collect ‘opihi at Ni‘ihau. This culturally important resource has declined on most of the populated Hawaiian Islands. In area 505, 100 lbs of ‘opihi (without species information) were commercially collected in 2009. In the same area, 50 lbs of ‘opihi alinalina were reported collected in 2012. In area 506, 20 lbs (250 individuals) of ‘opihi alinalina were reported commercially collected.

Ni‘ihau Commercial Fishing Landing Data (Area 505 & 506)			
Fiscal Year	Number of Licensees	Number Caught	Lbs. caught
2007	32	330,720	225,359
2008	31	10,492	90,687
2009	30	7,755	21,128
2010	24	6,920	31,450
2011	27	18,376	48,379
2012	37	12,986	60,675
2013	32	11,769	59,126

Table 31. Commercial fishing near Ni‘ihau (FY2007 to FY2013).
Source: *State of Hawai‘i Department of Land and Natural Resources (2014).*

Recreation and Tourism

Several dive and recreational tour boat companies offer diving and tour excursions to Ni‘ihau from the island of Kaua‘i. Figure 26 shows the relative frequency of commercial dive and snorkel tour use around Ni‘ihau. The majority of recreational diving has been reported to occur around Lehua Island though commercial dive boats will less frequently visit dive sites on the southern and coast of Ni‘ihau and very rarely visit sites on the eastern coast of Ni‘ihau. Figure 27 shows the primary locations for commercial boat based wildlife viewing and snorkel tour locations around Ni‘ihau. Lehua remains the most popular location for wildlife viewing but moderate use is also seen along the northeastern coast. Less frequently, wildlife viewing boats will also travel to the southern coast of Ni’ihau.

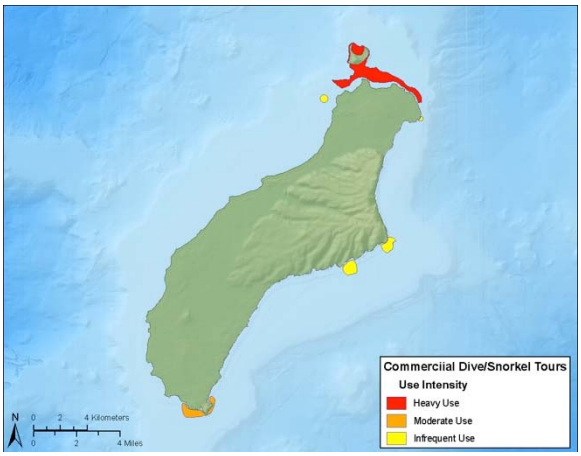


Figure 26. Commercial dive and snorkel tour locations around Ni‘ihau.
Source: *Office of National Marine Sanctuaries (2012).*

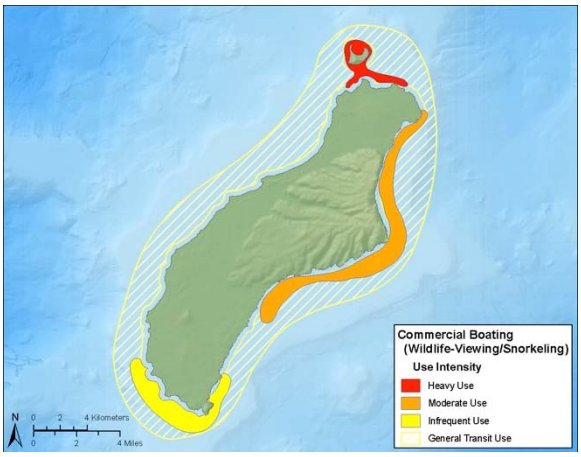


Figure 27. Commercial boat-based wildlife viewing and snorkel tours around Ni‘ihau.
Source: *Office of National Marine Sanctuaries (2012).*

Military

The U.S. military's presence on Ni‘ihau began in World War II when a Japanese pilot crashed his plane on the island. An infantry unit from Kaua‘i was subsequently stationed on the island and the military remains active on the island today for testing and training. There is a Kingfisher Underwater Training Area off the southeast coast of Ni‘ihau. A simulated underwater minefield was installed in an area 2 miles off the Ni‘ihau coast between the depths of 300 and 1200 ft in flat areas without coral cover. The area is used to train with the kingfisher mine-detection system. The Department of Defense (DOD) also conducts operations along the western side of Kaua‘i and Ni‘ihau. Test ranges that extend beyond the 100-fathom isobaths are considered essential for national security and defense. Additional existing and proposed military activities around Ni‘ihau are summarized in Table 32.

Military Activities Around Ni'ihau	
Existing	**Proposed**
• Radar • AEGIS drone targets on east coast of island • Special Warfare Operations • Electronic Combat Operations • Mine Countermeasure Exercises • Flare Exercises	• Increased electronic combat by 76% • Up to 6 Undersea War Exercises (USWEX) per year • Biennial RIMPAC exercise (including 3 strike groups) • Additional Major Exercises • Additional sonar usage

Table 32. Existing and proposed Navy activities around Ni‘ihau.

8.1.3. Institutional Environment

Ni‘ihau is privately owned by the Robinson family but the coastal waters around Ni‘ihau and Lehua Island out to three nautical miles are managed by the State of Hawai‘i. The waters beyond three nautical miles, to the outer edge of the United States Exclusive Economic Zone (200 nm) are under the jurisdiction of the federal government. The State of Hawai‘i manages a Bottomfish Restricted Fishing Area to the south of Ni‘ihau. The U.S. Navy administers the Kingfisher Training Range located two nautical miles to the southeast of Ni‘ihau. Lehua Island is federal property administered by the U.S. Coast Guard. It is also a designated Seabird Sanctuary

managed by the Department of Forestry and Wildlife (DOFAW) under the State of Hawai‘i Department of Land and Natural Resources.

8.1.4. Threats to Resources

Many threats to marine waters of Ni‘ihau and Lehua are common threats to the marine waters of the populated Hawaiian Islands. Climate change, erosion, marine debris and vessel grounding may be particularly significant stressors to calcifying coral reef organisms such as coral at Ni‘ihau. The continuous recruitment and growth of calcifying organisms is critical to the cycle of reef structure maintenance and construction as natural bioerosion occurs. Damage to the already relatively low cover of coral by a range of stressors may impact the coral reef’s resilience.

Introduced species such as the bluelined snapper *Lutjanus kasmira* are known to harbor a parasite that is transmitted to native goatfish (Gaither et al. 2013). The impacts to native fish at Ni‘ihau are not well understood but there have been several reports of overfishing at nearshore waters of Ni‘ihau indicating that the population of native fish may be declining.

The high density of endemic Hawaiian monk seals may be susceptible to marine debris or changes in beach habitat from climate change. Other regional threats that apply to Ni‘ihau include bycatch, incidental take interactions and vessel interactions.

8.2. North Shore of Kaua‘i: Ha‘ena Ahupua‘a to Ke‘e

8.2.1. Biophysical Environment

8.2.1.1. Habitats

Ha‘ena ahupua‘a is located on the north shore of the island of Kaua‘i, west of the town of Hanalei. Between Hae‘ena Point, on the eastern edge of the ahupua‘a, and Kailiu Point, 1.2 miles west of Ha‘ena Point, is Ha‘ena Beach. Ke‘e Beach, just east of Kailiu Point, marks the eastern edge of the steep bluffs of the Na Pali Coast (Clark 1990, BookletChart Ha‘ena Point to Kepuhi Point 2003). Coral reef extends from Ha‘ena State Park to Ke‘e Beach, approximately 100 m from the beach, forming a shallow sandy lagoon at Ke‘e Beach (Clark 1990, PacIOOS 2013).

8.2.1.2. Marine Species

A baseline study of the marine life off Ke‘e Beach, carried out by Save Our Seas and other institutes, documented species found in the shallow, sandy lagoon and on the reef flat. Fish species richness was low (40 species, 15 families), in comparison to neighboring Hanalei Bay (160 species). The lagoon had few fish, with the exception of a relative abundance of goatfish (weke‘ula). The reef flat bounding the lagoon hosted more species. Wrasses, surgeonfish and damselfish were most abundant on the reef. Two endemic wrasse species, the saddle wrasse (hinalea lau-wili) and the belted wrasse (omaka), were the first and second most abundant species, respectively, while convict tang (manini) was the third most observed. The study observed mostly small fish and concluded that the reef and lagoon provided a good habitat for juvenile fish as well as grazing surgeonfish (Stepath 1999).

The endangered Hawaiian monk seal has been observed in the area, with greater frequency at Ke‘e Beach and Tunnels Beach and lower frequency at Kailio Point and most infrequently at Ha‘ena Point (Hawaiian Monk Seal Observations 2012). Humpback whales have also been seen frequently in this area.

8.2.2. Human Environment

8.2.2.1. Cultural and Historic Setting

The approximate pattern of human settlement in the Ha‘ena area, as discovered through archeological research, begins with a period of marine-based economy and a subsequent

development of agriculture paralleled by a population expansion. Dating methods have proven unreliable in the region but settlement may have started as early as A.D. 1000 (Clark 1990, Dye 2005). Archeological research has unearthed materials to support both fishing and farming from fishhooks and adzes to taro patches (lo‘i). Taro was grown in terraced ponds in the alluvial plains around Limahuli Stream and sweet potatoes were grown on the coastal terrace. The discovery of burials sites, imu (underground ovens), and heiau (shrines), indicates settlement in the area. The period of expanded settlement and agriculture was followed by a diminishing population in Ha‘ena during the time of early European contact in the 18th and 19th centuries (Dye 2005).

Ha‘ena Beach Park was once host to traditional Hawaiian net fishing called hukilau. The beach is called Maniniholo for the travelling manini fish (convict tang) found there. The name Maniniholo was also given to the dry cave across the highway, a lava tube. Hauwa Reef, on the eastern side of Ha‘ena Bay, and Makua Reef, to the west, both have surf breaks near them. Surfing sites include Tunnels, off Ha‘ena Point, Cannons, to the west of Ha‘ena Point (Clark 1990).

East of Ha‘ena Beach Park, Ha‘ena State Park encompasses 230 acres between Limahuli Stream to the East and Na Pali Coast State Park to the west. The state park is home to many heiau sites, including several related to hula. A heiau to Laka, the goddess of hula, was built near Ke‘e Beach. Just inshore of Ke‘e Beach is a traditional fishpond called Naia (Fish Ponds 2012).

Ke‘e Beach marks the head of the Kalalau Trail, first built by the Hawaiian Government around 1860 to connect the isolated valley settlements. It allowed for trade of commodities such as oranges, taro and coffee between the ahupua‘a of Ha‘ena, Hanaka‘ia, Hanakoa and Kalalau (Kalalau Trail Brochure 2012).

8.2.2.2. Human Uses

Ha‘ena State Park, often called “the end of the road”, marks the end of Kuhio Highway and the start of the Kalalau Trail into Na Pali State Park. The park includes part of Ke‘e Beach. The Ha‘ena State Park and Na Pali trailhead see about 500,000 people annually (Higuchi 2008). DLNR estimated that 1700 people visit the Ke‘e Beach area daily – 450 of which embark on the Kalalau trail. The other 1250 of which use Ke‘e Beach (Stepath 1999).

The beaches in Ha‘ena State Park attract multiple water sports including surfing and windsurfing, boating, snorkeling and SCUBA diving. Tunnels Beach, on Ha‘ena Point, is a popular spot for surfing and windsurfing, as well as boating, snorkeling and diving along the reef where rock arches and tunnels can be found. The area is a popular launch site for kayaking trips to the Na Pali Coast (Clark 1990).

8.2.3. Institutional Environment

The Na Pali Coast State Wilderness Park, encompassing part of Keʻe Beach, prohibits disturbing all "plants, geological, historical and archaeological features." Boating, hunting and fishing are restricted to certain areas within the park (Park Rules).

Parts of the populated Hawaiian Islands are designated as conservation districts by the State. Those districts are then divided into subzones of varying classifications: protective, limited, resource, general or special. A section of the reef and surrounding water near Kailiu Point is designated a protective subzone, which means the area is intended for protection of natural and cultural resources. The coastline to the west of Kailiu Point is designated a resource subzone, which ensures the sustainability of natural resources within the subzone. To the east of Kailiu Point, the coastline is a designated limited subzone, which intends to limit use of areas where the natural environment constricts human settlement. Each subzone classification has different land uses that are prohibited, restricted and permitted therein (Haw. Adm. Rul. Title 13, Chapter 5).

The Haʻena community-based subsistence fishing area (CBSFA) was established in 2006. The CBSFA encompasses the water within 1 mile of the shoreline of Haʻena ahupuaʻa. The bill requires DLNR to consult with the Haʻena community to regulate fishing practices, including gill netting and spear fishing, and to establish no-take zones in waters off the ahupuaʻa of Haʻena, among other regulations (Haw. Rev. Stat. §188-22.9). Haʻena residents have proposed regulations to DNLR including restricting the use of non-traditional fishing gear, but the proposal had yet to be approved.

8.2.4. Threats to Resources

In the bill establishing the Haʻena CBSFA, the State recognized a decline in fish populations in the region of Haʻena State Park as a result of increased tourism and detrimental fishing practices (Haw. Rev. Stat. §188-22.9). The baseline study by Save Our Seas suggested that tourist walking on the Keʻe reef flat detrimentally affected the coral cover (Stepath 1999). Hawaiian monk seals, endemic to Hawaiʻi and observed in the area, are endangered, with only 1,200 remaining. Threats to their population include bycatch and entanglement in marine debris and declining fish populations on which they prey (Hawaiian Monk Seal 2013).

8.3. North Shore of Kaua‘i: Hanalei River

8.3.1. Biophysical Environment

8.3.1.1. Habitats

The Hanalei River is located on the east side of the Hanalei ahupua‘a and the mouth of the river opens up into Hanalei Bay adjacent to the Hanalei Beach Park. The position of the head of tide (brackish water) at the Hanalei River estuary varies with time and can range from the mouth to 16,076 feet (4900m) upstream (Harrison et al. 1991).

Distance Upstream	% Head of Tide
0m	100
2297 feet (700m)	90
6562 feet (2000m)	80
9843 feet (3000m)	70
13123 feet (4000m)	30
16,404 feet (5000m)	0

Table 33. Maximum upstream point of measurable salinity in the Hanalei River.
Source: *Adapted from Harrison et al. (1991).*

8.3.1.2. Marine Species

The Hanalei River estuary provides a breeding area for many juvenile native fish species including the mullet or ama‘ama (*Mugil cephalus*) and the flagtails or aholehole (*Kuhlia sandwicensis*). Giant trevally (*Caranx ignobilis*) and bluefin trevally (*Caranx melampygus*) also breed in the estuaries, although they are found with less frequency. Smith and Parrish (2002) found evidence of these species as far as 13,123 feet (4000m) upstream. Weke (*Mulloides flavolineatus*) are also present in the river but it is unknown whether they breed in the estuary. It is believed that they migrate to the ocean before reaching maturity (Harrison et al. 1991). The blacktail snapper or to‘au (*Lutjanus fulvus*) is relatively abundant in the Hanalei River and largely inhabits the brackish water area in the estuary. The fish is common with both commercial and recreational fishermen because it is a popular food for consumption. O‘opu naniha (*Stenogobius genivittatus*), one of the few freshwater fish in Hawai‘i, is found in the Hanalei River. White ulua (*Caranx ignobilis*) and omilu (*Caranx melampygus*) are found exclusively in the Hanalei River.

The estuary also supports all five species of the endemic Hawaiian goby fish. Many goby fish are amphidromous which means they migrate between freshwater and saltwater during different stages of their lifecycle. The O‘opu Nakea (*Awaous stamineus*) was reported in ranges of the river

from the mouth to 8 miles (13km) upstream (Harrison et al. 1991). Juvenile species develop upstream and migrate downstream when they reach maturity. Female species attach fertilized eggs to the rocks located at the mouth of the river and then guard them until they hatch and return upstream. Nests of the Oʻopu Nakea were found to be concentrated at least as far as the first riffle in the Hanalei River. Other Hawaiian goby species including *Lentipes concolor* and *Sicyopterus stimpsoni*, display less movement throughout their lifecycle.

The wetland areas directly adjacent to the Hanalei River provide habitat for several Native Hawaiian water birds including the Hawaiian stilt or ae'o (*Himantopus mexicanus knudseni*), the Hawaiian coot or ʻalae keʻokeʻo (*Fulica alai*), the Hawaiian moorhen or ʻalae ʻula (*Gallinula chlorops sandvicensis*), the Hawaiian duck or koloa maoli (*Anas wyvilliana*). The endangered Hawaiian hoary bat or apeʻapeʻa (*Lasiurus cinereus*) can be found in this area as well. Several endangered Hawaiian geese or nēnē (*Branta sandwicensis*), have also been released into the Hanalei National Wildlife Refuge.

8.3.2. Human Environment

8.3.2.1. Cultural and Historic Setting

The Native Hawaiian goby fish, which are found in the Hanalei River, were an important resource to the Native Hawaiians. Oʻopu Nakea, Oʻopu Nopili, and Oʻopu Akupa were food sources, typically wrapped in ti leaves and cooked, dried, or eaten raw. Oʻopu Nopili was also used in ceremonies, such as the weaning ceremony for first-born children and house-warming feasts. Juvenile goby (called hinana) were also were prized by Native Hawaiians. Communities would hold traditional fishing events to encourage the juvenile fish out to sea where they would be trapped. Oʻopu Alamoʻo was kapu (sacred) and believed to be related to the moʻo gods and bad luck if caught.

The wetlands surrounding the river provide a rich environment for the Native Hawaiian practice of taro farming. Taro farming has been conducted for over 1,000 years in Hanalei Valley. Taro was a main staple of Native Hawaiians and could sustain past island-wide native populations. There are also a number of historic sites located directly adjacent to the Hanalei River. The Hanalei Bridge is on the National Register of Historic Places. The Hoʻopulapula Rice Mill is the only remaining rice mill structure in all of Hawaiʻi and is listed on the National Register of Historic Places.

8.3.2.2. Human Uses

The lower Hanalei River is common site for recreational activities including sightseeing tours, kayaking, and recreational and commercial fishing. The upper Hanalei River is included in the Hanalei National Wildlife Refuge and is closed to the public to minimize disturbance and protect endangered waterbirds. The wetlands surrounding the Hanalei River support taro farming, which provides a sustainable food source for the surrounding local population.

8.3.3. Institutional Environment

The U.S. Fish and Wildlife Service (USFWS) manages the Hanalei National Wildlife Refuge (NWR) which includes the upper Hanalei River. The Hanalei NWR was established in 1972 under the Endangered Species Act to conserve endangered water birds including the koloa maoli

(Hawaiian duck), the ‘alae ke‘oke‘o (Hawaiian coot), the ‘alae‘ula (Hawaiian moorhen), the ae‘o (Hawaiian stilt), and the nēnē (Hawaiian goose). The Hanalei River Valley provides nesting and feeding habitat for these important bird species. The USFWS has identified an additional 27 native species and 18 introduced species of water bird that use the Hanalei River Valley. In 2009, the USFWS initiated a multi-year planning process to develop a Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) to guide the management of fish, wildlife, plants, habitats and public uses at Kīlauea Point, Hanalei, and Hulē‘ia National Wildlife Refuges.

The Hanalei NWR has partnered with local education groups including the Hanalei Watershed Hui and the Waipa Foundation to educate the public about watershed management in the Hanalei River Valley. The Hanalei Watershed Hui is a 501(c)(3) nonprofit established in 2000 to implement the Hanalei American Heritage River Program and Hanalei Watershed Action Plan. Since then, the Hui has focused on the assessment and restoration of the natural, cultural and economic assets of Hanalei. The Hui partners with federal, state, and county agencies, NGOs, community organizations and residents to address issues and concerns (Hanalei Watershed Hui 2012). In 2009, the Hanalei Watershed Hui developed a Hanalei River Stewardship Plan to provide river users, surrounding land users and businesses with the tools and information to support sustainable use of the Hanalei River. The plan includes activities to disseminate education information to recreational river users as well as to create local stewardship events and activities. In 2014 the Hanalei Watershed Hui completed a Hanalei to Ha’ena Disaster Resilience Plan.

The Waipa Foundation operates a community center and promotes traditional learning through hands on activities that connect students to their ‘aina (land and natural resources). The Waipa ahupua‘a is located to the west of the Hanalei ahupua‘a adjacent to the Waioli ahupua‘a. The ahupua‘a is owned by Kamehameha Schools and managed as a community-based 501(c)(3) nonprofit by the Waipa Foundation (Waipia Foundation 2012).

8.3.4. Threats to Resources

Degradation, pollution, or any other alteration to the river habitat could greatly affect breeding patterns and have negative impacts on Native Hawaiian fish populations, including goby, mullet, and trevally. These species are dependent upon the two-way migration through the estuary, so maintaining a way to migrate back and forth is necessary for the health of these populations. Threats from land-based sources of pollution may also impair water quality. The Hanalei River feeds into Hanalei Bay so poor water quality could threaten coral reef habitats. Additionally, the river currently lacks the proper infrastructure to support growing visitor populations. Without proper education and understanding, visitors may pollute the area and engage in excessive recreational activities that impact the natural biology of the Hanalei River.

8.4. North Shore of Kaua‘i: Pīla‘a Ahupua‘a

8.4.1. Biophysical Environment

8.4.1.1. Habitats

Pīla‘a ahupua‘a, East Waiakalua ahupua‘a, West Waiakalua ahupua‘a, and Kāhili ahupua‘a are located on the north shore of Kaua‘i east of Kīlauea Point. The eastern edge of Pīla‘a ahupua‘a is marked by Kepuhi Point.The bay stretching about 1.9 miles (3 km) between Kepuhi Point and the eastern edge of Kīlauea Point National Wildlife Refuge, called Mokolea Point, contains a coral reef between 0.5 and 1.5 km offshore with a lagoon inland. The rest of the benthic habitat is characterized by mostly turf algae and uncolonized submerged lands (Shallow-Water Benthic Habitats of the Main Hawaiian Islands 2007, Booklet Chart Ha‘ena Point to Kepuhi Point 2003). Kīlauea Stream reaches the sea in this bay just east of Kīlauea Point National Wildlife Refuge. Pīla‘a Stream, much smaller than Kīlauea Stream, reaches the sea in the middle of the bay near Pīla‘a Beach (Englund et al. 2002).

8.4.1.2. Marine Species

The Hawai‘i Biological Survey of the Bishop Museum identified the riparian wildlife of Pīla‘a Stream and of a small tributary to the Pu‘u Ka ‘Ele Resevoir in conjunction with permitting for a private stream alteration project. The survey found four native bird species, the Black-crowned Night-Heron, the Common Moorhen, the Hawaiian Coot and the nēnē (Englund et al. 2002).

The survey found five native fish species in Pīla‘a Stream, near its mouth: three species of gobies endemic to Hawai‘i (*Awaous guamensis, Eleotris sandwicensis and Stenogobious hawaiiensis)*, the Hawaiian flagtail (*Kuhlia xenura)* and the flathead mullet (*Mugil cephalus*). There were also two introduced species observed in the mouth of the stream, mosquito fish (*Gambusia affinis*) and the Mexican molly (*Poecilia Mexicana*) (Englund et al. 2002).

Hawaiian monk seals have been observed infrequently at Pīla‘a Beach and Waiakalua, and with greater frequency in the nearby Kīlauea Point National Wildlife Refuge. They have been observed with the greatest frequency just east of Pīla‘a at Larsen’s Beach, which is an identified pupping site (Hawaiian Monk Seal Observations 2012, Hawaiian Monk Seal Pupping Sites 2012). It is possible that there is less ease of access to Pīla’a so there are fewer reported monk seal sightings. Green sea turtles (honu) nest near the mouth of the Kīlauea Stream and also at Pīla‘a Beach (Sea Turtle Nesting and Basking Beaches 2012). Toothed whales live in the area, as evidenced by an odontocete stranding on Pīla‘a/Waiakalua in 1983 reported by the NOAA Fisheries-PAO (Maldini 2003). Humpback whales have also been seen frequently in this area.

8.4.2. Human Environment

8.4.2.1. Cultural and Historic Setting

The shoreline between Kīlauea Point National Wildlife Refuge and Kepuhi Point encompasses four ahupua‘a: Kahili, West Waiakalua, East Waiakalua, and Pīla‘a. The eastern part of the reef stretching across these four ahupua‘a is a well-known location for kohu harvesting. Kahili was once a mullet fishery but isn’t any longer. Kalihi ahupua‘a also used to be the location of a rock quarry that has since been abandoned. West and East Waiakalua, also known as Waiakalua-iki and Waiakalua-nui, were once terraced and irrigated by spring water for agricultural use (Clark 1990).

8.4.2.2. Human Uses

There are several beaches in the area, including Pīla‘a Beach, Waiakalua-iki and Waiakalua-nui and Kahili, or Rock Quarry, Beach. These beaches can be adequate for snorkeling but can be hazardous to swimmers and can be murky (Clark 1990, Jokiel and Brown 2004). There is a popular surf site near Rock Quarry Beach (Surfing Sites 2012). Approximately 500,000 visitors per year enter nearby Kīlauea Point National Wildlife Refuge to see Kīlauea Lighthouse and the surrounding wildlife (Visiting Kilauea Point National Wildlife Refuge 2013).

8.4.3. Institutional Setting

Kīlauea Point National Wildlife Refuge, on the western edge of Kahili ahupua‘a, was established to protect threatened and endangered species and their habitats. The refuge restores habitat for coastal plants and migratory birds, such as the nēnē, among other species (Management 2010). Parts of the populated Hawaiian Islands are designated as conservation districts by the State. Those districts are then divided into subzones of varying classifications: protective, limited, resource, general or special. Most of the shoreline between Kepuhi Point and Kīlauea Point National Wildlife Refuge is designated a Limited Subzone, which intends to limit use of areas where the natural environment constricts human settlement. Kīlauea Point National Wildlife Refuge itself is designated a Protective Subzone, which means the area is intended for protection of natural and cultural resources. Each subzone classification has different land uses that are prohibited, restricted and permitted therein (Haw. Adm. Rul. §13-5).

8.4.4. Threats to Resources

As a result of grading and other construction projects by a private landowner in Pīla‘a between 1997 and 2001, the quality of water flowing through coastal streams to the reef was severely degraded (Settlement Factsheet 2011). The reefs were inundated with mud and a significant amount of coral cover was lost (Jokiel and Brown 2004). Pflueger’s construction included

impounding streams to create ponds, which damaged stream habitats for fish, insects and birds. In 2005, Pflueger was found to be in violation of the Clean Water Act and was required to pay fines to the Environmental Protection Agency (EPA) and the State as well as restore some of the habitat lost (EPA 2011).

In the EPA's 2004 Waterbody Quality Assessment Report for Kīlauea Stream, turbidity was the reason for classifying the stream as impaired. Turbidity can be caused by urban runoff and erosion and can damage habitats by increasing water temperature and decreasing the dissolved oxygen concentration. Turbidity was cause for impairment in Kīlauea Stream again in 2006.

Three of the waterfowl species found in the survey of the Pīla‘a area are at risk. The Common Moorhen, the Hawaiian Coot and the nēnē are on the Federal Register endangered species list (Englund et al. 2002). The same survey found that introduced fish were harming the endemic goby. Half of the ‘o‘opu nakea (*Awaous guamensis*) sampled were affected by either the disease fin rot or by parasitic leeches (Englund et al. 2002).

Honu are listed as a threatened species, due in part by the tumor-causing papilloma virus (Marine Mammals and Sea Turtles 2013, Van Houtan et al. 2010). The Hawaiian monk seal is listed as endangered, with only 1,200 individuals left worldwide (Marine Mammals and Sea Turtles 2013). Threats to their population include bycatch and entanglement in marine debris and declining fish populations on which they prey (Hawaiian Monk Seal 2013).

8.5. North Shore of O‘ahu to Ali‘i Beach

8.5.1. Biophysical Environment

8.5.1.1. Habitat

The north shore refers to the northwestern coastline of the island of O‘ahu between Ka‘ena Point, the westernmost point of the island, and Kahuku Point, the northernmost point of the island. Ali‘i Beach lies nearly halfway between these two points in Wailua Bay near the town of Hale‘iwa.

Hale‘iwa Harbor is situated between Hale‘iwa Beach Park and Ali‘i Beach Park on the west bank of the mouth of the Anahulu River. It is not included within sanctuary boundaries. The harbor was dredged and the rest of the bay is classified as bank/shelf with the exception of reef flat adjacent to Hale‘iwa Beach Park. The harbor is 90-100% uncolonized by either coral or algae. Outside of the harbor, much of the near shore submerged lands are characterized by 10-50% macroalgae and some seafloor is covered 50-90% in turf algae (Shallow Water Benthic Habitats of the Main Hawaiian Islands 2007). Outside of the harbor, coral cover extends intermittently to 1-2 km off the beach (Shallow Water Benthic Habitats of the Main Hawaiian Islands 2007).

8.5.1.2. Marine Species

The most commonly seen turtles in Hawai‘i are the hawksbill, *Eretmochelys imbricata*, and green sea turtles, Chelonia mydas. Green sea turtle (honu) feed on algae off rocks nearshore and nest and bask on beaches (Critters of the MLCD 2013, Site Characterization 2008). Honu nest at Pua‘ena Point and can appear at the mouth of the Anahulu River and at Ali‘i Beach Park (Hawai‘i Aquaculture Marine Mapper 2013). Spotted eagle rays (hailepo), or bullhead rays, travel alone or in schools of up to 30 rays, feeding on mollusks and crustaceans in the sand. (Critters of the MLCD 2013).

The endangered Hawaiian monk seal (‘īlioholoikauaua, *Neomonachus schauinslandi*) feed on fish, cephalopods and crustaceans on offshore reefs and haul out on beaches to rest and to breed (Critters of the MLCD 2013). They have been observed with low frequency in the area (Sea Turtle Nesting and Basking Beaches 2012). From the Phocidae family, the Hawaiian monk seal is one of two remaining monk seal species in the world. They are most often found in the Northwestern Hawaiian Islands but they are now known to breed on all islands. (Critters of the MLCD 2013, Hawaiian Monk Seal 2013)

In the Pūpūkea-Waimea Marine Life Conservation District (MLCD) 4.5 miles to the northeast of Hale‘iwa Harbor, fish, invertebrate and marine mammals are well documented. The fish found in this nearby bay include the snortnose wrasse, endemic to Hawai‘i, the frogfish and the thornback cowfish, or makukana, which feed on algae and invertabrates on the reef. The fantail filefish, or ō‘ ī li uwī‘uwī, is relatively rare on reefs but undergoes an irregular population bloom every several years overwhelming the shallow waters with their abundance only to get picked off by predators or wash ashore. Several members of the surgeonfish family can be found on the north shore including the white spotted surgeonfish (‘ahi), the orange band surgeonfish (na‘ena‘e), the eyestripe surgeonfish (palani), and the unicornfish (kala). These surgeonfish relatives are all herbivores feeding on algae off rocks (Critters of the MLCD 2013).

Bluefin trevally (oʻmilu) feed on smaller fish and invertebrates and are preferred by fishermen. Gray chubs (nenue) are the most common species of chub found in Hawaiʻi. Nenue inhabit rocky coastlines and have a largely herbivorous diet. The crowned toby, or puʻuolai, is found only in Hawaiʻi, preying on urchins, corals and crustaceans (Critters of the MLCD 2013). The endemic Hawaiian goby oʻopu alamoo (Lentipes concolor) was discovered in a tributary of the Anahulu River in the early 1990's after the species had been considered extinct or very rare in the 1980's (Critters of the MLCD 2013, Higashi and Yamamoto 1993). Oʻopu alamoo are diadromous gobies with a long larval life compared to that of a marine goby (Radtke et al. 2001). Since the oʻopu alamoo was identified as a Category One endangered species candidate in the 1970's, more research has been conducted on breeding behaviors to better inform conservation (Kinzie 1993).

8.5.2. Human Environment

8.5.2.1. Cultural and Historic Setting

Two ahupuaʻa meet at Haleʻiwa Harbor: Paʻalaʻa to the southwest and Kawailoa to the northeast (State of Hawaiʻi Ahupuaʻa Boundaries 2010). Both of these ahupuaʻa are contained within the moku of Waialua, once considered to be a political and agricultural center of Hawaiʻi (Alameida 1994). The perennial water source that the Anahulu River provided along with the alluvial flats and terraces along the river made the Anahulu Valley an attractive place for settlement and agriculture, especially taro. Archeological analysis has shown a fluctuating pattern of settlement from seasonal to permanent to abandoned (Dega and Kirch 2002).

With the establishment of the North Shore Surfing Reserve in 2010, the State of Hawaiʻi legislatively recognized the cultural importance of surfing to the State. (Hawaiʻi Exec. Order No. 10-07 2010) The north shore is famous for several surf breaks, including two state Designated Recreation Zones dedicated to surfing in Waialua Bay. Spearfishing is the traditional Hawaiian practice of fishing with a spear either by boat or freediving. This tradition was practiced across the populated Hawaiian Islands, and has been promoted on the north shore of Oʻahu by the North Shore Underwater Club for over fifty years (Stoffle and Allen 2012).

8.5.2.2. Human Uses

Haleʻiwa is a common tourist destination on Oʻahu and the nearby Haleʻiwa Beach Park and Aliʻi Beach Park are host to a number of aquatic activities. In the winter, the increased surf break off Aliʻi Beach attracts recreational and competitive surfers. There are two recognized surfing breaks in the area: one 0.3 mile (0.5 km) off of Puʻaena Point and the other 0.3 mile (0.5 km) off of Aliʻi Beach Park. Haleʻiwa Harbor is the origin for several boating activities including

snorkeling, SCUBA diving, and fishing. There is one dive site approximately 0.6 mile (1 km) off of Ali‘i Beach Park. There is a small state Designated Recreational Zone for commercial personal watercraft a couple hundred yards to the west of Pua‘ena Point (Ocean Recreation Zones 2012).

8.5.3. Institutional Environment

The Hawai‘i Division of Aquatic Resources (DAR) regulates fishing in Hale‘iwa Harbor according to Haw. Rev. Stat. §188-35 Fisheries Management Area. The 0.063 square mile (0.1638 square km) management area encompasses Hale‘iwa Harbor from 10 yards downstream of the Anahulu Bridge to 100 yards off both the harbor’s breakwater and the Hale‘iwa Beach Groin. The DAR controls fishing within the area with several regulations including only using one line with two or fewer hooks when fishing and using no more than 10 nets of a diameter of 2 m when crabbing (Regulated Fishing Areas on O‘ahu 2013).

The North Shore Hawai‘i Surfing Reserve, which stretches from Hale‘iwa to Ali‘i Beach Park to Sunset Beach to the northeast from the high water mark out to the surf breaks, was established in 2010 by Executive Order (EO) 10-07. The EO mandated that the State of Hawai‘i Department of Land and Natural Resources (DLNR) can accept funding to assist in the promotion and preservation of the reserves. This includes erecting signs and markers indentifying the reserve and helping other organizations and agencies to protect the cultural and environmental integrity of the reserves (Hawai‘i Executive Order 10-07 2010).

Pūpūkea-Waimea Marine Life Conservation District (MLCD), to the northeast of Hale‘iwa Harbor, is regulated by DAR. The MLCD prohibits fishing and taking sand, coral or other specimens from the area, with a few exceptions such as catching finfish and collecting certain algae species (Marine Life Conservation District, O‘ahu, Pupukea 2013). The non-profit organization Malama Pūpūkea-Waimea helps to protect the MLCD through education and other community efforts (Mission and Programs 2013).

8.5.4. Threats to Resources

Turtle populations are low in Hawai‘i with green sea turtles and hawksbill turtles listed as threatened and endangered species. The green sea turtles’ endangerment is due in part by the tumor-causing papilloma virus (Marine Mammals and Sea Turtles 2013, Van Houtan et. al. 2010). The Hawaiian monk seal is endangered as well, with only 1,200 individuals left worldwide (Marine Mammals and Sea Turtles 2013).

8.6. Maunalua Bay

8.6.1. Biophysical Environment

8.6.1.1. Habitats

Maunalua Bay is located on the South Eastern Shore of the island of Oʻahu, between Lēʻahi (Diamond Head) volcanic cone and Koko Head peak. The bay is often delimited as the waters between Kūpikipikiʻō Point (Black Point) near Lēʻahi to Kawaihoa Point at Koko Head. The bay adjoins five ahupuaʻa across seven watersheds with at least four perennial streams and as many as 52 drainages (most of which have been channelized) and are largely urban with impervious surfaces. There are several locations along the shoreline where natural freshwater springs feed into the bay.

8.6.1.2. Marine Species

The majority of the benthic geomorphology is hard bottom with isolated patches of sand and fringing aggregate coral reefs mostly parallel to the coastline. Aggregate coral reefs host typical Hawaiian coral reef species. Native seagrass as well as native and introduced macroalgal meadows are dominant on sand and soft-bottom habitats. Sea turtles, Hawaiian monk seals, and humpback whales all utilize the waters of Maunalua Bay as habitat. The Paiko Lagoon is a State of Hawaiʻi Wildlife Sanctuary for sea and shore birds. The sand flats of Maunalua Bay are well-regarded habitat for bonefish and yellow fin goatfish which are fishery target species. Introduced algae have colonized the submerged lands and compete with native organisms in some locations of the bay. Recent restoration efforts have cleared up to 2.9 million pounds of introduced algae and restored up to 23 acres of softbottom-sand habitat (Nature Magazine). In many locations land based sources of pollution have led to sedimentation on nearshore reefs and degraded water quality (Wolanski et al. 2009).

8.6.2. Human Environment

8.6.2.1. Cultural and Hisotric Setting

The fishpond in Maunalua, Kuapā Pond or Loko Keahupua o Maunalua, was once one of the largest fishponds in the Hawaiian Islands, measuring 523 acres on a 1851 map (Wyban 1992). The original name for the pond, Keahupua o Maunalua, translates to “the shrine of the baby mullet of the two mountains” (Anchor QEA L.P. 2011). Keahupua o Maunalua probably served

Kahekili, the moʻo (ruler) of Oʻahu, and his successor, Kamehameha I (Anchor QEA L.P. 2011). The pond was actively fished until 1959, when residential and commercial development began.

During the land distribution māhele in 1848, Maunalua was given to Kamāmalu, grandaughter of Kamehameha I. She rented Keahupua o Maunalua to William Webster who used the area around the pond for ranching (McElroy 2005). Webster drew the first map of the pond and shortened the name to Kuapā Pond (Anchor QEA L.P., 2011). In 1866, when Kamāmalu died, the fishpond was given to the Bishop Estate, who owns it still today (McElroy 2005). Several konhiki (fishpond managers) leased the fishpond from the Bishop Estate including Tokoi Jodoi, from 1915-1938, and Young Fong, from 1938-1947.

Keahupua o Maunalua received its first European visitors in 1786 when the English ships King George and Queen Charlotte anchored in Maunalua Bay twice that year and traded with the residents there. They exchanged nails, metal and beads for food and water. Kahekili came aboard and gave them gifts, including mullet from the fishpond (Anchor QEA L.P. 2011).

Descriptions and maps of the pond indicate that areas were walled into fish pens and some of the wetland may have been used for cultivation including taro. In some of the drier areas, sweet potatoes and other root vegetables were grown. In the 19th century, there was a Kamehameha Agricultural School in the ahupuaʻa.

Kuapā pond translates to "walled pond" referring to an offshore fishpond, which is a misnomer since the pond is considered an onshore pond, or loko puʻune, with a natural sand barrier (Anchor QEA L.P. 2011). The sand barrier was built up into a sea wall with rock on the outside to reinforce it. The seawall construction took several years and it is said that thousands of people formed a human chain to bring rock from the Koʻolau Mountains to Maunalua (Costa-Pierce 2003). Other stories say that menehune built the seawall overnight (Wyban 1992).

There were several fishponds in the Maunalua ahupuaʻa, most of which are no longer functional. Some ponds have been filled in to accommodate residential development such as Wailupe and Kupapa fishponds (Clark 2005). Development began in Keahupua o Maunalua in 1959 by Kaiser-Aetna. The development caused extensive dredging, being dredged at least 9 times since 1959, making most of the fishpond structure unrecognizable with the exception of a fish trap which may still be intact near the entrance to the marina (Anchor QEA L.P. 2011).

There used to be burial caves, fishing shrines – one to ʻamaʻama (mullet) and another to akule (scad) – and other heiau around the fishpond. Most sites are no longer intact and one of the last known intact heiau, Hawea Heiau, located uphill of the pond on Kaluanui Drive, was damaged.

8.6.2.2. Human Uses

Offshore waters of Maunalua Bay have high human use by boaters, personal water craft users, kayakers, canoe paddlers, and other ocean users facilitated by a nearby public boat ramp and the private marina. Koko Marina has about 1,000 registered vessels (Anchor QEA L.P. 2011).

There is an artificial reef in Maunalua Bay approximately one mile offshore created to enhance fishing in the area. In 1961, the state's first artificial reef was created in Maunalua Bay by dumping cars and concrete pipe to create habitat that would attract fish (Brock and Norris 1989, Artificial Reefs 2014). As the original material has disintegrated and been washed offshore, tires, barges and a Navy landing craft utility (LCU) have been added to the area for increased fish habitat.

8.6.3. Institutional Environment

Maunalua Bay is a designated Ocean Recreation Management Area (ORMA) managed by the Division of Boating and Ocean Recreation (DOBOR). It was established to provide for increased public access, reduce user conflicts, promote overall public safety, and avoid possible adverse impacts on humpback whales or other protected marine life (Haw. Adm. Rul. § 13-256). ORMAs serve to restrict certain commercial activities to specific locations and time periods, as well as regulate equipment use. Permits are issued for activities within different zones and quotas are placed on the number of boats that can operate within a specific zone. For example, a maximum of six commercial personal watercraft may be authorized to operate within a 400 foot diameter area at any one time. Recreational and commercial vessels may use designated areas when a permitted activity is not taking place and may cross these areas at all times with caution. Paiko Lagoon Wildlife Sanctuary, located east of Niu Peninsula in Maunalua Bay is a regulated fishing area under the Division of Aquatic Resources (Other Regulated Fishing Areas 2014). Within the lagoon and on the State owned land surrounding the lagoon, it is prohibited to take, possess or harm plants or wildlife, or introduce other species.

8.6.4. Threats to Resources

The nearshore environment along Maunalua Bay has been impacted by a variety of anthropogenic stressors. The bay adjoins seven watersheds with at least four perennial streams, and as many as 52 drainages (most of which have been channelized), from watersheds that are largely urban with impervious surfaces. The characteristics of these modified drainages facilitate the rapid movement of storm water, sediments, nutrients and other chemicals directly into the ocean. The west side of the bay has experienced dramatic shoreline changes, sediment flux and eutrophication (Wolanski et al. 2009). The central part of the bay has experienced a land based sediment buildup coinciding with establishment of an introduced algae *Avrainvillea amadelpha*. The east side of the bay has been heavily developed, and the original shoreline has been extended seaward through fill and the construction of the Hawai‘i Kai private marina. Offshore waters of Maunalua Bay have high human use by boaters, personal watercraft users, kayakers, and canoe paddlers facilitated by a nearby public boat ramp and the private marina.

Several introduced species including at least four species of introduced algae and invertebrates such as sponges and bryozoans have become established in

Maunalua Bay. Large-scale restoration efforts to remove introduced algae have been ongoing and open up habitat for other species. The intention is for native species to reestablish, however introduced species could utilize the new habitat. Recently one of the top five most introduced algal species not previously known to Maunalua Bay or the south shore of O‘ahu was found near the boat ramp shoreline of Maunalua Bay (Conklin et al. 2009). However, educated ocean users were able to remove the algae from the shoreline before it had time to establish and subsequent surveys found no other signs of the alga, suggesting that it had come in as fresh material from a watercraft.

In surveys of marine algae, reef fish and invertebrates, a higher percentage of introduced species was found in Maunalua Bay, 18%, than in Waikīkī, 6.9%. The proportion of introduced specied in Maunalua Bay is consistent with proportions in other harbors and bays around O‘ahu. Inside the marina, the percentage of introduced species reached 40%, the highest percentage recorded in Hawai‘i (Cole et al. 2002).

8.7. Penguin Bank

8.7.1. Biophysical Environment

8.7.1.1. Habitats

Penguin Bank is a submerged shelf located off the southwestern tip of the island of Moloka‘i. The mid-depth bank is 100-300 feet (40-100 m) and extends approximately 30 miles (50 km) southwest from La‘au point (Clark 2002). There are three finger-like projections ranging from approximately 150 – 200 m on the southern portion of the bank, which enclose basins that extend to a depth of 400 m. The bank has a similar depth to other banks in the Hawaiian Archipelago. The production dynamics are also likely to be similar to banks located elsewhere in Hawai‘i and the Pacific (Haight 1993). Penguin Bank used to be part of the Hawaiian Emperor seamount chain which formerly made up Maui Nui Island (Clark 2002).

8.7.1.2. Marine Species

Penguin Bank is geologically formed from a drowned volcano and capped with calcium carbonate deposits from marine calcification. The upper part of the bank is composed primarily of calcium carbonate pavement, sand and macroalgae. Calcifying macroalgae is thought to be major a contributor to sediment on the upper part of the bank (Agegian and Mackenzie 1989). One study found evidence of some calcium carbonate having a buffering effect to surrounding waters of Penguin Bank, thus decreasing the acidity (Sabine & Mackenzie 1995). This result has yet to be corroborated by further studies, but the existence of a buffering effect could mitigate ocean acidification making Penguin Bank a refuge habitat.

Multiple species of coral are recorded on the outer ledges (100 m – 400 m) of Penguin Bank, though mesophotic (depths at the lowest light penetration) reef ecosystems on the bank are are uncharacterized and remain poorly understood. Within the current sanctuary boundaries (100 fathoms or approximately 183 m), about 35% of coral records are Scleractinian light dependent coral that survive on low light levels. Black and soft coral have a greater distribution over the bank and are well suited to the habitat as they are not light dependent. Both Scleractinian reef building corals as well as black and soft corals (44 site records) have been observed along the upper pinnacles and slopes of the 3 finger-like projections at approximately between 100 - 200 m depths of the southern part of Penguin Bank (Hawaii Undersea Research Laboratory data).

The outer ledges of the bank slope, along with mesophotic and deep sea coral, create habitat complexity and are well known productive bottomfishing locations. The basins contained within the southern 3 finger-like projections are recognized as important bottomfish habitat which led to the establishment of a Bottom Fish Restriced Area (BRFA) ‘F’ with the following geographic boundaries: 21°02′ N , 20°55′ N, 157°34′ W, 157°22′ W. Numerous studies on the biology and ecology of bottomfish have been conducted in the BRFA.

Bottomfish connectivity studies have found that the bottomfish restricted area (BRFA) on southern Penguin Bank is a significant contributor to bottomfish larval export for the Main Hawaiian Islands (Vaz 2012). Bottomfish habitat areas that are predicted to receive larvae produced by fish at Penguin Bank include: Ni‘ihau, Kaua‘i, O‘ahu, Lana‘i, Moloka‘i, Maui, Kaho‘olawe and Northern Hawaii Island (Vaz 2012).

Penguin Bank provides important foraging habitat for monk seals (Brillinger et al 2008), generally recognized at least out to the 200 m isobath though foraging may occur deeper. The dominant calcareous organisms on the non-sloping upper 100 – 200 m of Penguin Bank are red and green algae, benthic foraminifera, and bryozoans (Agegian and Mackenzie 1989). Crustone coralline algae is the deepest dwelling algae that has been identified at Penguin Bank (Agegian and Abbott 1985). The primary sediments found in Penguin Bank are mixed mineralogic assemblage of benthicly derived magnesian calcite and aragonite (Agegian and Abbott 1989).

There are currently three artificial reefs made of concrete and plastic that were deployed in deep water on Penguin Bank in 1985 (Moffitt, Parrish and Polovina 1989). Fish communities are monitored periodically around the structures to determine the potential impact of artificial reefs on fish and transient species aggregation and production. Habitat is a limiting factor in reef fish recruitment (Sale 1978). Bottom fish habitat is limited to small scattered areas (Haight 1993).

8.7.2. Human Environment

8.7.2.1. Historic and Cultural Setting

Historically, subsistence fishing by communities in the Penguin Bank area was found to be abundant. Hawaiians fished for moi, kumu, uhu, ʻopelu, ʻono, akule, ʻulua, and ʻahi. There were many koʻa, burial sites and heiau on the Molokaʻi coastline recognizing fishing in Penguin Bansk (see box). Maui aliʻi Kihaʻa Piʻilani constructed trails to the coast lined with shells for access to marine resources (McGregor 2006).

The name Penguin Bank originated from the HMS Penguin which was originally used to survey the area. The British ship conducted deep sea soundings for the purpose of laying a telegraph cable between Canada and Australia in 1987 (Clark 2002).

> "Every finger on top here, we have fishing shrines. And if you do one survey of all these fingers, connected to the Penguin Bank. Molokaʻi Nui A Hina owns the Penguin Bank. This is ours we want to save it for our generations. But every finger, where I pointing, get one heiau on top, a fishing shrine. Yeah, and were the koʻa stay, the finger stay. You going throw for moi. Next step in the ocean, the ʻulua, same finger, next step the ʻahi, and the deep water fishes, connected to the Banks. So we have koʻa's right through."
> – *Halona Kaopuiki, resident of Molokai, Office of Hawaiian Affairs*

8.7.2.2. Human Uses

Today, Penguin Bank is one of the most heavily fished sites in Hawaiʻi for opakapaka, onaga, ʻulaʻula (Clark 2002). Subsistence fishing continues to occur off Laʻau Point and is an important harvesting area for communities on Molokaʻi. Commercial fishing also occurs in Penguin Bank (Table 34). Between 2007 and 2013, between 129 and 172 commercial fishermen reported harvesting in Penguin Bank. Total number of fish caught has steadily risen from 17,658 to 29,891 over that same time period. Similarly, total pounds caught have increased from 93,693 to 159,229 pounds. Commercial fishing for deep-water snappers (e.g. *Pristipomoides* spp. and *Etelis* spp.) has been reported on the reef slopes.

Penguin Bank Commercial Fishing Landing			
Fiscal Year	Number of Licensees	Number Caught	Lbs. caught
2007	129	17,658	93,693
2008	128	21,022	95,249
2009	147	21,538	98,086
2010	158	23,333	111,043
2011	159	24,685	128,220
2012	147	20,621	113,312
2013	172	29,891	159,229

Table 34. Commercial fishing landing data reported for Areas 331 (2007-2013).

The annual paddling race from Molokaʻi to Oʻahu traverses Penguin Bank. The race covers 32 miles between Kalua Koi on west side of Molokaʻi to Waikīkī on Oʻahu. Laʻau Point is the starting point for a swim/paddle race from Molokaʻi to Oʻahu. The race first began in 1952 and currently has about 160 paddlers participate annually (Molokaʻi 2 Oʻahu 2014).

The shallow depths around Penguin Bank make it a preferred location for military training and testing (Table 35). Submarines frequently conduct post-overhaul shallow-water dives. The area is also used for shallow-water anti-submarine warfare (ASW) operation.

Military Activities in Penguin Bank	
Submarines Post-Overhaul Shallow-Water Dives	All submarines completing any major repair work are required to conduct initial submerged testing in shallow water. It is necessary to conduct initial testing close to shipyard facilities in case an unscheduled return to port is required for repairs. Penguin Bank is the only shallow water in Hawaiian waters suitable for these required tests.
Shallow-Water ASW Operations	Exercises involving surface ships and submarine, using low power active sonar transmissions, that last from 2-5 days and use sonobuoys, smoke floats, expendable bathythermographs, and submarine-launched inert torpedoes. Operations are conducted in Penguin Bank because of the unique characteristics of the shallow water.
Submarine Mine Warfare Training	Submarines practice implanting inert mine shapes, which are later recovered by small crafts. The training cannot be conducted in deep water.

Table 35. Military activities that occur in Penguin Bank.

8.7.2.3. Institutional Environment

Penguin Bank was established as a Bottomfish Restricted Fishing Areas (BRFA) in 1998 by the State of Hawaii Division of Aquatic Resources. The original boundaries were expanded in 2007 to include previously unprotected areas. The State of Hawaiʻi is currently undergoing a process to evaluate the current BRFA closures and make adjustments as necessary to the current management for the Hawaiian Islands bottom fish fishery. However the current revision plan calls for six BRFAs to remain closed including Penguin Bank. In addition, all precious coral beds in Penguin Bank are designated Essential Fish Habitat (EFH) under NOAA Fisheries and federal consultations are required for activities that may affect precious corals.

8.7.2.4. Threats to Resources

The mesophotic corals that grow on Penguin Bank are threatened by impacts from climate change such as ocean acidification, which could reduce the coral's ability to calcify, and coral bleaching due to rising sea temperatures. Penguin Bank used to be heavily fished, both recreationally and commercially, for species such as opakapaka, onaga, and 'ula'ula. To protect the fish populations from overfishing, the Penguin Bank BRFA was established in 1998 and then expanded in 2007. As reported fish catches from Penguin Bank are on the rise, overfishing could be a potential threat to the ecosystem. Hawaiian monk seals, which use Penguin Bank as an important foraging habitat, are an endangered species with only 1,200 individuals left worldwide (Marine Mammals and Sea Turtles 2013).

8.8. Maui Nui

8.8.1. Biophysical Environment

8.8.1.1. Habitats

Maui Nui (greater Maui) is a submerged marine landmass bound by Maui, Lānaʻi, Molokaʻi, and Kahoʻolawe. Geologic records indicate that 1.2 million years ago, Maui Nui was a volcanic island that covered 5,600 square miles (14,600 sq. km). The bathymetry of the Maui Nui area is relatively shallow. The Maui Nui area is made up of Pailolo Channel, Kalohi Channel, and ʻAuʻau Channel.

The ʻAuʻau Channel reaches depths of 450 feet (140 m), however the majority of submerged lands is in the mesophotic depth range between 130-300 feet (40-90 m) deep. Topography on the channel floor consists of numerous drowned solution basins and ridges, sediment plains, and conical reef pinnacles (Grigg et al. 2002). These were exposed during periods of low sea level during multiple glacial periods over at least the last 800,000 years (Lambeck et al. 2002). Reef growth in the Channel during the Holocene consists of a thin veneer a few meters thick on those topographic highs (Grigg et al. 2002).

The ʻAuʻau channel is unique, not only in terms of its geology, but also in terms of its physical oceanography and local weather patterns. There are several physical conditions that help make the ʻAuʻau Channel (specifically the southeastern portion) an ideal place for mesophotic hard corals. These conditions include having consistently good water quality and clarity because it is flushed by tidal currents semi-diurnally; the amount of sediment run-off from the nearby land (i.e., notably between Launiupoko and Papawai Points) is lower than in other parts of Maui (Grigg 2006, Fletcher et al. 2008); and the sediments that do enter the water column are not continually re-suspended because this area is largely protected from seasonally strong wind and wave energy. Being protected from this strong wind and wave energy is also important because it creates conditions favorable to faster rates of coral accretion (Dollar 1982, Dollar and Tribble 1993, Grigg 1998), and because it reduces the amount of mixing that occurs in the water column during the summer. This reduction in mixing may allow the water column to warm more uniformly (as seen in the summer water temperature profiles by Grigg 2006), pushing the thermocline (below the one seen at ~5 m) deeper than in other nearby locations. Combined, these oceanographic and weather conditions create patches of comparatively warm, calm, clear waters that remain relatively stable through time.

8.8.1.2. Marine Species

Humpback whales (*Megaptera novaeangliae*) are prevalent in the ‘Au‘au Channel region. A majority of humpback whales in the North Pacific come to Hawai‘i in the winter months for mating and calving (Baker et al. 1986). They are often seen in coastal regions and shallow banks (< 183 m) around Maui, Moloka‘i, Kaho‘olawe, and Lāna‘i (Baker and Herman 1981, Mobley et al. 1999). The whale-watching industry is significant to the local economy, generating up to $11 million in annual revenues for the State. In 2008, approximately 50 tour operators statewide offered whale watching tours to an estimated 330,000 passengers (ONMS 2013). Although the population of northern humpback whales appears to have recovered over the last twenty years, threats from entanglement and ship strikes still exist.

A geographically independent population of manta rays (*Manta* spp.) has also been identified in the ‘Au‘au Channel region. *Manta alfredi* aggregate in shallow coastal areas with rocky or coral reef habitats with productive upwellings (Deakos et al. 2011). The high frequency of adult males and mating trains have been observed between December and April, suggest the Channel may be a significant mating area. In addition, *Manta alfredi* often visit the area to rid themselves of parasites (Deakos 2010). Manta rays are particularly vulnerable to localized anthropogenic threats in part because they come to maturity later in life, generally bare few offspring, and tend to be residential in nature (Deakos et al. 2011). In the ‘Au‘au Channel, they face threats from entanglement by non-target fishing gear. They may also be vulnerable to near shore anthropogenic impacts such as coastal development, storm water runoff, pollutant loadings, boat strikes, and unregulated ‘swim with manta’ programs (Deakos et al. 2011). Since the Maui manta ray population appears to be genetically independent, they may be at a higher risk to local threats and require additional management efforts (Musick 1999).

In addition, it is the historical center of the black coral jewelry industry in Hawai‘i (Grigg 1965, 1993). This has led to extensive interest in submerged lands surveys of coral beds by divers for jewelry production and even harvesting with remotely operated vehicles (ROV) and submersibles. More recently, research on the unique geology and reef communities of this region has increased due to the broad area of potentially suitable mesophotic habitat and the recent discovery of some areas with extensive coral coverage and Halimeda beds at mesophotic depths (Grigg et al. 2002, Kahng and Grigg 2005, Kahng and Kelley 2007, Rooney et al. 2010). Boland and Parrish (2005) surveyed black corals and fish communities off Lahaina, Maui. They identified forty fish taxa and observed that black coral trees provide important habitat for a wide range of fish species. Black coral harvesting has persisted since the 1950s for jewelry making in Hawai‘i. In 2001 *Carijoa riisei*, an octocoral native to the tropical Western Atlantic, was discovered overgrowing black corals in the ‘Au‘au Channel in Hawai‘i. *C.*C *riisei* spreads vegetatively and smothers the coral.

8.8.2. Human Environment

8.8.2.1. Cultural and Historic Setting

The waters off Lahaina, Maui referred to as Lahaina Roads, have historically been anchorage for both whaling ships and navy vessels. The basin is protected by Lāna‘i, Maui, Moloka‘i and Kaho‘olawe, making it ideal for safe anchorage (Martin 1979). During the attack on Pearl Harbor, Lahaina Roads was an additional target for the Japanese, hoping to find US Navy vessels at anchor (USS Maryland 1997).

8.8.2.2. Human Uses

Commercial fishing occurs throughout the Maui Nui area (Table 36). In 2013, 229 commercial fishermen reported catch in the area (Commercial Fishing Landing Area 320 and 321). They brought in 47,873 fish for a total of 144,162 pounds caught. Total pounds caught has risen gradually over the past six years and more than doubled since 2007 when 66,823 pounds were caught. The number of fish caught has also increased significantly since 2007 (27, 389 caught) although overall catch reached a high in 2009 (66,042 caught).

Maui Nui Commercial Fishing Landing			
Fiscal Year	Number of Licensees	Number Caught	Lbs. caught
2007	137	27,389	66,823
2008	156	30,909	75,269
2009	187	66,042	95,177
2010	184	51,357	91,634
2011	215	57,008	127,594
2012	201	46,771	136,326
2013	229	47,873	144,162

Table 36. Commercial fishing landing data reported for Areas 320 and 321 (2007-2013).
Source: *State if Hawai'i Department of Land and Natural Resources.*

The waters between Maui, Moloka'i and Lāna'i are primary habitat for humpback whales during the winter months. Whale watching is a popular activity in the area and there are many tour operators that are based on Maui (Bendure and Friary 2008).

The 'Au'au Channel provides habitat for two species of commercially valuable black coral, *Antipathes dichotoma* and *A. grandis* which are harvested for jewelry. The coral is harvested by scuba divers loosening coral pieces and floating them to a boat at the surface with lift bags (Grigg 2001). Harvesting rates have increased over the last ten years although they have reportedly remained below estimates of maximum sustainable yield (WesPac 2013).

The channel between Maui, Lāna'i and Moloka'i is extensively used for the biennial RIMPAC exercise as an explosive ordinance disposal/min counter measure (EOD/MCM) exercise area as well as for shallow-water anti-submarine warfare. Salvage ship and diving operations are also frequently conducted in the area.

Military Activities in Maui Nui Area (Maui, Molokaʻi, and Lānaʻi)	
Shallow Water ASW Operations	Operations include using low-power active sonar transmissions, sonobuoys, smoke floats, expendable bathythermographs, and inert torpedoes. Operations take place inside the 100-fathom isobaths surrounding Maui, Molokaʻi, and Lānaʻi.
Mine-counter Measure (MCM) Training	Training includes the use of bottom-moored inert mines, sonar, towed mine sweeping device, and MCM surface ships.
Hawaiian Area Tracking System (HATS)	HATS is installed southeast of Lānaʻi to provide a passive acoustic range for shallow water exercise torpedo firings.
USMC Helicopter Operations Training	Molokaʻi has been identified as the only effective training area for local night vision goggles (NVG).
US Army Flight Training	Uses Molokaʻi training area for day, night, unaided, and NVG training. Conduct flights in around Maui/Molokaʻi for low level training and for transit routes between Oʻahu and Hawaiʻi Island.

Table 37. Current Military activities that occur in the Maui Nui Area.

8.8.3. Institutional Setting

The ʻAuʻau Channel black coral bed was designated an ``Established Bed" with a harvest quota of 5,000 kg every two years that applied to federal and state waters in Hawaiʻi. This was intended to prevent overfishing and achieve optimum yields of black coral resources (Fed. Reg. Vol. 73). In addition, a 5-year moratorium was placed on the harvest of gold coral throughout the U.S. Western Pacific. The moratorium was based on information that gold corals grew much more slowly and lived longer than previously thought, suggesting that these species were vulnerable to overharvest. In 2013, the moratorium was extended through June 2018 (Fed. Reg. Vol. 78). All precious corals beds in the Maui Nui area are designated Essential Fish Habitat (EFH) under NOAA Fisheries and federal consultations are required for activities that may affect precious corals. The precious corals beds in the ʻAuʻAu Channel have been identified for their extremely important ecological functions and are further defined by NOAA Fisheries and WesPac as Habitats of Particular Concern (HAPC).

8.8.4. Threats to Resources

Land-based pollution and runoff threaten water quality in the nearshore areas around Maui. As detailed in the *2012 State Water Quality and Monitoring Assessment Report*, Maui Island has 76 impaired water areas, the highest number of impaired waters per island in the state (Hawaii Department of Health 2012). Five newly impaired waters off Maui have been listed since the previous assessment in 2010 while only one has been delisted. Among the pollutants measured in excess in the newly impaired waters are nitrogen, phosphorus, chlorophyll a, and ammonium (Hawaii Department of Health 2012). Some nearshore reefs in the Maui Nui area have shown decline in coral cover due in part to poor water quality, invasive algae and insufficient stocks of grazing fish to control algal growth (Hawaii DAR and Hawaii Coral Reef Initiative 2012). Both this nearshore coral and the mesophotic coral found in the ʻAuʻau Channel are threatened by impacts from climate change such as ocean acidification, which could reduce the coral's ability to calcify, and coral bleaching due to rising sea temperatures.

9. Environmental Consequences

This section describes the overall potential impacts of each of the sanctuary alternatives on the biological, physical and human environment. Four alternatives are evaluated in this section, including a No Action Alternative (Alternative 1). Alternative 3 is the proposed action.

9.1. Methodology

Each resource analyzed in this section includes the methods used for impact analysis and a discussion of the factors used to determine the significance of direct and indirect impacts per 40 C.F.R. § 1508.8. Direct impacts are those that are caused by the alternatives and occur at the same time and place. Indirect impacts are those caused by the alternatives that occur later in time or further removed in distance, compared to the direct effects. A summary of the current conditions and threats is provided under the Affected Environment and would continue under the No Action Alternative (Alternative 1). The impact analysis for the other three alternatives occurs on three levels: (1) the set of actions proposed for each of the alternatives that impact the resources; (2) the physical, biological, and cultural resources, and human uses impacted; and (3) the specific locations where these impacts occur. The analysis separates the non-regulatory activities (i.e. management plan) common to all alternatives from the specific regulatory actions. A summary table illustrates the impacts by resource and by alternative, showing the highest level of impact for each resource (Table 40). The nature of the existing conditions in the sanctuary waters around the populated Hawaiian Islands is interpreted from available literature and summarized in the Affected Environment (Section 6). Where sufficient location-specific information is available, these data are primarily utilized. Where location-specific data is lacking, general conditions for the islands are utilized with appropriate qualifications.

9.1.1. Resources Impacted

Activities and actions proposed within or intended to improve management of the existing and proposed sanctuary boundaries used the following methodology to determine potential effects of various alternatives on the physical, biological, and human environment. The resources analyzed in this document are summarized in Table 38 and the methodology to analyze each resource is described in more detail below.

Resources Impacted			
Biophysical Environment	**Human Environment**	**Institutional Environment**	**Operational Environment**
Habitats Marine Species Water Quality	Economics Cultural Resources Maritime Heritage Resources Fishing Activities Offshore Development Recreation & Tourism Education Research & Monitoring Human Health & Safety	State Government Federal Government	Human Resources Infrastructure

Table 38. Resources impacted by the proposed action and alternatives.

9.1.1.1. Biophysical Environment

Habitats
Impacts to habitat occur from areas such as poor water quality (e.g. sedimentation, pathogens) and physical damage (e.g. ship groundings). The methodology used to determine how a sanctuary alternative impacts habitats includes the following: (1) identifying existing and past anthropogenic causes of habitat degradation; (2) assessing level of impact without action, and opportunity for each alternative to address the impact.

Marine Species
Marine species within the current and proposed sanctuary boundaries include marine plants, corals, benthic invertebrates, fish, mobile invertebrates, sea turtles, marine mammals and seabirds. The methodology used to determine how a sanctuary alternative would impact these marine species includes the following: (1) identifying existing and past human uses and their impacts on marine species; (2) assessing potential future impacts from a proposed new action on sanctuary resources; (3) assessing compliance of activities for which there are applicable federal and state regulations; (4) assessing level of impact without action, and opportunity for each alternative to address the impact.

Water Quality
The impacts to water quality will be addressed from both land-based sources and marine sources. The methodology to determine how a sanctuary alternative would impact water quality includes consideration of the following: (1) identifying existing and past human uses and their impacts on water quality; (2) assessing potential future impacts of human use on sanctuary resources from a proposed new action; and (3) assessing compliance of activities for which there are other applicable federal and state water quality standards, programs and policies.

9.1.1.2. Human Environment

Economics
For activities proposed within the sanctuary or intended to improve management of the sanctuary, the methodology used to determine how an alternative would impact economics and revenue generation includes the following: (1) evaluating ongoing and past activities within the sanctuary to identify potential to affect economics and revenue generation in Hawai‘i; (2) assessing whether or not each activity is consistent with federal or state laws, regulations, or policies; and (3) evaluating the potential to disproportionate effects on low-income or minority populations and the potential for increased adverse health risks to children with regards to Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

Maritime Heritage Resources
Maritime heritage resources within the current and proposed sanctuary boundaries include shipwreck sites, historic aircraft sites, and the remains of landings and docks. The method for assessing potential impacts to maritime heritage resources includes the following: (1) identifying maritime heritage resources within or adjacent to the existing or proposed sanctuary; (2) assessing compliance of activities for which there are applicable laws (e.g. the National Historic Preservation Act); and (3) assessing level of impact without action and opportunity for each alternative to address the impact.

Cultural Resources
Cultural resources within the current and proposed sanctuary boundaries include fishponds, surfing sites, and traditional navigation and voyaging sites. The method for assessing potential impacts to cultural resources includes the following: (1) identifying sensitive cultural resources within the sanctuary boundaries; (2) identifying project activities that could affect those resources; and (3) determining the type and magnitude of potential direct and indirect impacts on those resources from a proposed new activity.

Fishing Activities
The potential impacts to fishing activity are dependent on the details of a given fishery. The methodology used to determine how a sanctuary alternative would impact fishing activity includes the following: (1) evaluating current trends in fishing methods, effort, and reported landings; (2) assessing level of impact without action and opportunity for each alternative to address the impact; and (3) assessing existing regulations to determine the impact of the proposed action, (4) determining impacts on fishery from existing regulations and authority under which this activity may already be managed.

Offshore Development
Offshore development in Hawaiʻi includes offshore energy production and aquaculture. The method for assessing potential impacts to offshore development includes the following: (1) identifying existing and proposed offshore development projects that could impact sanctuary resources; (2) assessing level of impact without action and opportunity for each alternative to address the impact; and (3) assessing existing regulations to determine the impact of the proposed action.

Recreation & Tourism
The methodology for assessing potential impacts to recreation and tourism is dependent on the extent and scope of existing non-consumptive recreation and tourism uses. The method for assessing potential impacts to recreation and tourism includes the following: (1) identifying the historic and current level of tourism and recreation and existing infrastructure and organization to support these human uses; (2) assessing existing access to sanctuary current and proposed sanctuary areas; (3) assessing plans and policies proposed by the Hawaiʻi Tourism Authority; and (4) assessing level of impact without action and opportunity for each alternative to address the impact.

Education
The methodology for assessing potential impacts to education relates to how the sanctuary can impact or enhance existing educational opportunities within and adjacent to the sanctuary. The methodology used to determine how an alternative would impact education activities includes the following: (1) assessing the types of potential education activities that can occur; and (2) assessing the ongoing activities within and around the proposed sanctuary units that may interfere with various education activities.

Research & Monitoring
The methodology for assessing impacts to research and monitoring relates specifically to how the sanctuary could provide for future research activities. The methodology used to determine how an alternative would impact research and monitoring activities includes the following: (1) assessing the types of potential research activities that can occur; and (2) assessing the ongoing activities within and around the proposed sanctuary units that may interfere with various research activities.

Human Health & Safety
The impact analysis evaluates the degree to which people within proposed sanctuary waters are protected from dangerous activities and hazardous materials. Where relevant, analysis of human health and safety is included in other human uses (e.g. fishing activity; recreation and tourism). The methodology used to determine how an alternative would impact human health and safety includes the following: (1) evaluating existing activities in the sanctuary to identify their potential to use or generate hazardous material or waste; and (2) assess compliance levels of these activities with applicable federal or location-specific hazardous and non-hazardous waste regulations, guidelines, management plans, spill response and contingency plans, and pollution prevention plans.

9.1.2. Significance of Impacts

To determine whether an impact is significant, Council on Environmental Quality (CEQ) regulations require the consideration of context and intensity of potential impacts (40 C.F.R. § 1508.27). Context normally refers to the setting, whether local or regional, and intensity refers to the severity of the impact. Also CEQ regulations require a discussion of the possible conflicts between the proposed sanctuary alternatives and the objectives of federal, regional, state, and local land use plans and policies for the area concerned (40 C.F.R. § 1502.16(c)).

Impacts are defined in the following categories:
- Significant beneficial impact;
- Less than significant beneficial impact;
- No impact;
- Less than significant adverse impact;
- Significant adverse impact.

9.2. Alternative 1: No Action

The no action alternative would not result in any additional adverse impact on the physical, biological, or human environment within the existing sanctuary. However, taking no action would forgo the beneficial effects associated with the other alternatives (discussed below). Taking no action would result in no change of the current management of the sanctuary under the 2002 Management Plan/Environmental Assessment. Additionally, no new regulations would be proposed for the sanctuary and the boundaries would remain the same. To the extent that future decisions would be made under the existing single-species management of humpback whales, these decisions would either be conducted and reviewed for the NEPA compliance under this EIS, or would be reviewed under a separate NEPA analysis before a decision is made. The no action alternative does not fulfill the purpose and need described in this document (see Section

4). Changes in management, threats, and public involvement in marine resources provide strong rationale to increase the scope of sanctuary management.

9.2.1. Impacts to Biophysical Environment

Habitats

By not taking any action, habitats in the sanctuary, particularly sensitive coral reefs, could be impacted by human use activities that come into direct contact with the seabed including anchoring, research activities (i.e. sampling), and prop scarring. The no action alternative also does not provide for any functional sanctuary discharge regulation. For instance, the discharge of fishing gear, referred to as ghost gear, may become entangled and cause damage to sensitive habitats. Discharge may be land-based or marine-based and although there are other state and federal regulations in place, a sanctuary regulation would provide a higher fee schedule than those of existing authorities for damage, which could be a deterrent to intentional or negligent discharge and the potential for damage to sanctuary habitats.

Marine Species

The no action alternative would allow for the protection of humpback whales regardless of whether they are delisted or not. However, that level of sanctuary protection would not be extended to other species such as other marine mammals, sea turtles, seabirds or protected species. All marine mammals, sea turtles and seabirds, regardless of their status would be ensured protection under the new proposed sanctuary regulations. If any of these animals are not listed as threatened or endangered, under status quo there would be no protection measure in place in the sanctuary. If any proposed new offshore development activities were to either disturb sensitive bottom habit such as coral reefs, including mesophotic corals, then no protection would be afforded to habitats or water quality. Therefore, taking no action would forgo the beneficial effects on marine species within the sanctuary.

Water Quality

A no action alternative would fail to implement a regulation to prohibit discharges. Therefore, both land and marine-based sources of impacts on water quality and sensitive sanctuary ecosystems would not be addressed and would potentially continue to decline. Currently the trend indicates that water and sediment quality are showing clear indications of decline, therefore this alternative would result in a less than significant adverse impact on water quality. If any offshore development

activities were to discharge into the water column, particularly during installation, then no protection would be afforded to water quality.

9.2.2. Impacts to Human Environment

Maritime Heritage Resources

The no action alternative would forego the benefit of the prohibition against the disturbance of maritime heritage resources. Human impacts to maritime archaeological resources can be inadvertent or intentional. Inadvertent impacts include anchor and mooring damage and improper diving activities. Historic sites within the sanctuary show evidence of both. Popular dive sites without proper established moorings are subject to anchor damage. Divers who attempt to clean wrecks by removing the encrusted algae and sediment, unintentionally initiate renewed corrosion. Possible inadvertent impacts include high sedimentation rates (possibly resulting from coastal development), which obscure coastal resources such as fishponds, and sand dredging for channel or beach replenishment projects, which (without proper archaeological surveys) can destroy resource sites. Intentional human impacts include the damage and removal of historic artifacts from shipwreck and aircraft sites. In spite of existing state and federal laws, there have been a number of known incidents within the sanctuary. For example, naval aircraft have been damaged by non-permitted commercial boat moorings attached to propeller shafts, cockpit instruments have been removed, 50-caliber machine guns have been illegally recovered, and compass housings have been taken from historic World War II landing craft. On steamship wreck sites, compasses have been removed, deck lights have been stolen, and brass and copper and bronze fittings have been looted. Based on the status quo, these maritime heritage resources are subject to theft, removal and/or damaging of parts, and both intentional and unintentional damage due to human use activities such as anchoring.

Cultural Resources

The no action alternative would forego the benefit of the prohibition against the disturbance of cultural resources. Cultural resources within the sanctuary face threats from natural and anthropogenic activities. In the marine environment, sediment erosion can damage built structures. Coastal vegetation growth can also damage near-shore structures (*e.g.* fishponds). Various ocean uses also pose a threat to cultural resources. Coastal and offshore development, including utilities that alter submerged lands can potentially impact cultural resources. Detonation of explosives, military training exercises, and waste discharge can harm cultural sites in and adjacent to the marine environment. Based on the status quo, cultural resources are vulnerable to natural erosion, sedimentation, development and explosives, among other things.

Fishing Activities

The no action alternative provides no additional biological or economic impacts, or burden, to the fishing industry or fisheries resources.

Offshore Development

The no action alternative would not impact any proposed offshore development activities because these proposed development activities have already taken the current sanctuary management regime into account.

Education

Under the no action alternative there would be no change to existing sanctuary education programs. Current education and outreach programs focus on humpback whales as well as other marine resources. However sanctuary education programs do not cover the full range of possible activities including specific lessons about ecosystem management, water quality, or climate change, for example. Therefore, the no action alternative would not provide the benefit that an ecosystem approach offers, including a larger context of the place that encompasses both the natural and human community.

Research & Monitoring

The no action alternative would allow for the continuation of research and monitoring focusing solely on humpback whales. With this single species approach, there is no improved understanding of or monitoring for change in the broader environment in which humpback whales spend part of each year of their life cycle, including the important habitats for breeding and birthing, as well as that of the other species that share that same ecosystem. Therefore, the no action alternative would not provide the benefit of ecosystem-wide research and monitoring.

9.3. Alternative 2

9.3.1. Revised Management Plan

The revised management plan proposed under Alternative 2 has been rewritten to reflect ecosystem-based management of marine resources within the sanctuary. This analysis addresses impacts as they relate to the management plan revision presented in this document. While the review of the management plan is required by the National Marine Sanctuaries Act (NMSA), and is considered a federal action requiring at least a consideration of a NEPA analysis, it is important to note the proposed management plan itself does not specifically enable any of the activities listed in the action plans to occur. Non-regulatory management activities could take place in the sanctuary without this revision as described under the no action alternative, and management activities could continue to occur under the current management plan. However, a revised management plan allows for the update of existing non-regulatory programs, calls for new programs to be developed, and includes a process to consider future regulatory actions. Management concerns and resource threats described in the Affected Environment (Section 6) would be improved through the implementation of the non-regulatory activities described in the management plan.

Taken together, the sanctuary expects that the strategies and activities included in this management plan would have less than significant beneficial environmental impact. By increasing protection of resources both directly and through interagency cooperation in research, education, and management, and sanctuary will expand the scope of management from single species to an ecosystem-based management approach. The potential environmental consequences of the proposed activities considered in the revised management plan action plans are described in more detail below. Despite these likely positive effects, detailed analyses of these plans are not possible. Most of the action plans provide general guidelines but are not highly specific or detailed in nature. This combined with the fact that these action plans could be implemented regardless of which alternative is selected, limits the ability to differentiate impacts to the natural or human environment among these alternatives.

Implementing Ecosystem Protection

The *Implementing Ecosystem Protection* thematic area includes three action plans: *Understanding and Managing Species and Habitats*, *Resilience to a Changing Climate*, and *Water Quality Protection*. Together these action plans describe how sanctuary management would adopt an ecosystem-based management approach to protect species and habitats within the sanctuary.

The *Understanding and Managing Species and Habitats Action Plan* describes activities to create a resilient marine ecosystem that can respond to and recover from change, that supports sustainable ecosystem functions and services, and protects healthy populations of biologically, culturally, and economically significant marine species and habitats. Activities to assess, evaluate and develop management approaches to protect and enhance key habitats would contribute to more resilient ecosystems within the sanctuary and could have a positive impact on marine resources. Once priority habitats have been identified, targeted research and monitoring programs can be developed to better understand and address impacts to key habitats in the

sanctuary. Developing collaborative resource management partnerships to better identify, understand and address threats to priority habitats within the sanctuary would enhance understanding of human use activities and their impacts and prioritize future management actions. Increased engagement by the public in identifying and reducing threats could expand ocean stewardship.

Similar efforts to assess human use impacts to protect priority marine species could result in increased understanding of human interactions and threats to species, and could inform appropriate managementapproaches.. Increased understanding of humpback whales could contribute to more effective management actions to protect humpback whales and their habitat. Identifying threats and damage from commercial and recreational ocean users to priority marine species could help identify best management practices to reduce harmful interactions. For example, a management framework to address threats to priority marine species from vessel activity could reduce harmfulinteractions between vessels and species. Conducting and enhancing education and outreach on marine habitats and species could increase public awareness resulting in opportunities for individuals to take responsibility for reducing threats to habitats and species.

The *Resilience to a Changing Climate Action Plan* describes activities to achieve a climate resilient sanctuary maintained through innovative management approaches and supported by an informed public. Activities to identify and better understand existing and potential climate impacts to marine resources, and dependent human communities, would inform targeted sanctuary management actions. This could improve the response capacity of marine resources and human communities in and adjacent to the sanctuary, potentially resulting in a positive impact to marine species. These actions could also improve the ability to inform and prioritize management actions based on natural and cultural resource vulnerability and impacts of climate and non-climate stressors. By tailoring sanctuary management actions to build resilient natural and human systems that have the capacity to respond, recover, or adapt to change, the sanctuary would be able to better manage for change in the future. The creation of a collaborative, coordinated, and integrated climate change approach across agencies would result in a more effective response to climate change impacts to marine resources and communities. Furthermore, integration of climate information into sanctuary outreach would have a positive impact on education by creating a public aware of climate impacts and actions they can take to decrease their carbon footprint and enhance adaptive capacity.

The *Water Quality Protection Action Plan* proposes activities to achieve water quality standards and levels of compliance that support healthy ecosystems, habitats and marine resources. By increasing collaborative partnerships to address land-based and marine-based pollution, the sanctuary would strive to protect and enhance water quality that contributes to sustaining a healthy and fully functioning coral reef ecosystem in the sanctuary. Positive impacts would include increased coordination, more effective water quality management, and higher levels of compliance with State of Hawai‘i water quality standards. The development of water quality research and monitoring partnerships to identify priority areas for improved water quality management by the sanctuary, could increase understanding of research and management needs and gaps which could eventually have a positive impact on water quality resources in the

sanctuary. Specific activities could also have a positive impact on cultural resources by increasing understanding and ability to respond to impacts to water quality in fishponds.

Expanding sanctuary education and outreach to build better awareness about, and engagement in, collectively addressing and contributing to high water quality standards in the sanctuary, could influence behavior resulting in responsible water quality practices. For example, vessel operators who become more knowledgeable about implementing best management practices could be motivated to change their behaviors (such as using pump out stations) which could reduce impacts on water quality. Finally, actions to improve water quality in the sanctuary by reducing wastewater discharge from vessels in the southern Maui Nui area, could result in a better-informed framework for addressing water quality impacts. This could improve understanding of water quality trends in south Maui Nui as well as improve understand of the threats to water quality and how the sanctuary could be involved in addressing water quality threats in south Maui Nui. This could have a positive impact on water quality resources in the long term.

Perpetuating Cultural Heritage

The *Perpetuating Cultural Heritage* thematic area includes two action plans: *Living and Evolving Cultural Traditions* and *Maritime Heritage*. Together these plans describe the activities that the sanctuary staff would undertake to integrate cultural and maritime heritage resource conservation into sanctuary planning efforts.

Through implementation of the *Living and Evolving Cultural Traditions Action Plan,* sanctuary staff would perpetuate customary environmental practices and principles within the sanctuary. As sanctuary staff undertake activities to better understand traditional Hawaiian cultural perspectives as related to the natural environment and customary environmental management practices, they would strengthen place-based knowledge and traditional resource management approaches.

Activities to incorporate traditional Hawaiian management practices into sanctuary resource management approaches could have a positive impact on managing cultural and historic resources within the sanctuary. The human environment would benefit from more culturally appropriate resource management techniques. Within this objective, cultural and historic resources would benefit from an effort to increase understanding of navigational seascapes as an important part of Native Hawaiian heritage.

Efforts to facilitate the communication of cultural perspectives would have a positive impact on resource conservation by enhancing understanding of cultural management of natural resources. In particular, the sanctuary hopes to inform management by coordinating with partner agencies to comprehensively integrate place-based cultural perspectives and practices into resource management. Additionally, sanctuary staff plan to improve management by informing treatment of sensitive cultural information by the sanctuary and other management agencies.

The *Maritime Heritage Action Plan* describes activities the sanctuary would undertake to engage NOAA, the State of Hawai'i, partner agencies, businesses and local communities in the identification and appreciation of maritime heritage resources in Hawai‘i. Collectively these activities would have a positive impact on the preservation of maritime heritage resources for the

benefit of current and future generations. Actions to characterize, understand and assess maritime heritage resources found in sanctuary waters would increase recognition of, and appreciation for, historic places within the sanctuary to inform potential management actions. Increased maritime heritage educational opportunities could increase student awareness and appreciation for the significance of maritime heritage resources within and adjacent to sanctuary waters. Actions could also benefit the ocean-based businesses and tour operators through increased engagement with the dive industry. Outreach activities could also increase appreciation for the maritime heritage of the Hawaiian Islands through sanctuary outreach efforts. Finally, actions to preserve and protect for future generations the maritime heritage resources found within sanctuary waters, could result in more effective and efficient preservation and protection of maritime heritage resources.

Transitioning Towards Sustainability

The *Transitioning Towards Sustainability* thematic area includes three action plans: *Community Partnerships*, *Ocean Literacy*, and *Sustainable Use*. Collectively, these plans describe the activities that sanctuary staff would undertake to engage communities and stakeholders to have a positive impact on marine resources within the sanctuary. The *Community Partnerships Action Plan* describes how the sanctuary would empower human communities to be stewards of their marine environment to enhance management. By working collaboratively with communities on implementing both traditional and science-based management approaches, the sanctuary would have a positive impact on the human environment as well as the biological environment by increasing capacity for effective community engagement in management of marine and cultural resources within the sanctuary.

As the sanctuary continues to increase active participation by enhancing and expanding the sanctuary's volunteer program, the sanctuary would have a positive impact on the human community by expanding the current volunteer base to support effective sanctuary management. These efforts would also have a positive impact on the marine environment by providing opportunities to fill sanctuary management gaps by engaging volunteers in protecting marine and cultural resources within and around the sanctuary. As the sanctuary continues to facilitate dialogue with communities and stakeholders through the community-based sanctuary advisory council (Objective 3), the sanctuary could have a positive impact on the biological environment by improved management by informed decision-makers, scientists and stakeholders to address current and emerging sanctuary issues.

The *Ocean Literacy Action Plan* describes how the sanctuary would increase awareness, knowledge and appreciation of natural and cultural marine resources in order to promote and enhance ocean stewardship within the sanctuary. By targeting audiences with specific messages to enhance their understanding of ecosystem-based management, the sanctuary would be able to reach new and broader audiences with timely and relevant information to strengthen their relationship and awareness of the sanctuary. This could have a positive impact on the human environment by improving education and communication and it could have a positive impact on marine species by improving awareness of resources and the importance of resource conservation. By creating meaningful and relevant learning and engagement opportunities, the sanctuary would have a positive impact on ocean users by increasing their understanding of their relationship to the coastal and marine environment and their role in marine conservation. The

sanctuary could also have a positive impact on marine species by broadening community engagement in sanctuary monitoring programs to increase understanding about sanctuary resources.

The *Sustainable Use Action Plan* would support vibrant coastal communities and economies that promote the sustainable use of the marine environment by engaging ocean-based businesses and tour operators to educate ocean users about sustainable use of natural and cultural resources. This would have a positive impact on ocean-based businesses and tour operators actively implementing best management practices. These activities would also have a positive impact on the marine environment by increased awareness of the significance of resources within sanctuary waters. Outreach to the travel and tourism industry and visitors would result in a better understanding of resources and promote behavioral change by visitors and tourism-based businesses, which would have a positive impact on both the human environment and the biological environment.

Sanctuary Focus Areas

The *Sanctuary Focus Area* thematic area includes four action plans: *Ni‘ihau, Pīla‘a, Southern Maui Nui*, and *Maunalua Bay*. Collectively these action plans describe place-based planning efforts to address threats to marine resources at specific locations throughout the sanctuary.

The *Ni‘ihau Action Plan* describes actions to achieve healthy coastal and marine ecosystems, and preserve the rich cultural history of Ni‘ihau. Research to identify, evaluate and better understand the marine resources of Ni‘ihau and Lehua would inform the need to improve resource management for priority areas. Developing a co-management relationship with the Niihauan community would help set standards for safeguarding sensitive information and increase protection for habitats and species through the collaborative management actions the community and sanctuary undertake.

The *Pīla‘a Action Plan* seeks to establish a replicable model for applying both traditional Hawaiian and western science-based management practices to restore the health of nearshore ecosystems in the Pīla‘a ahupua‘a. Gathering scientific and cultural information to assist in planning and implementing the restoration for the Pīla‘a pilot project would help in the establishment of target conditions for restoration of Pīla‘a. Developing a restoration and learning site planning process framework specifically for Pīla‘a would establish a model for application in other ahupua‘a.

The *Southern Maui Nui Action Plan* seeks to establish a research area in the south Maui Nui area. Activties that seek to reduce wastewater discharge from vessels in south Maui Nui could potentially improve water quality in the area. Improved awareness of alternatives to discharging wastewater and increased use of pump-out stations may also have beneficial impacts to water quality.

The *Maunalua Bay Action Plan* seeks to restore healthy coral reef and sea grass habitats, abundant coral reef marine life and high water quality standards in Maunalua Bay. Restoration activities could have a positive impact on marine resources and habitats including coral reefs and seagrass. Efforts to minimize ocean use impacts could result in more effective management of

sanctuary resources achieved through greater compliance. The use education and outreach as a management tool to engage communities and stakeholders in understanding the value of Maunalua Bay would result in greater community engagement in marine conservation in Maunalua Bay and enhance effectiveness of sanctuary management.

Ensuring Management Effectiveness

The *Ensuring Management Effectiveness* thematic area includes four action plans: *Operational Foundation*, *Compliance and Enforcement*, *Emergency Preparedness and Damage Assessment*, and *Assessing Progress*. Collectively these action plans outline the means and level of institutional support necessary for sanctuary staff to successfully meet the sanctuary goals and activities detailed in each action plan. The *Operational Foundation Action Plan* describes how the sanctuary seeks to attain effective and well-planned operations, human resources and adequate physical infrastructure to support effective management of the sanctuary. Providing administrative and budgetary support would enhance office operations to ensure effective management of the sanctuary.

By attracting, supporting and retaining highly skilled staff to implement the activities of the management plan, the office would have sufficient and appropriate human resource capacity for effective management plan implementation. Proposed activities to assess, evaluate and maintain facilities and vehicles would result in meeting sanctuary standards and supporting staff needs to successfully implement programmatic activities. The proposed outcomes would also include updating planning framework for facility needs and identifying opportunities for new facilities to support sanctuary operations and outreach. Finally, by maintaining an on-water presence in the sanctuary, the sanctuary would ensure a streamlined process for effective and efficient sanctuary research, monitoring, resource protection and education activities, which would facilitate implementation of programs that could have a significant positive impact on these resources.

The *Compliance and Enforcement Action Plan* describes activities that would achieve a high level of compliance with regulations, guidelines, and best practices. Collectively these activities would result in increased protection of the marine environment within the sanctuary and benefit biological, cultural, and historic resources. Activities to increase coordination and effectiveness of enforcement efforts could result in high levels of compliance with sanctuary regulations and enhance protection of sanctuary resources. Enforcement officials would benefit from more streamlined information and coordination. Enhancing education and outreach efforts would increase public understanding, support and compliance with sanctuary regulations. Ocean user groups could benefit from an improved understanding of ocean resources and marine species could benefit from enhanced compliance with sanctuary regulations through community and volunteer efforts.

The *Emergency Preparedness and Damage Assessment Action Plan* would increase protection of sanctuary resources from both natural hazards and human-caused incidents or injuries, through coordinated emergency response and damage assessment. Actions to improve coordinated emergency response would increase coordination in emergency response planning and effectiveness in responding to an incident. Activities within this objective would have a positive impact on emergency preparedness by increasing effective use of tools and data to prepare and respond to emergencies. By preparing for potential impacts from natural hazards and human-use

activities to natural and cultural resources within the sanctuary, sanctuary staff would increase understanding of the spatial distribution of resources and potential threats and hazards. This information could be critical to emergency responders about areas of greatest value, sensitivity, and potential exposure to catastrophic events and have an overall positive impact on human communities and the marine environment by informing response activities to target particularly sensitive areas. Additionally, participation in the Natural Resource Damage Assessment (NRDA) process with ONMS and the State of Hawai‘i for incidents that injure sanctuary resources would increase coordination in the assessment of natural resource damage and subsequent restoration efforts. Under the current management approach, the sanctuary is only authorized to conduct a NRDA for incidents that directly impact humpback whales and their habitat. Under the new proposed ecosystem-based management framework, in the event there was damage from a human use activity to a sanctuary resource, sanctuary management would have the authority to conduct NRDA and evaluate the possibility of recovering damages to any natural resource in the sanctuary.

The *Assessing Progress Action Plan* proposes a performance evaluation mechanism to continually gauge the sanctuary's progress in meeting its management goals and objectives. The use of process indicators as a measure of whether management activities are meeting the natural and cultural resource protection objectives could help ensure robust, results-based implementation of the management plan, and that management plan evaluation is transparent and effectively communicated to diverse audiences. The use of impact indicators to measure the progress of the sanctuary towards addressing change within ecological, cultural or social systems could help inform adaptive management (a calculated change in management to specific levels of change). A framework to support adaptive management actions could have a positive impact on biophysical and cultural resources in the long-term.

9.3.2. Regulations

9.3.2.1. Name Change

Changing the name of the sanctuary would not have any impact on resources.

9.3.2.2. New and Revised Sanctuary-Wide Regulations

Action: Combine humpback whale take and possess regulations

Combining the regulations prohibiting the take and possess of humpback whales would have no impact on resources because the change is administrative and would not affect the way that the sanctuary would regulate, permit, or authorize take and possession of humpback whales.

Action: Clarify humpback whale approach regulation

The clarification and articulation of existing regulations prohibiting approaching humpback whales would have no impact on resources.

Action: Remove existing prohibitions on disturbance of the submerged lands and discharge

The proposed regulation to prohibit discharge and altering submerged lands of the Special Sanctuary Management Aras is discussed in Section 9.3.3.3. This section describes the proposal to remove the current regulation at 15 C.F.R. § 922.184(a)(5) that is tied to existing management authorities over these activities (discharge and altering submerged lands) and violations of user groups in regards to these other authorities' permit requirements or permit conditions.

Currently the sanctuary supports the authority of existing agencies that regulate discharge and altering submerged lands by supplementing enforcement efforts and thereby strengthening compliance with the terms and conditions of required leases, permits or licenses issued by federal or state authorities. Most alteration of submerged land activities are overseen by the Army Corps of Engineers (Rivers and Harbors Act (RHA)), Section 404 Clean Water Act (CWA)) and DLNR. The sanctuary supplements the authority of existing agencies (Environmental Protection Agency (EPA), COE, DOH, and DLNR) that regulate the alteration of seabed activities such as dredge, drill, fill and construction. The current sanctuary regulation does not prohibit or restrict those alterations of submerged land activities which do not require federal or state authorization. Regulated by the Corps under Section 10 of the RHA (dredging), by EPA and the Corps under section 404 (discharge of dredge or fill materials) of the CWA, and by Section 103 (ocean disposal of dredge materials) of Title I of the Marine Protection, Research and Sanctuaries Act (MPRSA). Permits are also required by several state agencies for activities in state waters. The sanctuary does not currently have independent authority to restrict or deny discharge or alteration of seabed activities that are specifically allowed under CWA Section 404, RHA Section 10, State of Hawai‘i Conservation District Use Application permits, or other permits issued by other federal or state agencies.

Since these current sanctuary regulations are tied to other agencies' permitable activities only, they cannot be enforced as stand-alone regulations under sanctuary authority. Alternatives 2-3 propose additional regulations that de-couple the discharge and altering submerged lands from other agencies' permit requirements, for discrete areas within the sanctuary (i.e., Special Sanctuary Management Areas). To avoid inconsistency between different areas within the sanctuary, Alternative 2 proposed to remove the current discharge and altering submerged land regulations altogether outside of the Special Sanctuary Management Areas. The net effect is that there will only be discharge and altering submerged lands regulations within the Special Sanctuary Management Areas, and not across the entire sanctuary.

Action: Add prohibition on disturbance of cultural and maritime heritage resources

A regulation prohibiting removing, damaging, or tampering with any historical or cultural resource within the sanctuary, would directly benefit cultural and maritime heritage resources. ONMS brings maritime heritage capacity to Hawai‘i that no other resource regulatory agency is currently providing. Sanctuary staff are compiling an inventory of maritime heritage resources, doing in-reach and outreach for maritime heritage awareness, and providing training classes in maritime archaeology. Local sanctuary staff are also supported by the Maritime Heritage Program (national system). The NMSA provides a strong legislative authority to protect significant maritime heritage resources. There are several reported instances of damage to maritime heritage resources that could be avoided or prosecuted effectively. For example, sport

divers located a PB4Y-1 navy aircraft ditched near Mā‘alaea Bay in 1944, and illegally removed the aft turret 50-cal machine guns without prosecution. Damage was observed to the turret canopy in 2005. Further damage and one of the machine guns missing was reported in 2006. The regulation would also have a significant positive impact on cultural heritage resources, including fishponds and other cultural heritage resources located within the sanctuary. ONMS has a track record of working closely with NGOs and Native Hawaiian consultants on cultural resource issues. The regulation would have the indirect benefit of enhancing cultural knowledge, traditional ecological knowledge, and local communities.

The regulation would complement activities proposed in the sanctuary draft management plan. The *Maritime Heritage Action Plan* outlines several activities to support the no removing, damaging or tampering with any historical or cultural resource regulation, with specific application in Maunalua Bay. The sanctuary would facilitate maritime heritage resource protection inter-agency workshops to enhance awareness about the value and legal status of maritime heritage resources. To support enforcement, the sanctuary would facilitate a local maritime heritage enforcement training program for law enforcement personnel. The *Living and Evolving Cultural Traditions Action Plan* outlines activities the sanctuary would take to identify and protect cultural resources within the sanctuary. Sanctuary staff would coordinate with partners to assess and protect coastal cultural resources such as Native Hawaiian traditional gathering sites and estuaries.

Action: Add authority to issue sanctuary permits and authorizations

Adding the authority to issue general permits, authorizations and special use permits does not, in and of itself, have any affect on the environment. Each individual permit and authorization application is considered on a case-by-case basis. Each agency decision would comply with all applicable review criteria and requirements set forth in sanctuary regulations, the NMSA, and other statutes and regulations, such as NEPA. Interagency consultations and permits may be required of ONMS or the applicant and would be addressed at the time of application review.

9.3.2.3. Special Sanctuary Management Area Regulations for Penguin Bank and Maui Nui Areas

Action: Add prohibition on take or possess of additional marine species

A regulation prohibiting taking and possessing any marine mammal, sea turtle, seabird, ESA-listed species or Hawai‘i Revised Statutes chapter 195D listed species, within or above sanctuary waters in the Penguin Bank and Maui Nui areas would provide additional protection for the species protected under the regulation in this area. Penguin Bank provides important foraging habitat for Hawaiian monk seals (Brillinger et al 2008). Humpback whales are highly concentrated in the Maui Nui area during the winter months, particularly in coastal regions and shallow banks around Maui, Moloka‘i, Kaho‘olawe, and Lāna‘i (Baker and Herman, 1991; Mobley, Bauer and Herman 1999). Wildlife viewing is a popular tourist activity in the Maui Nui area. Adding additional protection to marine mammals, sea turtles and sea birds would ensure that tour operators can continue to operate responsible wildlife viewing excursions. The regulation is unlikely to have a negative impact on tour operators since regulations prohibiting take and possession already exist under other state and federal authorities and most tour operators already comply with voluntary and mandatory wildlife viewing guidelines. Any

education or research projects that require taking or possessing protected species would currently require a permit under the MMPA, ESA, MBTA, or the State of Hawai‘i. The sanctuary would not prohibit any research or monitoring activities that have permits from these authorities so education and research would not be impacted by the proposed regulation.

The proposed regulation would enhance existing management authorities in Penguin Bank and the Maui Nui area. A complete description of regulatory authorities prohibiting take and possess in the marine environment surrounding the populated Hawaiian Islands is in Appendix D.

Action: Add new prohibition on discharges

A regulation prohibiting discharging or depositing any material or matter into sanctuary waters at Penguin Bank and the Maui Nui area (federal waters, outside of 3 nautical miles), or adjacent to these areas if that discharge subsequently enters and injures a sanctuary resource within these two areas would have a positive impact on water quality in those areas.

Vessel discharge is released from commercial and recreational vessels that traverse the area. Additionally, coastal discharge may enter and injure sanctuary resources within the Penguin Bank and Maui Nui areas. Therefore, a regulation prohibiting discharge and enter and injure may increase water quality in these areas. Many marine mammals, invertebrates and fish species may benefit as a result of improved water quality. Additionally, mesophotic and precious coral reef habitats may benefit from improved water quality in Penguin Bank and the Maui Nui area. Precious black corals (*Antipathes dichotoma* and *Antipathes grandis*) grow abundantly in these areas and provide habitat for a range of fish species (Boland et al. 2005). Protecting the black coral habitat may therefore have an indirect benefit for protecting associated fish assemblages.

The proposed discharge regulations could have a minor negative impact on tour operators who previously discharged waste into federal waters of the sanctuary. However, pump out stations installed at the Mā‘alaea Harbor Maui could mitigate some of the impact should vessel operators choose to use them. Reduced discharge is likely to improve human health as a result of improved water quality. The regulation would not have any impact on fishing activities because chumming materials or bait used in or resulting from fishing in the sanctuary are not prohibited under the proposed regulation. Additionally, cultural practices would not be impacted by the regulation since any discharge used for ceremonial purposes is also exempt from the regulation.

The proposed regulation would enhance existing management authorities in Penguin Bank and the Maui Nui area. A complete description of regulatory authorities prohibiting discharge in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on disturbance of the submerged lands

A regulation probibiting dredging, drilling into, or otherwise altering in any way submerged lands in Penguin Bank and the Maui Nui area (federal waters, outside of 3 nautical miles) would have a direct benefit on coral reef habitat within the Penguin Bank and the federal waters of the Maui Nui area. There are currently no protections for any non-precious stony corals, including mesophotic corals, in federal waters of Penguin Bank and the Maui Nui area. This regulation could provide protection to mesophotic corals. In addition, Penguin Bank has been identified as an important bottomfish fishery and is currently protected under state law as a Bottomfish

Restricted Fishing Areas (BRFA). Providing additional protection for coral reef habitat would enhance the preservation of the fishery and further support efforts to protect the area. The regulation would also support and enhance efforts to protect corals in the Maui Nui area that have been designated Essential Fish Habitat (EFH). The established bed for precious coral in the ‘Au‘au Channel places an annual quota on the harvest of black coral and a 5-year moratorium on harvesting gold coral through 2018 (NMFS 2013). Sanctuary management would exempt activities operating under a legal permit under NOAA Fisheries, so the proposed regulation would not add any additional restrictions to harvesting black coral.

The proposed regulation would provide additional protection for maritime heritage resources, which reside on the floor of the Penguin Bank and Maui Nui area. The current number of maritime heritage resources, including ships and airplanes, is unknown; however, historic documents indicate at least 195 ships and aircraft have been lost within sanctuary boundaries. Tour operators are unlikely to engage in activities that would interfere with submerged lands so recreation and tourism is unlikely to be impacted by this regulation. Dive tourism could benefit indirectly from healthier coral reefs potentially resulting in greater fish biomass.

As outlined in the State Energy Policy’s second directive, connecting the Hawaiian Islands through integrated, modernized grids is critical to meeting the State of Hawai‘i energy goals. However, the route for any underwater cable has not been officially determined. If the preferred route transects Penguin Bank or federal waters of the Maui Nui portion of the sanctuary, the utility company would have to apply for a permit from the appropriate authorities for the construction, operation and maintenance of a submerged cable. As the installation of a submarine cable would violate the prohibition on disturbance of submerged lands, the applicant would need to apply for a general permit for the installation of a submarine cable. The permit applicant’s project would need to comply with all permit review procedures and criteria, including a requirement the cable project be pre-approved by the State of Hawai‘i. ONMS would consider project-specific environmental effects and compliance responsibilities at the time of permit application review. In addition, ONMS could issue a special use permit for the ongoing operation and maintenance of a submarine cable if the project is determined to be consistent with section 310 of the NMSA.

The proposed regulation would complement and enhance existing management authorities in Penguin Bank and the Maui Nui area. Penguin Bank was established as a Bottomfish Restricted Fishing Area (BRFA) in 1998. The ‘Au‘au Channel black coral bed is designated an “established bed” with a harvest quota of 5,000 kg every two years that applied to federal and state waters. A 5-year moratorium has been placed on the harvest of gold coral throughout the U.S. Western Pacific (through 2018). All precious corals beds in the Maui Nui area are designated Essential Fish Habitat (EFH) and federal consultations are required for activities that may affect precious corals. The precious corals beds in the ‘Au‘au Channel have been identified for their extremely important ecological functions and are further defined by NOAA Fisheries and WesPac as Habitats of Particular Concern (HAPC). A complete description of regulatory authorities prohibiting disturbing submerged lands in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on use of explosives

A regulation prohibiting possessing or using explosives within the sanctuary waters at Penguin Bank and the Maui Nui area (federal waters, outside of 3 nautical miles) would have a positive impact on the biophysical environment. The biophysical environment in Penguin Bank and the Maui Nui area would benefit from a regulation prohibiting explosives. Explosives can directly cause physical harm to marine species and habitats. Any explosive near the seafloor can have a direct negative impact on coral reefs and marine organisms that depend on coral reefs for their habitat. In additional, explosives can indirectly harm marine species through both light and noise disturbances. Prohibiting the use of explosives in Penguin Bank and the Maui Nui area can also help preserve maritime heritage resources, which could be destroyed or damaged from a blast. The total number of maritime heritage resources in this area is unknown in part because of the depth of channels and the limited resources to explore the area. However, it is likely that the Maui Nui area contains some undiscovered vessels and aircrafts, some of which could potentially be war graves.

Offshore developers requiring the use of explosives for the installation, construction, maintenance or operation of any development project would have to apply for a permit with the appropriate authorities, which could then be authorized by sanctuary management if it met the necessary conditions. Necessary steps would need to be taken to assess the potential impact of the project to marine resources within Penguin Bank and the Maui Nui area. This additional step could result in a minor negative impact to offshore development. Fireworks, as a form of explosive, would be prohibited under this regulation. Federal waters of Penguin Bank and the Maui Nui area are located 3 nautical miles offshore so these are not areas of high firework activity. It is unlikely that recreational or commercial fireworks displays would be negatively impacted by a regulation in these areas.

Prohibiting the use of explosives in Penguin Bank and the Maui Nui area would extend current State of Hawai‘i regulations into Federal waters, which prohibit the possession and use of explosives in or around fishing areas in state waters within three nautical miles (Haw. Adm. Rul. § 13-75-5, Haw. Rev. Stat. § 188-23). A complete description of regulatory authorities prohibiting the use of explosives in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on introduction of introduced species

A regulation prohibting introducing or otherwise releasing an introduced species into the sanctuary waters in the Penguin Bank and Maui Nui areas (federal waters outside of 3 nautical miles) could reduce the threat to native species from introduced species in Penguin Bank and the Maui Nui area. The introduction of an alien pest species snowflake coral (*Carijoa riisei)* is a threat to the precious black coral fishery in the Maui Nui area (WPRFMC 2013). Snowflake coral are often found on shipwrecks or in sheltered and shaded crevices or shallow caves on the deeper reefs. They are particularly abundant in the ‘Au‘au Channel because of the high irradiance in shallow water and cold temperatures in deep water (Kahng 2005). They are believed to out-compete black coral for space and other resources (Colin 1995; Thomas 1979). Since black coral is harvested sustainably for commercial jewelry sales, a regulation prohibiting introduced species could indirectly benefit commercial jewelers.

The prohibition on releasing an introduced species into the sanctuary is not expected to significantly adversely impact tour operators because this activity is generally not part of their business or operational practices. Catch and release fishing activities would not be affected because the prohibition would not apply to the catch and release of fish species already present in Penguin Bank and the Maui Nui area. Ocean users may indirectly benefit from the increased health of the marine environment. Preventing their introduction would therefore benefit ocean users by preventing detrimental impacts.

The proposed regulation would compliment and enhance existing management authorities in Penguin Bank and the Maui Nui area. A complete description of regulatory authorities prohibiting introduced species in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

9.3.3. Boundary Change

9.3.3.1. Ni‘ihau

Incorporating the waters around the island of Ni‘ihau into the sanctuary would have a positive impact on biophysical resources. The limited information on larval transport and connectivity between Ni‘ihau with other Hawaiian Islands and submerged reefs compel natural resource managers to consider the important ecological role that Ni‘ihau may have within the whole Hawaiian Archipelago. Ni‘ihau is the closest of the populated Hawaiian Islands to the Northwestern Hawaiian Islands and the Papahānaumokuākea Marine National Monument and is at the interface between the two bioregions and the specific biophysical and cultural connectivity dynamics at this interface are of special interest.

Ni‘ihau has higher fish biomass than other populated Hawaiian islands, yet lower biomass than the Northwestern Hawaiian Islands, serving as a functional transition zone in the archipelago. Ni‘ihau is also an important habitat for bottomfish, monk seals and humpback whales. Commercially valuable bottomfish have been observed in greater size and abundance in the Bottomfish Restricted Fishing Area (BRFA) off Ni‘ihau than outside the BRFA. Monk seals have been surveyed in significantly greater numbers on Ni‘ihau as compared to other populated islands in the archipelago and Lehua Islet is an important monk seal feeding and resting site. Humpback whales have also been observed in high numbers near the coast of Ni‘ihau. These marine species within this boundary extension would benefit from inclusion within the sanctuary as a result of the ecosystem-based management approach proposed in this management plan. The expanded management scope would include more marine resources within the sanctuary for consideration in research, monitoring and protection. The *Understanding and Managing Species and Habitats Action Plan* includes a focus on marine species (e.g., monk seals, marine turtles, and spinner dolphins). The *Ni‘ihau Action Plan* includes activities to assess and protect sensitive species and habitats specifically at Ni‘ihau and Lehua, such as monk seal pupping sites. Humpback whales around Ni‘ihau would benefit from inclusion in the sanctuary due to the sanctuary regulation prohibiting taking and possessing whales.

The habitats around the island have not been well surveyed so little is known about the composition of benthic habitats. The surveys that have been completed show a relatively low percent coral cover, compared to other populated Hawaiian islands, with lower rates of coral disease due to isolation (Friedlander et al. 2008). The majority of the benthic cover surveyed around the island is crustose coralline algae. By being included in the sanctuary, the physical habitat within this boundary addition would benefit from the sanctuary’s shift to ecosystem-

based management. In the *Understanding and Managing Species and Habitats Action Plan*, activities are planned to monitor and protect habitats.

Water quality around Ni‘ihau would benefit from inclusion in the sanctuary through plans to monitor and improve conditions. The *Ni‘ihau Action Plan* includes a specific activity to assess the water quality and land and water based sources of pollution on Ni‘ihau and Lehua. In addition to that site-specific activity, the *Water Quality Protection Action Plan* includes activities that would improve the water conditions throughout the sanctuary. These activities include partnering with other organizations and agencies on monitoring, pollution and debris reduction, and outreach on water quality issues.

On Ni‘ihau, Hawaiian culture remains a strong part of the population’s lifestyle so many natural resources are currently used in cultural practices. Traditional subsistence fishing remains an important activity in Ni‘ihau, so the fish within the reef, which have been reserved for Niihauans exclusively by King Kamehameha since 1839 (Tava 1984, Meyer 1998). *Pupu* shells are also an important cultural resource for the stringing of *lei pupu o Ni‘ihau*. Maritime heritage and cultural resources around Ni‘ihau would benefit from inclusion in the sanctuary through activities in the management plan, such as *Activity SN-1.1*, which proposes to compile information on cultural resources around Ni‘ihau. Niihauans use traditional fishing methods such as nets and fish in particular locations called *koa* (Tava 1984, Meyer 1998). These traditional fishing practices, along with other cultural practices on Ni‘ihau, would benefit from inclusion in the sanctuary as a result of the support lent to cultural perpetuation in several action plans. In the *Ni‘ihau Action Plan*, the sanctuary plans to develop protocol for protecting sensitive cultural knowledge. The *Living and Evolving Cultural Traditions Action Plan* includes activities sanctuary-wide to gather information and incorporate cultural knowledge into management. These activities are not expected to impact the actual practice of cultural traditions within the sanctuary; however increased knowledge of cultural practices is the first step to providing appropriate protection.

The inclusion of Ni‘ihau in the sanctuary will not impact marine traffic in the area because humpback whales approach regulations are already established under the Marine Mammel Protection Act (MMPA). The inclusion of Ni‘ihau would have a beneficial impact on education and outreach in the area. The *Ni‘ihau Action Plan* includes activities to expand educational opportunities both for children on Ni‘ihau and for off-island audiences. More broadly, the *Ocean Literacy Action Plan* outlines sanctuary-wide education activities, such as expanding the Ocean Awareness Training (OAT) program, teacher trainings and student internship opportunities. Only a limited amount of research has been conducted on the island due to highly restricted access. Including Ni‘ihau in the sanctuary and working cooperatively with the landowners would have a beneficial impact on research and monitoring activities in the area. The *Understanding and Managing Species and Habitats Action Plan* includes several activities that would conduct and support research in the sanctuary including citizen science programs, pilot research projects and behavior pattern studies sanctuary-wide that would contribute to the body of research in the region.

9.3.3.2. O‘ahu

Extending the western boundary of the sanctuary on the north shore of O‘ahu to Ali‘i Beach Park would have a positive impact on biophysical resources. The physical habitat of the proposed boundary extension on the north shore of O‘ahu includes intermittent coral cover about 0.6-1.2 miles (1-2 km) offshore (Shallow Water Benthic Habitats of the Main Hawaiian Islands 2007). By being included in the sanctuary, the physical habitat within this boundary addition would benefit from the sanctuary’s shift to ecosystem-based management. In the *Understanding and Managing Species and Habitats Action Plan*, activities are planned to monitor and protect habitats. Similarly, the marine species within this boundary extension would benefit from inclusion in the sanctuary as a result of the ecosystem-based management approach proposed in this management plan. The expanded management scope would include more marine species within the sanctuary for consideration in research, monitoring and protection. In particular, the *Understanding and Managing Species and Habitats Action Plan* includes a focus on protected species. Both green sea turtles (honu) and Hawaiian monk seals have been observed in this area of the north shore of O‘ahu and would therefore benefit from increased protection. Humpback whales within the boundary addition would benefit from inclusion in the sanctuary due to the regulations which currently prohibit taking and possessing humpback whales.

Maritime heritage and cultural resources within this boundary addition would benefit from inclusion within the sanctuary through the activities described within the *Perpetuating Cultural Heritage* thematic area. Activities that would support cultural and historic resources include creating spatial databases of these resources. The inclusion of this section of the north shore of O‘ahu into the sanctuary would have a beneficial impact on education and outreach in the area. In addition to the sanctuary-wide education and outreach activities outlined in the *Ocean Literacy Action Plan*, the sanctuary plans to specifically identify facilities on the north shore of O‘ahu to provide education and outreach opportunities adjacent to the sanctuary.

Tourism and recreation on the north shore of O‘ahu are closely tied to surfing. This management plan proposes to support the cultural significance of surfing in the area. The inclusion of this boundary addition would potentially benefit the region’s recreation and tourism, and the economic revenue therein. Recognizing the State of Hawai‘i surf reserve on the north shore of O‘ahu, the *Living and Evolving Cultural Traditions Action Plan* plans to engage in efforts to perpetuate broad understanding of surfing as a thriving aspect of cultural heritage in Hawai‘i, which could include interpretive signage and outreach and education. This supports EO 10-07 which encourages DLNR to engage organizations and associations to place appropriate signs or markers that are designed to commemorate and identify a Hawaii surfing reserve. The increased promotion of surfing heritage on the north shore of O‘ahu could have a beneficial impact on sustainable tourism in the region. Although Hale‘iwa Harbor is excluded from the proposed sanctuary boundaries, inclusion of waters outside the harbor could impact marine traffic entering

or leaving Haleʻiwa Harbor in the case that whales are present. Vessels that approach within 100 yards of a whale within the proposed boundary would be in violation of the sanctuary humpback whale approach regulations. However this is not an additional burden on vessels since humpback whale approach regulations are already in place under the MMPA.

The inclusion of this boundary addition would have a beneficial impact on cultural practices within the area as a result of the support lent to cultural perpetuation through the *Living and Evolving Cultural Traditions Action Plan*. This action plan includes activities to gather information and incorporate cultural knowledge into management. These activities are not expected to impact the actual practice of cultural traditions within the sanctuary; however increased knowledge of cultural practices is the first step to providing appropriate protection.

Including this boundary addition in the sanctuary would have a beneficial impact on research and monitoring activities in the area. The *Understanding and Managing Species and Habitats Action Plan* includes several activities that would conduct and support research in the sanctuary. Specifically, citizen science programs, pilot research projects and behavior pattern studies sanctuary-wide would contribute to the body of research in the region.

9.3.3.3. Kauaʻi: Hāʻena Ahupuaʻa

Extending the western sanctuary boundary on the north shore of Kauaʻi to the Hāʻena ahupuaʻa would have a positive impact on the biophysical environment. The physical habitat in this boundary extension includes coral reef which extends from Hāʻena State Park to Keʻe Beach about 300 feet offshore that forms a near shore sandy lagoon (Clark 1990). This habitat would benefit from inclusion in the sanctuary as a result of the sanctuary's shift to ecosystem-based management. In the *Understanding and Managing Species and Habitats Action Plan*, activities are planned to monitor and protect habitats. Keʻe Beach was found to have relatively low species richness while the reef flat and lagoon provided habitat for juvenile fish (Stepath 1999). Hawaiian monk seals and humpback whales have been observed in the area (Hawaiian Monk Seal Observations 2012, Mobley 2003). Including this boundary addition in the sanctuary would have a beneficial impact on these marine species, among others, through the sanctuary's expanded management scope, which would include a greater variety of marine species within the sanctuary for consideration in research, monitoring and protection. Humpback whales within the boundary addition would benefit from inclusion in the sanctuary due to sanctuary regulations prohibiting taking and possessing humpback whales. The *Water Quality Protection Action Plan* outlines several activities that would improve water conditions throughout the sanctuary, including the boundary extension to include Hāʻena ahupuaʻa. These activities include partnering with other organizations and agencies on monitoring, pollution and debris reduction, and outreach on water quality issues.

This boundary addition and the adjacent land include several features of cultural significance such as the Maniholo lava tube, Naia fishpond and the lagoon which was traditionally used for hukilau (Hawaiian net fishing; Clark 1990, Fish Ponds 2012). The cultural and historic resources in this boundary addition would benefit from inclusion in the sanctuary through the activities described within the *Perpetuating Cultural Heritage* thematic area. Activities that would support cultural and historic resources include creating spatial databases of these resources. Moving forward, and when appropriate, the sanctuary would explore the feasibility of adjusting other boundaries to conform to these traditional management areas. In some instances, this is

challenging because over time and within different contexts the ahupuaʻa boundaries have changed.

The inclusion of this boundary addition would have no impact on recreational fishing activities in the area. Its inclusion, though, could potentially have a beneficial impact on the community-based subsistence fishing area (CBSFA) established in Haʻena. As described above, the inclusion of this boundary addition would have a beneficial impact on cultural practices within the area as a result of the support lent to cultural perpetuating through the action plan *Living and Evolving Cultural Traditions*. This action plan includes activities to gather information and incorporate cultural knowledge into management. These activities are not expected to impact the actual practice of cultural traditions within the sanctuary; however increased knowledge of cultural practices is the first step to providing appropriate protection.

Vessels that approach within 100 yards of a whale within the proposed boundary extension would be in violation of sanctuary humpback whale approach regulations. However this is not an additional burden on vessels since humpback whale approach regulations are already in place under the MMPA. The inclusion of this boundary addition into the sanctuary would have a beneficial impact on education and outreach in the area. Several of the action plans include education and outreach activities that would improve public awareness and information in the area. In particular, the *Ocean Literacy Action Plan* outlines sanctuary-wide education activities, such as expanding the Ocean Awareness Training program, teacher trainings and student internship opportunities. Including this boundary addition in the sanctuary would have a beneficial impact on research and monitoring activities in the area. The *Understanding and Managing Species and Habitats Action Plan* includes several activities that would conduct and support research in the sanctuary. Specifically, citizen science programs, pilot research projects and behavior pattern studies sanctuary-wide would contribute to the body of research in the region.

9.3.3.4. Kauaʻi: Pīlaʻa Ahupuaʻa

Extending the eastern sanctuary boundary on the north shore of Kauaʻi to include the Kāhili ahupuaʻa, West Waiakalua ahupuaʻa, East Waiakalua ahupuaʻa, and Pīlaʻa ahupuaʻa would have a positive impact on the biophysical environment. The total area of the proposed boundary expansion would be approximately 5.02 square miles (0.4% of the current sanctuary area). The proposed sanctuary area would be used to pilot resource management strategies that incorporate traditional knowledge and scientific practices.

The physical habitat of the bay proposed for inclusion in the sanctuary, which stretches between Kepuhi Point and Mokolea Point, is characterized by a coral reef and nearshore lagoon of turf algae and uncolonized seafloor (Shallow-Water Benthic Habitats of the Main Hawaiian Islands 2007). This habitat would benefit from inclusion in the sanctuary as a result of the sanctuary's shift to ecosystem-based management. In the *Understanding and Managing Species and Habitats Action Plan*, activities are planned to monitor and protect habitats. Hawaiian monk seals, green sea turtles (honu), toothed whales and humpback whales have all been observed in the proposed boundary addition off Pīlaʻa (Hawaiian Monk Seal Observations 2012, Sea Turtle Nesting and Basking Beaches 2012, Mobley 2003). Including this boundary addition in the sanctuary would have a beneficial impact on these marine species, among others, through the sanctuary's expanded management scope, which would consider a variety of marine species in

research, monitoring and protection. Humpback whales within the boundary addition would benefit from inclusion in the sanctuary due to sanctuary regulations prohibiting taking and possessing humpback whales. Water quality in the stream entering Pīlaʻa lagoon and reef was severely degraded as a result of private construction projects on the adjacent land (Pflueger Clean Water Act Settlement 2011). The *Pīlaʻa Action Plan* aims to restore the reef, lagoon and small estuary to healthy water conditions. Therefore, inclusion of this area into the sanctuary would have a beneficial impact on water quality.

Parts of the reef within this boundary addition hold cultural significance as limu kohu harvesting locations. Limu and other cultural and historic resources in this boundary addition would benefit from inclusion in the sanctuary through the activities described within the *Pīlaʻa Action Plan*. In addition to the cultural perpetuation activities described in other action plans, this plan outlines restoration of the lagoon and reef area through traditional and western science approaches. The goal of the plan is to restore the natural and biological environment for traditional subsistence harvest of natural and cultural resources. The Pīlaʻa reef, lagoon, and small estuary holds resources that Hawaiians cultivated, husbanded and valued highly (Andrade 2012). The cultural practices of maintaining and harvesting these resources would benefit from the inclusion of this boundary addition as a result of the support lent to perpetuating culture through the action plan *Living and Evolving Cultural Traditions*. The *Pīlaʻa Action Plan* also supports cultural perpetuation by incorporating traditional knowledge and practices into the restoration of the lagoon system.

Whales have been observed within the proposed boundary addition off Pīlaʻa, so the inclusion of this area could impact marine traffic in the area in the case that whales are present. Vessels that approach within 100 yards of a whale within the proposed boundary extension would be in violation of the sanctuary humpback whale approach regulations. However this is not an additional burden on vessels since humpback whale approach regulations are already in place under the MMPA. The inclusion of this boundary addition into the sanctuary would have a beneficial impact on education and outreach in the area. Several of the action plans include education and outreach activities that would improve public awareness and information. In particular, the *Ocean Literacy Action Plan* outlines sanctuary-wide education activities, such as expanding the Ocean Awareness Training program, teacher trainings and student internship opportunities. Including this boundary addition in the sanctuary would have a beneficial impact on research and monitoring activities in the area. The *Understanding and Managing Species and Habitats Action Plan* includes several activities that would conduct and support research in the sanctuary. Specifically, citizen science programs, pilot research projects and behavior pattern studies sanctuary-wide would contribute to the body of research in the region.

9.3.3.5. Penguin Bank

Incorporating waters on the southern end of Penguin Bank into the sanctuary would have a positive impact on biophysical resources. The proposed regulations for federal waters (outside of 3 nautical miles) would extend to the additional areas and provide additional protection for critical habitats and a range of marine species. Reef building corals (i.e., Scleractinian) are found along the outer ledges along the southern end of Penguin Bank, and mesophotic corals are found along the slopes of the outer ledges to depths of nearly 400 m. The proposed regulation prohibiting altering submerged lands would provide protection for these reef species.

Additionally, the coral reef structure in this area provides critical habitat for several species of bottom fish. Although this area is already protected as a Bottom Fish Restricted Area (BRFA), the additional protections on habitat could contribute to healthy populations of bottom fish. This will have an overall beneficial impact on the area as well as elsewhere in the Hawaiian Islands where it is predicted that larvae produced by fish at Penguin Bank include may flow including Niʻihau, Kauaʻi, Oʻahu, Lanaʻi, Molokaʻi, Maui, Kahoʻolawe and Northern Hawaii Island (Vaz 2012). The proposed regulations prohibiting discharge into the sanctuary would benefit water quality throughout the area which could benefit species and habitat throughout the area as well as in adjacent areas.

Monk seal foraging habitat extends beyond the current sanctuary boundary on the southern end of Penguin Bank so incorporating the additional area will provide additional protection. The proposed regulation prohibiting taking or possessing any marine mammal will apply to monk seals found in the new area.

Biophysical resources will also benefit from the proposed actions in the draft management plan. The *Understanding and Managing Species and Habitats Action Plan* includes a focus on marine species including monk seals. The *Water Quality Protection Action Plan* could contribute to monitoring and improving conditions in the area.

Location	Alternatives	Regulatory Action	Management Plan Action	Impacts
Proposed New Boundary Additions				
Ni'ihau 218.15 mi²	2 – 4	Sanctuary-wide regulations	Sanctuary Focus Area Action Plan	+ Marine species, including monk seals, whales and coral reefs, would have greater protections + Cultural resources and practices would have greater protections - Marine traffic may face greater penalties for taking whales and other protected species
Hā'ena Ahupua'a, Kaua'i 8.03 mi²	2 – 4	Sanctuary-wide regulations	Overall Management Plan	+ Marine species, including coral reefs, monk seals and whales would have greater protection + Cultural practices, including subsistence fishing, would be supported - Marine traffic may face greater penalties for taking whales and other protected species
Pila'a Ahupua'a, Kaua'i 5.02 mi²	2 – 4	Sanctuary-wide regulations	Sanctuary Focus Area Action Plan	+ Marine species, including coral reefs, sea turtles and water quality, would have greater protections + Cultural practices, including harvesting of limu and opihi, would be supported - Marine traffic may face greater penalties for taking whales and other protected species
North Shore, O'ahu 4.00 mi²	2 – 4	Sanctuary-wide regulations	Overall Management Plan	+ Marine species, including sea turtles and monk seals would have greater protections + Cultural practices, including surfing, would be perpetuated - Marine traffic from harbor may face greater penalties for taking whales and other protected species
Hanalei River, Kaua'i 0.04 mi²	4	Sanctuary-wide regulations	Overall Management Plan	+ Marine species, including native gobies and water quality, would have increased protections + Cultural resources and practices would have increased protections
Penguin Bank,	2 – 4	Sanctuary-wide or	Overall Management	+ Marine species, including monk seals and corals, would have greater

Location	Alternatives	Regulatory Action	Management Plan Action	Impacts
Moloka‘i		federal waters regulations	Plan	protections ⊙ Offshore development would require a permit - Marine traffic may face greater penalties for taking protected species
Existing Sanctuary Areas with Proposed New Actions				
Mā‘alaea , Maui	2 - 4	Sanctuary-wide regulations	Sanctuary Focus Area Action Plan	+ Marine species, including water quality and nearshore ecosystems, would be improved
Maui Nui, between Lāna‘i, Moloka‘i and Maui	2 – 4	Sanctuary-wide or federal waters regulations	Overall Management Plan	+ Marine species, including mesophotic and precious black corals, would have greater protections ⊙ Offshore development would require a permit - Marine traffic may face greater penalties for taking protected species
Maunalua Bay, O‘ahu	3 & 4	Sanctuary-wide or site-specific regulations	Sanctuary Focus Area Action Plan	+ Marine species, including native coral reef habitats and water quality, would have greater protections + Cultural practices, including traditional navigation techniques would be supported - Marine traffic, including personal water crafts, may face higher penalties for taking protected species

Table 39. Summary of impact of proposed actions to specific locations.

9.4. Alternative 3: Proposed Action/Preferred Alternative

Alternative 3 proposes the same actions as Alternative 2 with the addition of extending the Special Sanctuary Management Area regulations to Maunalua Bay. Therefore the environmental impacts would be the same as those presented in Alternative 2 with only the differences described below.

9.4.1. Regulations

9.4.1.1. Special Sanctuary Management Area Regulations for Maunalua Bay

Action: Add prohibition on take or possess of additional marine species

A regulation probitibiting taking or possessing any marine mammal, sea turtle, seabird, ESA-listed species or Hawai‘i Revised Statutes chapter 195D listed species, within or above sanctuary waters in Maunalua Bay (state waters within 3 nautical miles) would benefit marine species in the area. Humpback whales, green sea turtles and Hawaiian monk seals are known to inhabit the waters of Maunalua Bay. The high use of personal watercraft and other watercraft as well as high commercial and recreational diving activity in Maunalua Bay may increase the likelihood that ocean users would come in contact with these protected species. The proposed regulation to prohibit taking and possessing protected species in Maunalua Bay would benefit those species. The sanctuary regulation would provide an additional legal mechanism to enforce take and possession of protected species helps to reduce and dissuade the take of these species through a legal mechanism. Prohibiting the take or possession humpback whales, marine mammals, sea turtles, seabirds, ESA-listed species or Hawai‘i Revised Statutes chapter 195D listed species would allow the sanctuary under the NMSA to apply enforcement mechanisms and pursue civil violations of take and possession of these protected species.

The proposed regulation would enhance existing management authorities in Maunalua Bay. Maunalua Bay is a state designated Ocean Recreation Management Area (ORMA) managed by the Division of Boating and Ocean Recreation (Haw. Adm. Rul. §13-256). ORMAs serve to restrict certain commercial activities to specific locations and time periods, as well as regulate equipment use. Permits are issued for activities within different zones and quotas are placed on the number of boats that can operate within a specific zone. Recreational and commercial vessels may use designated areas when a permitted activity is not taking place and may cross these areas at all times with caution. A complete description of regulatory authorities prohibiting take and possess of protected species in discharge in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on discharge

A regulation prohibiting discharging or depositing any material or matter into sanctuary waters in Maunalua Bay (state waters within 3 nautical miles), or adjacent to this area if that discharge subsequently enters and injures a sanctuary resource would benefit the biophysical environment in the area. The nearshore environment along Maunalua Bay has been impacted by a variety of anthropogenic stressors. The west side of the bay has experienced dramatic shoreline changes and sediment flux (Wolanski et al. 2009). The central part of the bay has experienced a land

based sediment buildup coinciding with establishment of an alien invasive alga *Avrainvillea amadelpha*. The east side of the bay has been heavily developed, and the original shoreline has been extended seaward through fill and the construction of the Hawai‘i Kai private marina. Offshore waters of Maunalua Bay have high human use by boaters, personal watercraft users, kayakers, and canoe paddlers facilitated by a nearby public boat ramp and the private marina. The bay adjoins seven watersheds with at least four perennial streams, and as many as 52 drainages (most of which have been channelized), from watersheds that are largely urban with impervious surfaces. The characteristics of these modified drainages facilitate the rapid movement of storm water, sediments, nutrients and other chemicals directly into the ocean. Community, non-government organizations (NGOs), state and federal government agencies have made efforts for over a decade to improve the health of the bay and restore the ecosystem. The proposed regulation would reduce impacts to the biological and physical environment in Maunalua Bay by improving the resilience of the ecosystem and facilitating recovery of degraded resources.

A regulation prohibiting the discharge of material in Maunalua Bay, or outside of Maunalua Bay where the material enters and injures sanctuary resource, would prevent major sources of stressors such as marine debris, pollutants, sediment, nutrients and pathogens from degrading water quality. While major construction, excavation, dredging and dumping require a permit under state regulations, discharge of treated vessel sewage is allowed. The reduction in discharge material would improve water quality conditions for coral and other benthic species within the bay. This improvement in habitat may result in improvements in health, recovery and resilience of species and habitats in the bay. Species such as sea turtles and marine mammals benefit from healthy and vibrant ecosystems.

Recreation activities are abundant in Maunalua Bay however most tour operators already adhere to discharge regulations under the State of Hawai‘i so the sanctuary regulations are unlikely to have an additional impact on those industries. Prohibiting discharge may provide an indirect benefit to maritime heritage resources that could be damaged or degraded from harmful discharge.

The proposed regulation would enhance existing management authorities in Maunalua Bay. Existing management authorities in Maunalua Bay are described in the previous section. A complete description of regulatory authorities prohibiting discharge in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on disturbance of the submerged lands

A regulation prohibiting dredging, drilling into, or otherwise altering in Maunalua Bay (state waters within 3 nautical miles) would reduce direct physical and biological damage to marine habitats. Coral reef habitats are particularly vulnerable to impacts from disturbing submerged lands. Coral reef organisms grow relatively slowly and are vulnerable to anthropogenic threats such as discharge and climate change (i.e. ocean acidification). Therefore, it is important to reduce other disruptive stressors, such as disturbing the seafloor, which may exacerbate degradation. The frequent use of jet skis and speed-boats in Maunalua Bay increases the likelihood of vessel groundings, which can damage the seafloor, especially in shallow areas. Anchoring vessels on submerged lands is prohibited if it damages live coral but coral is not

always visible from the surface of the water. Newly recruited coral, juveniles and cryptic coral species that remain small are all susceptible to unintentional anchor damage. Most coral grow on hard substrate, which is considered very sensitive to damage, so it is less likely that anchoring on sand would damage coral.

The proposed prohibitions against disturbing the seafloor within Maunalua Bay would allow the sanctuary, under the NMSA, to apply enforcement mechanisms and pursue civil violations for altering the seafloor. Sanctuary management is proposing to have the authority to authorize permits for construction and dredging in Maunalua Bay so the impact to development is not likely to be significant. Koko Marina has been dredged at least nine times since the initial development in 1959 (Anchor QEA, L.P. 2011). Most recently, parts of the marina and entrance channel were dredged in 2012 and the excess material was relocated to areas within the marina and off Portlock and Maunalua Bay beach parks.

There was a large fishpond in Maunalua Bay, called Loko Keahupua-o-Maunalua, which was once the largest fishpond amongst all the Hawaiian Islands. Loko Keahupua-o-Maunalua once supplied mullet, ‘ama‘ama, and other fish to populations in the surrounding area. There were also fishing heiau and several other, smaller fishponds along the coast in Maunalua Bay including Wailupe and Kupapa Fishponds, both of which have been filled in and built upon, thus are no longer operational. Most of these cultural resources are no longer recognizable or in operation, with some exceptions such as a fish trap that may still remain intact near the entrance to the marina (Anchor QEA, L.P. 2011). Prohibiting the alteration of submerged lands could, by extension, prohibit the alteration of the cultural resources that remain in the bay such as fishpond walls and traps, which would benefit these resources.

A community-based conservation organization, Mālama Maunalua, promotes native algae in the bay by hosting invasive algae removal volunteer events. If these activities are authorized by the State of Hawai‘i. Under alternative 3, sanctuary management would have the authority to authorize the permit issued by the State of Hawai‘i for an activity that violates a sanctuary regulation. The regulation to prohibit disturbing the seafloor would also prevent incidental direct damage to maritime heritage resources. By extension, maritime heritage resources are considered part of the seafloor and the exception for allowed anchoring on sand does not allow anchoring on these resources. For these reasons, the implementation of no disturbance to the seafloor regulations would have a less than significant beneficial impact on maritime heritage resources.

The proposed regulation would enhance existing management authorities in Maunalua Bay. Existing management authorities in Maunalua Bay are described in the previous section. A complete description of regulatory authorities prohibiting altering submerged lands in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on use of explosives

A regulation prohibiting possessing or using explosives Maunalua Bay (state waters within 3 nautical miles) would help reduce direct damage to marine species and habitats. In addition, the prohibition would prevent explosive-related impacts to water quality such as explosive chemicals and sediment generated from explosions. Explosives on coral reefs have been documented to be extremely destructive. Explosions can physically destroy marine life, coral reefs, other benthic

habitats, chemical residues from the explosions can be toxic to marine life and noise can be disruptive to animal behavior. In addition, a variety of contaminants can enter the marine environment through the debris and fallout fireworks produce.

The proposed regulation would enhance existing management authorities in Maunalua Bay. Existing management authorities in Maunalua Bay are described in the previous section. A complete description of regulatory authorities prohibiting explosives in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

Action: Add new prohibition on introduction of introduced species

A regulation prohibiting introducing or otherwise releasing an introduced species into Maunalua Bay (state waters within 3 nautical miles) would have a positive impact on the biophysical environment in the area. Several introduced species have become established in Maunalua Bay including sponges, bryozoans, fish and at least four species of alien invasive algae. Large-scale restoration efforts to remove invasive algae (focusing on *Avrainvillea amadelpha*) and open habitat for native species have been ongoing. Recently one of the top five most invasive alien algal species (*Kappaphycus sp.*) in Hawaiʻi (not previously known to Maunalua Bay or the south shore of Oʻahu) was found near the boat ramp shoreline of Maunalua Bay, which prompted alarm of a new potential invasion of Maunalua Bay (Conklin et al. 2009). However, ocean users were able to remove the algae from the shoreline before it had time to establish and subsequent surveys found no other signs of the alga, suggesting that it had come in as fresh material from drift or watercraft. Introduced species that compete with native species for resources and space, can alter habitats and directly harm important species such as coral (Martinez 2012a, Martinez 2012b, Smith et al. 2006, McCook et al. 2001). The prevention of additional stressors such as introduced species directly benefits the ecosystems, habitats and native species of Maunalua Bay.

Community, NGOs, state and federal government agencies have made efforts for over a decade to improve the health of the Maunalua Bay and restore the ecosystem. Of particular note, the community organization Mālama Maunalua has taken steps to address the growth of invasive algae species in the bay. Mālama Maunalua has engaged in efforts to remove alien species en masse, replant native species and monitor the efficacy of these habitat restoration efforts. To restore native fish populations, Mālama Maunalua educates ocean users on sustainable harvest with the goal of establishing a community-based marine co-managed area in the bay (Mālama Maunalua 2009). The proposed regulation would enhance these efforts. The regulation to prohibit introduced species would also prevent introduction of harmful species that would overgrow, damage or degrade maritime heritage resources.

The proposed regulation would enhance existing management authorities in Maunalua Bay. Existing management authorities in Maunalua Bay are described in the previous section. A complete description of regulatory authorities prohibiting introduced species in the marine environment surrounding the populated Hawaiian Islands is presented in Appendix F.

9.5. Alternative 4

Alternative 4 proposes the same actions as Alternative 2 and 3, with the addition of extending the regulations that apply to Penguin Bank, Maui Nui, and Maunalua Bay to the entire sanctuary. Therefore, the environmental impacts would be the same as those presented in Alternative 2 and 3 with the only differences described below. Beneficial impacts to the ecosystem from Alternative 4 would result from strengthening the management of human activities, restricting activities with the potential to cause damage to the ecosystem, and fostering cooperative management with communities. The expanded scope would allow the sanctuary to better support collaboration with other marine resource management agencies to improve marine ecosystem resilience and the sustainability of marine resources through healthy ecosystems.

9.5.1. Regulations

9.5.1.1. Sanctuary-Wide Regulations

Action: Add prohibition on take or possess of additional marine species

A sanctuary-wide regulation prohibiting taking or possessing any marine mammal, sea turtle, seabird, ESA-listed species or Hawai‘i Revised Statutes chapter 195D listed species, within or above the sanctuary would benefit the marine ecosystems around Hawai‘i. Hawai‘i is considered the most isolated group of oceanic islands in the world, and it possesses one of the most highly endemic, fragile, and endangered biota on Earth. Hawai‘i is home to more than 40% of the threatened and endangered species in the United States (Cox 1999). There are many threats to marine species in Hawaiian waters. Threats to humpback whales include entanglement, vessel collisions, acoustic disturbance, water quality, marine debris and invasive wildlife viewings. In addition, new information and emerging potential threats have been identified (i.e. ocean energy infrastructure, aquaculture, wildlife viewing with new technologies etc.) which may have unanticipated and potentially undesirable impacts. It has been shown that vessel traffic has a negative impact on humpback whale behavior. The short-term effects of vessel traffic on whales includes “horizontal avoidance behavior” consisting of faster swimming, followed by “vertical avoidance behavior” consisting of longer dive times (Baker and Herman 1989, Green 1990, Forstell et al. 1990). Other signs of harassment can include evasive swimming patterns, interruption of breeding, nursing, or resting activities, actions by a female humpback whale to shield a calf from a boat or human behavior, or even abandonment of a previously frequented area (NMFS 2013). Because take of marine species includes harassment and disturbance of those species, the proposed sanctuary-wide take and possess prohibition could diminish these impacts to whale behavior caused by human interaction.

Vessel strikes to humpback whales are relatively common (Laist et al. 2001). In instances of vessel strikes to large-whales, important factors contributing to the seriousness of the vessel strike are the size of the vessel and the speed at which the vessel is traveling at the time of the strike. Larger vessels are more likely to inflict lethal and serious injuries while vessels traveling at 14 knots or faster cause the most severe and lethal injuries (Laist et al. 2001).

Prohibiting taking or possessing humpback whales, marine mammals, sea turtles, seabirds, ESA-listed species or Hawai‘i Revised Statutes chapter 195D listed species would have a positive

impact on these species. The regulation provides an additional level of protection for marine species due to increased deterrence and compliance with regulations in place to protect them from potentially harmful take. Under the NMSA, the sanctuary would be able to pursue civil violations of any action of taking or possessing protected species within the sanctuary. Since take of these species includes harassment and disturbance of behavior, the sanctuary could also prosecute activities that would harm or impact behavior including invasive wildlife viewing, touching, and feeding. Although Section 7(a) of the ESA requires consultations on federal actions which may affect endangered species or their critical habitats, this only applies to activities authorized, funded, permitted, or carried out by federal agencies, not to direct private or state actions and does not fully prevent degradation of those habitats. The NMSA would provide an additional legal mechanism for prosecution, which could minimize the take or possession of marine species in the sanctuary.

The regulation is unlikely to have a significant impact on vessel traffic since enforcement records indicate that there has been no major impact on vessel traffic or operations from MMPA or ESA marine mammal take regulations. Likewise, the regulation would not have a significant impact on fishing activities or offshore development. The regulation may have a minor impact on recreational wildlife viewing since invasive wildlife viewing, touching, and feeding would be prohibited. However many tour operators already comply with existing regulations as well as existing voluntary wildlife viewing standards to mitigate potentially harmful impacts to marine mammals. The regulation could also have a minor impact on research and monitoring as well as certain education activities that involve approaching and interacting with protected species. However, as with tour operators, most research and education activities occurring in Hawai‘i already comply with existing federal and state regulations as well as voluntary wildlife viewing standards.

Currently, attempts to approach marine mammals (i.e., Hawaiian spinner dolphins) can be considered a “take” under the MMPA, thereby making such activities illegal (National Marine Fisheries Service 2007). Specifically, the MMPA defines “take” as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal” and defines “harassment” as “any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]” (NMFS 2007).

The regulation would enhance management activities that the sanctuary is proposing in the *Understanding and Managing Species and Habitats Action Plan*. The sanctuary plans to coordinate with federal and state agencies as well as other stakeholders on management and understanding of priority threats and resources as well as habitat threat reduction and mitigation. In addition the sanctuary would support the implementation of NOAA and State of Hawai‘i priorities for the management of protected marine resources through collaboration and use of planning documents.

Action: Add new prohibition on discharges

A sanctuary-wide regulation prohibiting discharging or depositing any material or matter into the sanctuary, or adjacent to the sanctuary if that discharge subsequently enters the sanctuary and injures a sanctuary resource would have a positive impact on water quality. Water quality in Hawai‘i ranges from relatively clean to somewhat impaired. In 2012, the State of Hawai‘i Department of Health reported 225 impaired marine segments in Hawai‘i including 23 on Kaua‘i, 73 on O‘ahu, 3 on Moloka‘i, 7 on Lāna‘i, 76 on Maui, and 43 on Hawai‘i (Hawai‘i Department of Health 2012). In 2012, turbidity was the most common pollutant in triggering a listing for marine water impairment, possibly due to polluted runoff. Nearshore localized concentrations of pollutants occur near populated areas due to stormwater discharges and permitted sanitary outfalls. Overall coastal water quality in Hawai‘i is rated “good” through the Water Quality Index (Environmental Protection Agency 2012) and sediment quality index is rated “poor” by 2006 surveys. Overall condition of waters including water quality and sediment quality is rated “fair.” This rating is lower than the “good” rating assessed in 2002 surveys reported in 2008 (Environmental Protection Agency 2012). The State of Hawai‘i Department of Health aims to make measurable improvements to its polluted runoff control program by focusing on selected watersheds (Hawai‘i Department of Health 2012).

Good water quality is essential to most marine species and habitats. It is important to maintain good water quality where existing and improve impaired water quality where needed for the health of the ecosystem and sanctuary resources. Poor water quality caused by runoff can have a negative impact on coral reefs. Excess nutrients in the coral reef habitat can cause algal or microbial blooms, which can smother the reef, damaging and possibly killing coral. Elevated land based nutrients are suspected to exacerbate the green sea turtle (*Chelonia mydas*) disease fibropapillomatosis (Van Houtan et al. 2010). Pathogens released into the water can spread disease to coral and coralline algae and possibly fish, invertebrates, turtles and marine mammals (Aeby 2005; 2006). Since both Hawaiian spinner dolphins and humpback whales inhabit nearshore areas including shallow coves and bays, their habitat is especially threatened by coastal pollution, runoff, and sediment discharge (NMFS 2006).

The discharge and enter and injure prohibitions would have a direct, long-term, beneficial impact on physical resources (i.e., water quality) because it would prohibit potentially harmful discharges by introduction of pollutants, such as bacteria, viruses, solids, pharmaceuticals, organics, nutrients, and metals. The regulation would minimize the introduction of foreign substances and pathogens into the sanctuary improving water quality and coral reef habitat and protecting particularly sensitive habitat. Excess nutrients in the coral reef habitat can cause algal blooms, which can smother the reef, damaging and possibly killing coral. Pathogens released into the water can spread disease to coral and coralline algae and possibly impact fish, invertebrates, turtles and marine mammals (Aeby 2005; 2006). The discharge prohibition also limits the exposure of fish, invertebrate species, turtles and marine mammals to hazardous substances, including pathogens, excess nutrients, and turbidity.

The regulation supports implementation of the Clean Water Act, the Ocean Dumping Act, the Rivers and Harbors Act, the Marine Plastic Pollution Research and Control Act, the Marine Debris Research Prevention and Reduction Act, and State of Hawai‘i Department of Health water quality standards (see box). Additionally, the regulation provides an additional legal

mechanism for prosecution, which should help to dissuade this activity in the sanctuary under the NMSA. The prevention of unexpected discharge in the sanctuary benefits the environment by preventing major stressors from occurring.

The discharge and enter and injure prohibition may require that ocean users employ other methods to safely discharge materials inside and outside of the sanctuary. This regulation should not interfere with current on-the-water activities within the sanctuary. Any impact to recreation and tourism, research and monitoring, or education should be less than significant. The prevention of discharge may benefit the human environment by improving the aesthetic quality and health of the marine environment, supporting better water quality for those species that are also important for tourism and non-use values. Under NMSA there would be greater enforcement capabilities and resources to protect and enhance water quality. Legal penalties available under NMSA include civil penalties for violations, and assessment of response costs and monetary damages for injuries to sanctuary resources.

The regulation supports several proposed management activities in the draft management plan. The *Water Quality Action Plan* outlines several activities the sanctuary intends to implement to address water quality issues. The sanctuary intends to work with the State of Hawai‘i and other water quality managers to ensure the protections outlined in the State Water Quality Standards are implemented in sanctuary waters. To achieve long-term improvements in water quality, the sanctuary intends to engage appropriate authorities and local businesses to develop best practices on responsible garbage and sewage disposal methods and locations. To improve understanding on the impacts of discharge to sanctuary water quality, the sanctuary would engage scientific experts to identify water quality related research and monitoring, and document and assess entanglements of humpback whales in marine debris.

Action: Add new prohibition on the disturbance of submerged lands

A sanctuary-wide regulation prohibiting dredging, drilling into, or otherwise altering in any way submerged lands would have a positive impact on the biophysical environment. Alteration of submerged lands can damage unique habitats and species. Harbor expansion, nearshore construction, dredging, sand mining, and the laying of pipes, cables and mooring buoys on the ocean floor can result in the disruption or displacement of habitat and increased turbidity levels. Seafloor structure originating from coral reef organisms is produced at slow rates and is predicted to slow and eventually disintegrate from ocean acidification due to increased carbon that is being emitted into the atmosphere and absorbed by the oceans.

A prohibition against altering submerged lands seeks to enhance existing regulatory authorities in Hawai‘i. Altering submerged lands is currently regulated under both state and federal authorities. NOAA Fisheries prohibits any person from taking any stony coral, or to break or damage any stony coral with a crowbar, chisel, hammer, or any other implement. The State of Hawai‘i prohibits intentional or negligent large-scale damage to stony coral and live rock, such as by vessel groundings, introduction of sediments, biological contaminants, and other pollutants. It also prohibits the take, break, or damage of any stony coral or live rock. It is also unlawful to sell stony coral or live rock (Haw. Adm. Rul. § 13-95 Amended). Stony corals are defined as any species belonging to the Order *Scleractinia* (marine corals which generate a hard skeleton) that are native to the Hawaiian Islands. All reef corals, including mushroom corals,

belong to this order. Live rock is defined as any natural hard substrate to which marine life is visibly attached or affixed. Virtually every hard substrate in nearshore waters has something living attached to it. In addition, Hawai‘i Water Quality Standards define activities that are permissible in specific marine bottom ecosystems (for a complete list of Class I and Class II State of Hawai‘i defined marine bottom ecosystems in Hawai‘i see Appendix G). It is the intention that Class I marine bottom ecosystems remain as close to their natural pristine state with an absolute minimum of pollution from any human-induced source. Uses of marine bottom ecosystems in this class are passive human uses without intervention or alteration, allowing the perpetuation and preservation of the marine bottom in a most natural state, such as for nonconsumptive scientific research (demonstration, observation or monitoring only), nonconsumptive education, aesthetic enjoyment, passive activities and preservation. All uses of Class II marine bottom must be compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation. Any action which may permanently or completely modify, alter, consume, or degrade marine bottoms, such as structural flood control channelization, (dams); landfill and reclamation navigational structures (harbors, ramps); structural shore protection (seawalls, vestments); and wastewater effluent outfall structures may be allowed upon securing approval in writing from the Director of DLNR, considering the environmental impact and public interests (Haw. Adm. Rul. §11-54).

The prohibition against altering submerged lands allows sanctuary management to more effectively protect bottom habitat within sanctuary waters. The regulation would enhance existing regulatory authorities by supplementing enforcement of violators and strengthening compliance with the terms and conditions of required leases, permits or licenses. The natural resource damage assessment clause of the NMSA (Section 312) provides for the protection of sanctuary resources by making any person who destroys, causes the loss of, or injures any sanctuary resource liable for an amount equal to the amount of response costs and damages resulting from the destruction, loss, or injury. The sanctuary could apply damages to restoration efforts to restore, replace, or acquire the equivalent of any sanctuary resources. The sanctuary could engage appropriate state and federal agencies to assist in the implementation of any restoration activities. This action would result in a positive impact to benthic habitat, including coral reefs, throughout sanctuary waters.

The regulation could have a minor negative impact on research and education in the sanctuary. Collecting seafloor samples can sometimes involve bottom trawling, dredging and other collection methods that could impact submerged lands. Geologists collect rock samples using submersibles or dredge hauls, among other methods, to study undersea volcanoes (Garcia et al 2012, Templeton et al 2009). Some education programs harvest corals and live rock for instructional purposes. However researchers and educators would all be able to apply for research and education permits to conduct activities within the sanctuary that alter submerged lands. This regulation could also have a minor impact on recreation and tourism because artificial reefs, including intentionally sunken ships and planes, are created as recreational and tourist attractions (Tune 1997). In addition to improving fishing practices in Hawai‘i, artificial reefs have become popular tourist attractions for SCUBA divers and submarine tours. Additionally, recreational tours sometimes anchor on coral or sensitive substrates when a mooring or sandy bottom is unavailable. Tour operators may have to modify some of their practices to adhere to the regulation.

The regulation could potentially impact wind developers proposing offshore wind farms. No current offshore wind projects are in development in Hawai‘i but the State has the highest percentage of wind potential in the nation with 17% of the US offshore wind resources (Offshore Wind Energy 2013). The strongest wind areas are located between the islands of Hawai‘i and Maui, Maui and Lāna‘i, and Lāna‘i and Moloka‘i. In 2012, the Bureau of Ocean Energy Management (BOEM) established the Hawai‘i Outer Continental Shelf (OCS) Renewable Energy Task Force to support the development of offshore renewable energy projects.

The regulation could potentially impact ocean energy projects that require anchoring to the seafloor and undersea cables connecting them to land. Several ocean energy technologies have been piloted and proposed in Hawai‘i in the last ten years. Buoys that harness wave energy, such as the PowerBuoys deployed in Kāne‘ohe Bay by the Office of Naval Research, require mooring to the seafloor and connection to the shore through undersea cables (Gill 2012, Ocean Energy). Oscillating water column (OWS) technologies, such as Oceanlinux’s proposal for a stationary platform 1000-2000 feet off Pa‘uwela connected to a shore station by undersea cable, would similarly require altering submerged lands (Ocean Energy). Ocean Thermal Energy Conversion (OTEC) projects have been piloted by the Natural Energy Laboratory of Hawai‘i Authority involving shoreline facilities that connect to cold, deep ocean water that would require additional permitting under this regulation (Ocean Energy).

As outlined in the State Energy Policy’s second directive, connecting the Hawaiian Islands through integrated, modernized grids is critical to meeting the State of Hawai‘i energy goals. However, the route for any underwater cable has not been officially determined. If the preferred route transects the sanctuary, the utility company would have to apply for a permit from the appropriate authorities for the construction, operation and maintenance of a submerged cable. As the installation of a submarine cable would violate the prohibition on disturbance of submerged lands, the applicant would need to apply for a general permit for the installation of a submarine cable. The permit applicant’s project would need to comply with all permit review procedures and criteria, including a requirement the cable project be pre-approved by the State of Hawai‘i. ONMS would consider project-specific environmental effects and compliance responsibilities at the time of permit application review. In addition, ONMS could issue a special use permit for the ongoing operation and maintenance of a submarine cable if the project is determined to be consistent with section 310 of the NMSA.

Any entity (public or private) trying to establish an artificial reef or fish aggregation devices (FAD) in Hawai‘i must get a permit from the U.S. Army Corp of Engineers. Sanctuary management are proposing to be able to authorize other authorities’ permits so FADs and artificial reefs should not be impacted within the sanctuary. FADs and artificial reefs have been shown to concentrate fish populations, benefiting fishermen. Artificial reefs can be constructed from a variety of materials including derelict cars and barges but are now mainly built with concrete blocks called “z-modules” (Artificial Reefs 2013). FADs are built like moorings with concrete blocks anchoring them and a buoy floating above (Hawai‘i FAD Program 2013). Artificial reefs can enhance species diversity by up to 5 times and fish biomass by up to 20 times that of the previous habitat (Artificial Reefs 2013). There are 30 to 40 FADs deployed around the islands of Hawai‘i, Maui, O‘ahu and Kaua‘i (Hawai’i FAD Program 2013). There are five artificial reefs constructed by the Department of Aquatic Resources (DAR) across the State

located at Kualoa, Maunalua Bay, Ewa Deepwater, and Waiʻanae on Oʻahu and Keawakapu on Maui (Artificial Reefs 2013).

The regulation recognizes legally permitted aquaculture activities so they would not be impacted by the proposed regulation. Several state and federal agencies regulate the construction of aquaculture facilities such as the U.S. Army, the Hawaiʻi Office of Conservation and Coastal Lands and the Hawaiʻi Office of Environmental Quality Control. In 2005, there were three commercial mariculture developments in Hawaiʻi. In 2011, total aquaculture sales were $40 million. The first open ocean aquaculture project in the U.S. was the Cates International Inc. Pacific threadfin (moi) farm off Ewa Beach leased in 2001. Black Pearl Inc. (BPI) tried to lease 75 acres near the Honolulu Airport for farming pearl oysters in 2005 but the lease was still pending. The same owner of BPI also started Kona Blue Water Farms, which formed a farm within the sanctuary off Kailua-Kona to raise amberjack (kahala) and moi.

The regulation is supported by management activities proposed in the *Understanding and Managing Species and Habitats Action Plan*. The sanctuary plans to implement research and science activities at priority sites within the sanctuary to monitor change to facilitate options for not anchoring on hard substrate. Furthermore, the sanctuary plans to coordinate with the State of Hawaiʻi to develop and implement a day-use mooring buoy plan and buoy placement within the sanctuary to help minimize impacts to coral reef habitat and the seafloor. To educate ocean users on the purposes and benefits of protecting the seafloor, the sanctuary plans to collaborate with state and federal agencies to conduct watercraft user education courses on best management practices.

Action: Add new prohibition on use of explosives

A sanctuary-wide regulation prohibiting possessing or using explosives within the sanctuary could have a positive impact on the biophysical environment. Explosives have a negative impact on biological and physical resources in the marine environment. Explosives may cause blast trauma and injury to marine animals, depending on size and distance (Ketten 1995). Explosives can kill and maim marine organisms as well as destroy coral reef habitat proportional to power of and radius from the explosion. In close proximity, explosions have been shown to kill marine species (U.S. Navy 2012). At a farther distance, an explosion in Newfoundland was found to harm the ear bones in nearby humpback whales (Ketten et al. 1993).

Fireworks exploded over the sanctuary can cause light pollution, which has been shown to affect the behavior of marine species. In a study on the effects of artificial light on leatherback turtles in Gabon, holiday fireworks contributed to disorientation of nesting turtles (Deem et al., 2007). Fireworks may also have a negative impact on seabirds that feed at night.

Firework displays over water can contribute paper and cardboard and wood marine debris to the marine environment below (Cheshire et al. 2009). In addition, a variety of contaminants can enter the marine environment through the debris and fallout fireworks produce. Some of the common elements released in firework displays include barium, copper, cadmium, lithium, rubidium, strontium, and lead (Antony 2011). Elevated levels of hexachlorobenzene, used for combustion in fireworks, was found to have a negative impact on number of species and diversity of microbial communities in the Fuhe River in China (Liu et al. 2007). Firework

displays can also augment the concentrations of perchlorate in nearby water supplies (Aziz et al. 2006). Perchlorate can block thyroid function, which influences fish reproductive systems. Exposures as little as 31,000 ppb induced responses in thyroid activity in goldfish but its effects on reproductive system were inconclusive (Crouch and Synder 2013). Additionally, light pollution from fireworks can also affect marine species. In a study on the effects of artificial light on leatherback turtles in Gabon, holiday fireworks contributed to disorientation of nesting turtles (Deem et al. 2007).

Behavioral, physiological, and acoustic changes can occur in various marine organisms as a result of ocean noise. These changes have the potential to negatively impact individuals, populations, and ecosystems. Fish have been documented to experience auditory threshold shifts, especially when exposed to noise in their most sensitive hearing ranges (Scholik and Yan 2001). Physical trauma has been documented in the ears of fish exposed to air-guns used in marine petroleum exploration (McCauley et al. 2002). A reduction in growth and reproduction rates and an increase in aggression and mortality rates has been found in shrimp exposed to prolonged high sound levels (Lagardére 1982). A study on Caribbean hermit crabs showed that crabs in environments with motor boat noise allowed predators to approach more closely before they hid (Chan et al. 2010).

The regulation prohibiting explosions in the sanctuary would enhance existing state regulations in Hawai‘i. The State of Hawai‘i restricts the use of firearms and spears in the marine environment and altogether prohibits the use of explosives in catching fish. Spearfishing is limited for certain species by size, season and other restrictions. Spearing turtles, aquatic mammals or crustaceans is prohibited with the exception of introduced freshwater prawns (Haw. Adm. Rul. §13-75, Haw. Rev. Stat. §188-23). The State of Hawai‘i also prohibited the use of firearms to catch, attempt to catch or kill fish, crustaceans, mollusks, turtle, or marine mammals with the exception of sharks and gaffed tuna and billfish. Explosives, electro-fishing devices, and noxious chemicals are both unlawful to use in fishing and unlawful to possess in the vicinity of fishing activities (Haw. Adm. Rul. §13-75, Haw. Rev. Stat. §188-23).

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Prohibiting the use of explosives in the sanctuary would have a minimal impact on fishing practices. The possession and use of explosives are already prohibited in or around fishing areas by the State of Hawai‘i (Haw. Adm. Rul. **§**13-75, Haw. Rev. Stat. §188-23). The sanctuary’s prohibition would apply a higher penalty schedule to these violations. The use of explosives can have detrimental impacts to human health and safety. In addition to the physical harm incurred at close proximity to explosions, explosives can have impacts to water quality such as perchlorate

contamination, which has been found in nearby water after firework events and affects mammary gland for breastfeeding in humans (Sugimoto et al., 2012). Therefore, the prohibition of explosives could have a beneficial impact on human health and safety.

Prohibiting the use of explosives in the sanctuary could impact offshore development in the case that explosives are used in construction. It could affect the construction of the undersea cable being discussed by the HECO and PUC. Fireworks, as a form of explosive, would be prohibited under this regulation so there could be a minor impact to fireworks users who plan to hold displays over the sanctuary.

The proposed regulation would enhance management activities outlined in the sanctuary draft management plan. The *Sustainable Use Action Plan* includes several activities to engage ocean users in best management practices on sustaining marine resources. Some of this outreach material could include dissuading ocean users from employing explosives through educational materials on the harm that explosives cause to marine resources. For instance, the sanctuary would offer customized training for businesses and tour operators who carry out activities within and adjacent to the sanctuary and would also incorporate messages of sustainable use into various outreach materials, which could include the harm caused by explosives on marine life.

Action: Add new prohibition on introduction of introduced species

A sanctuary-wide regulation prohibiting introducing or otherwise releasing an introduced species into the sanctuary could have a positive impact on the biophysical environment. The State of Hawai‘i considers introduced species (also known as Aquatic Invasive Species) to be those species in marine and inland waters whose introductions cause or are likely to cause economic or environmental harm, or harm to human health (Shluker 2003). With respect to invertebrates, it is estimated that 201 marine and brackish invertebrate species have been introduced to Hawai‘i, and 86 additional species cannot be determined to be native or introduced. Of these species, 248 have become established. Like recent fish introductions, most of these invertebrates probably arrived through ballast water and hull fouling (Shluker 2003). At least 19 species of macroalgae have been introduced to Hawai‘i since the mid 1950’s. At least five have established and dispersed around the Hawaiian Islands and in some areas, they appear to be outcompeting native benthic species. Three species, *Gracilaria saliconia*, *Hypnea musciformis*, and *Kappaphycus* spp., form extensive destructive blooms. In some areas, invasive algae have invaded coral habitat and overgrown reef building corals. Algal blooms can overgrow and subsequently kill coral by smothering, shading and abrasion. This can lead to a decrease in organism diversity and physical degradation of reefs. Also, 34 marine fishes have been introduced to Hawai‘i’s waters and at least 20 have become established. Of these species, 13 were purposeful releases and seven were accidental introductions. Ta‘ape (blueline snapper, *Lutjanus kasmira*) and roi (peacock grouper, *Cephalopholis argus*) were introduced by the State of Hawai‘i as food fishes in the late 1950’s. These fish are widely considered by the public to be affecting native populations, but further research is needed to better understand the impacts of these fish. Prior to 1960, most fish introductions were purposeful, but since then, most are likely to be related to shipping (ballast water or hull fouling) or to the aquarium trade.

Introduced species have adversely affected more than 45 percent of listed threatened or endangered species in the United States. After habitat modification and loss, introduced species

are the third leading cause for species extinction (Wilcove et al. 1998, Kimball 2001, U.S. General Accounting Office 2002), with the rate of extinctions higher on islands than anywhere else in the world (South Pacific Regional Environment Programme 2000). There are many problems caused by introduced species that are of concern for Hawai‘i’s marine ecosystems including competition for resources and habitat destruction (Shluker 2003). There are a number of obstacles to introduced species management in the Pacific Islands region, including limited and inaccessible scientific information on basic biology for risk assessment and management, lack of awareness of invasive species impacts on biodiversity, insufficient mechanisms for information dissemination to relevant decision-makers, lack of well-developed regional coordination, and a shortage of technically trained personnel and necessary facilities, as well as insufficient funding to support the above (SPREP 2000).

A regulation prohibiting introducing species into the sanctuary would complement and enhance existing federal and state efforts to control introduced species in marine environments. The State of Hawai‘i prohibits the introduction or spread of species within state waters including Haw. Adm. Rul. § 4-76 (Non-Indigenous Aquatic Species) including discharge of ballast water and has permitting requirements. NOAA Fisheries and the State of Hawai‘i Department of Agriculture issue permits when mariculture ventures include non-indigenous species. In addition, the State of Hawai‘i also has an Aquatic Invasive Species Management Plan 2003.

A regulation prohibiting introducing species into the sanctuary would benefit marine species by decreasing threats from introduced species. Introduced species can out-compete native plants for resources (Smith et al. 2002, Martinez 2012). On coral reefs, introduced predatory species can decimate juvenile populations of native species and outcompete adults for resources and habitat (*e.g*. Albins and Hixon 2008). Introduced algae have also been shown to out-compete coral reefs for nutrients. In other instances, an introduced species can directly or indirectly alter physical habitat quality. For example, red mangrove roots have been shown to destroy Hawaiian fishpond walls and accumulate sediment and nutrients in coastal areas, altering the habitat for native species. Introduced species can also be vectors for disease that can harm and eventually kill native species. The introduced blue-line snapper spread disease to indigenous Hawaiian goatfish, severely impacting the species. The regulation would also provide an additional legal mechanism for prosecution of violators under the NMSA. The prevention of unpermitted introduced species from being released into the sanctuary benefits the environment by preventing a major invasion from occurring.

The introduced species prohibition may impact vessels that transport introduced species or equipment that may be contaminated by introduced species. However, it is likely that most transport vessels are taking the necessary precautions since regulations already exist in state waters. The regulation would not impact mariculture activities that have permits from NOAA Fisheries or the State of Hawai‘i. The regulation could indirectly benefit recreation and tourism by improving the aesthetic quality of the marine environment for recreational snorkelers and divers by preventing introduced algae invasions. Additionally, the regulation could have a positive indirect impact on fishing activity by reducing competition for native fish species in Hawai‘i. The regulation is not likely to have an impact on research and monitoring or education activities that take place within the sanctuary.

The proposed regulation would compliment management activities outlined in the sanctuary draft management plan. In the *Understanding and Managing Species and Habitats Action Plan*, the sanctuary plans to evaluate and prioritize opportunities for the sanctuary to further support efforts to minimize the impacts of aquatic invasive species. Additionally, since invasive species are often spread through human use, activities in the *Sustainable Use Action Plan*, such as identifying significant impacts of cumulative human use in the sanctuary and offering customized training for businesses and tour operators would also help to address the spread of invasive species. In Maunalua Bay, which has been particularly affected by invasive algae, the sanctuary plans to collaborate with researchers, natural resource managers and communities to assess the impacts of stressors such as invasive species.

9.5.2. Boundary Change

Incorporating the estuarine waters of the Hanalei River into the sanctuary on the north shore of Kaua‘i would have a positive impact on the biophysical envioronment. The physical habitat and marine species at the mouth of the Hanalei River would benefit from inclusion in the sanctuary as a result of the sanctuary’s shift to ecosystem-based management. In the *Understanding and Managing Species and Habitats Action Plan*, activities are planned to monitor and protect habitats. The Hanalei River estuary provides a breeding area for several fish species and is home to the five goby species native to Hawai‘i. In this plan, a variety of marine species within the sanctuary would be considered in research, monitoring and protection, which would have a beneficial impact on the ecosystem as a whole. Under Alternative 4, the prohibition against dredging, drilling into, or otherwise altering in any way the submerged lands would apply to the Hanalei River and help protect benthic habitat for marine species within the Hanalei River. The prohibition against releasing introduced species into the sanctuary would also benefit native species that inhabit the Hanalei River.

The *Water Quality Protection Action Plan* outlines several activities that would improve the water conditions throughout the sanctuary, including the boundary extension to include Hanalei River. These activities include partnering with other organizations and agencies on monitoring, pollution and debris reduction, and outreach on water quality issues. Additionally, under Alternative 4, the prohibitions against discharge would extend sanctuary-wide and therefore provide an additional level of protection to the Hanalei River. Specifically, it would be prohibited to discharge or deposit any material within the sanctuary, or outside of the sanctuary if the material subsequently enters and injures a sanctuary resource within the sanctuary.

The cultural and historic practices and resources in this boundary addition, including native goby species and wetlands for traditional taro farming, could benefit from inclusion in the sanctuary. Traditionally, gobies were an important resource used in ceremonies and fishing events. Taro was also a culturally significant resource in riparian wetlands around Hanalei River. The cultural practices of maintaining and harvesting these resources could benefit from the inclusion of this boundary addition as a result of the support lent to cultural perpetuating through the *Living and Evolving Cultural Traditions Action Plan*. This action plan includes activities to gather information and incorporate cultural knowledge into management, including coordinating with partners to assess and protect coastal and reef freshwater springs, estuaries, sea caves, and anchialine ponds within or adjacent to the sanctuary, recognizing their significance as wahi pana and sites of cultural practice. These activities are not expected to impact the actual practice of

cultural traditions within the sanctuary; however increased knowledge of cultural practices is the first step to providing appropriate protection. The sanctuary-wide prohibition of removing, damaging, or tampering with any historical or cultural resource would apply to the Hanalei River under Alternative 4, and serve to enhance the proposed management activities.

The inclusion of the Hanalei River in the sanctuary could have a beneficial impact on education and outreach in the area. Several of the action plans include education and outreach activities that could contribute to education in the area. In particular, the *Ocean Literacy Action Plan* outlines sanctuary-wide education activities, such as expanding the Ocean Awareness Training program, teacher trainings and student internship opportunities. The river currently lacks the proper infrastructure to support growing visitor populations. Without proper education, visitors could pollute the area and engage in recreational activities in that impact the biology of the Hanalei River. Therefore, human health and safety, through education, in the area could also benefit from being included in the sanctuary.

Including this section of the Hanalei River in the sanctuary could have a beneficial impact on research and monitoring activities in the area. The *Understanding and Managing Species and Habitats* action plan includes several activities that could conduct and support research in the sanctuary. Specifically, citizen science programs, pilot research projects and behavior pattern studies sanctuary-wide contribute to the body of research in the region.

Resource Impacts Comparison Table

Legend
+ = Significant beneficial impact
O = No impact
⦿ = Less than significant adverse impact
– = Significant adverse impact.

Resources	**Proposed Alternatives**			
	One	**Two**	**Three**	**Four**
Physical and Biological Environment				
Habitats	O Status Quo Maintained	+ Understanding and Managing Species and Habitats Action Plan & Resilience to a Changing Climate Action Plan should provide habitat protection in the sanctuary and in proposed boundaries on O‘ahu, Kaua‘i & Ni‘ihau; Pīla‘a Action Plan & Ni‘ihau Action Plan should provide habitat protection; Regulations prohibiting discharge, altering submerged lands, explosives, and introduced species should provide additional protections for habitats in Penguin Bank and Maui Nui area.	+ Understanding and Managing Species and Habitats Action Plan & Resilience to a Changing Climate Action Plan provide habitat protection; Regulations prohibiting discharge, altering submerged lands, explosives, and introduced species should provide additional protections for habitats in Penguin Bank, Maui Nui area, Maunalua Bay.	+ Understanding and Managing Species and Habitats Action Plan & Resilience to a Changing Climate Action Plan should provide habitat protection for the the Hanalei River; Regulations prohibiting discharge, altering submerged lands, explosives, and introduced species should provide additional protections for habitats throughout the Sanctuary.

Resources	Proposed Alternatives			
	One	Two	Three	Four
Marine Species	O Status Quo Maintained	+ Understanding and Managing Species and Habitats Action Plan & Resilience to a Changing Climate Action Plan should benefit marine species in the sanctuary and in proposed boundaries on Oʻahu, Kauaʻi & Niʻihau; Niʻihau, Pīlaʻa & Maunalua Action Plans should provide additional benefits; Regulations prohibiting approach, overflight, take & possession, discharge, altering submerged lands, explosives, and introduced species, should provide additional protection for marine species in Penguin Bank and Maui Nui area.	+ Understanding and Managing Species and Habitats Action Plan & Resilience to a Changing Climate Action Plan should benefit marine species; Regulations prohibiting approach, overflight, take & possession, discharge, altering submerged lands, explosives, and introduced species, should provide additional protection for marine species in Penguin Bank, Maui Nui area, Maunalua Bay.	+ Understanding and Managing Species and Habitats Action Plan & Resilience to a Changing Climate Action Plan should benefit marine species in the Hanalei River; Regulations prohibiting approach, overflight, take & possession, discharge, altering submerged lands, explosives, and introduced species, should provide additional protection for marine species throughout the Sanctuary.
Water Quality	O Status Quo Maintained	+ Water Quality Protection Action Plan should benefit water quality in the sanctuary and proposed boundaries on Oʻahu, Kauaʻi & Niʻihau; Māʻalaea Action Plan should provide additional benefits; Regulations prohibiting discharge should improve water quality in Penguin Bank and Maui Nui area.	+ Water Quality Protection Action Plan should benefit water quality. Regulations prohibiting discharge should improve water quality in Penguin Bank, Maui Nui area, Maunalua Bay.	+ Water Quality Protection Action Plan should enhance water quality in the Hanalei River; Regulations prohibiting discharge should improve water quality throughout the Sanctuary.
Human Environment				
Economics	O Status Quo Maintained	+ Sustainable Use Action Plan & Ecosystem Benefits and Values Action Plan activities should provide economic benefits; Regulations enhancing sanctuary resources should increase the	+ Sustainable Use Action Plan & Ecosystem Benefits and Values Action Plan activities should provide economic benefits; Regulations enhancing sanctuary resources should increase the	+ Sustainable Use Action Plan & Ecosystem Benefits and Values Action Plan activities should provide economic benefits; Regulations enhancing sanctuary resources should increase the

Resources	Proposed Alternatives			
	One	Two	Three	Four
		economic value of Penguin Bank and Maui Nui area by preserving a healthy ecosystem.	economic value of Penguin Bank, Maui Nui area and Maunalua Bay by preserving a healthy ecosystem.	ecosystem value of the sanctuary by preserving a healthy ecosystem.
Cultural Resources	O Status Quo Maintained	+ Living and Evolving Cultural Traditions Action Plan should protect cultural resources in the sanctuary and in proposed boundaries on O‘ahu, Kaua‘i, & Ni‘ihau; Historical and cultural resources regulation should provide additional protections for cultural resources throughout the sanctuary.	+ Living and Evolving Cultural Traditions Action Plan should protect cultural resources; Historical and cultural resources regulation should provide additional protections for cultural resources throughout the sanctuary.	+ Living and Evolving Cultural Traditions Action Plan should protect cultural resources in proposed boundary in Hanalei River; Historical and cultural resources regulation should provide additional protections for cultural resources throughout the sanctuary.
Maritime Heritage Resources	O Status Quo Maintained	+ Maritime Heritage Action Plan extended should protect maritime heritage resources in the sanctuary and in proposed boundaries on O‘ahu, Kaua‘i, & Ni‘ihau; SSMA Action Plan should provide benefits to Ni‘ihau & Pīla‘a; Historical and cultural resources regulation should provide additional protections for maritime heritage resources throughout the sanctuary.	+ Maritime Heritage Action Plan should benefit maritime heritage resources; Historical and cultural resources regulation should provide additional protections for maritime heritage resources throughout the sanctuary.	+ Maritime Heritage Action Plan should benefit marine species in the Hanalei River; Historical and cultural resources regulation should provide additional protections for maritime heritage resources throughout the sanctuary.
Fishing Activities	O Status Quo Maintained	+ Understanding and Managing Species and Habitats Action Plan should benefit resources in the sanctuary and in proposed boundaries on O‘ahu, Kaua‘i, & Ni‘ihau.	+ Understanding and Managing Species and Habitats Action Plan should benefit resources.	+ Understanding and Managing Species and Habitats Action Plan should benefit resources in the Hanalei River.

Resources	Proposed Alternatives			
	One	Two	Three	Four
	O Status Quo Maintained	⊙ Regulations prohibiting discharge and altering submerged lands may cause minimal inconvenience to fisherman in Penguin Bank and Maui Nui area.	⊙ Regulations prohibiting discharge and altering submerged lands may cause minimal inconvenience to fisherman in Penguin Bank, Maui Nui area, Maunalua Bay.	⊙ Regulations prohibiting discharge and altering submerged lands may cause minimal inconvenience to fisherman throughout the sanctuary
Offshore Development	O Status Quo Maintained	⊙ Regulation prohibiting altering submerged lands may cause minimal inconvenience in Penguin Bank and the Maui Nui area.	⊙ Regulation prohibiting altering submerged lands may cause minimal inconvenience in Penguin Bank, Maui Nui area, and Maunalua Bay.	⊙ Regulation prohibiting altering submerged lands may cause minimal inconvenience throughout the sanctuary.
Recreation & Tourism	O Status Quo Maintained	+ Sustainable Use Action Plan should support opportunities for recreation and tourism within the sanctuary and within the proposed boundaries on O‘ahu, Kaua‘i, & Ni‘ihau; Regulations protecting water quality, habitats and marine species should improve marine environment for recreation and tourism in Penguin Bank and Maui Nui area.	+ Sustainable Use Action Plan should support opportunities for recreation and tourism; Regulations protecting water quality, habitats and marine species should improve marine environment for recreation and tourism in Penguin Bank, Maui Nui area and Maunalua Bay.	+ Sustainable Use Action Plan should support opportunities for recreation and tourism within the proposed boundary in Hanalei River; Regulations protecting water quality, habitats and marine species should improve marine environment for recreation and tourism throughout the sanctuary.
Education	O Status Quo Maintained	+ Ocean Literacy Action Plan should support opportunities for education.	+ Ocean Literacy Action Plan should support opportunities for education.	+ Ocean Literacy Action Plan should support opportunities for education.
Research & Monitoring	O Status Quo Maintained	+ Understanding and Managing Species and Habitats Action Plan should support opportunities for research and monitoring within the sanctuary.	+ Understanding and Managing Species and Habitats Action Plan should support opportunities for research and monitoring.	+ Understanding and Managing Species and Habitats Action Plan should support opportunities for research and monitoring.

Resources	Proposed Alternatives			
	One	Two	Three	Four
		⊙ Regulations prohibiting approach, take, and possession, should cause minimal inconvenience to researchers in Penguin Bank and Maui Nui area.	⊙ Regulations prohibiting approach, take, and possession, should cause minimal inconvenience to researchers in Penguin Bank, Maui Nui area and Maunalua Bay.	⊙ Regulations prohibiting approach, take, and possession, should cause minimal inconvenience to researchers throughout the Sanctuary.
Human Health & Safety	O Status Quo Maintained	+ Emergency Preparedness Action Plan ensures Human Health & Safety.	+ Emergency Preparedness Action Plan ensures Human Health & Safety.	+ Emergency Preparedness Action Plan ensures Human Health & Safety.

Table 40. Resources impacted by the proposed action and alternatives.

9.6. Protection of Children from Environmental Health and Safety Risks

In April 1997, President Clinton signed Executive Order (EO) 13045, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. The EO requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. The proposed action and alternatives would not result in disproportionate negative impacts on children. Children may benefit from increased education opportunities offered by the sanctuary.

9.7. Environmental Justice

On February 11, 1994, President Clinton signed EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations*. The purpose of this order is to require federal agencies to identify and avoid disproportionate impacts on minority or low-income communities. Table 41 and Table 42 identify minority and low-income communities that could be affected by the proposed project. The proposed action and alternatives describe in this document would not result in any disproportionate negative impacts on environmental justice populations. Minority and low-income populations may benefit from place-based planning efforts that seek to integrate communities into sanctuary management planning.

Ethnicity	State total	City & County of Honolulu	Hawai‘i County	Kaua‘i County	Maui County
Caucasian	266,795	155,839	50,887	18,022	42,048
Black	7,694	6,384	984	113	214
Japanese	225,080	183,348	20,187	6,723	14,822
Chinese	40,153	37,462	818	908	965
Filipino	151,456	106,547	14,197	9,508	21,204
Korean	11,772	10,962	542	33	235
Samoan/Tongan	14,598	12,293	131	152	2,022
Mixed (except Hawaiian)[12]	286,797	208,871	36,976	13,069	27,880
Hawaiian/part Hawaiian	290,680	180,597	53,630	16,282	40,171

Table 41. Ethnicity as reported by individual by county (2010).
Source: *Hawai‘i State Department of Health, Office of Health Status Monitoring (Hawai‘i State Data Book 2011).*

Subject	State Total	Hawai‘i	Honolulu	Kaua‘i	Maui
High school graduate or higher	89.9%	90.2%	89.9%	89.9%	89.3%
With bachelor's degree or higher	29.5%	24.8%	31.9%	20.2%	24.9%

Table 42. Educational attainment of persons 25 years old and over by county (2010).
Source: *U.S. Census Bureau, 2010 American Community Survey 1-Year Estimates (Hawai‘i State Data Book 2011).*

[12] Includes other ethnicities not listed, don't know, refused or missing (84,771).

9.8. Local Short-Term Uses of the Environment and Long-Term Productivity

NEPA requires consideration of the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. The short-term uses of the environment relating to No Action (Alternative 1) and Proposed Action (Alternative 3) alternatives would improve the health and quality of the marine environment by protecting marine habitat through regulations related to (1) vessel operations, including discharge, anchoring, and other regulations; (2) providing a mechanism through the NMSA to respond to groundings and hazardous spills, the introduction and spread of invasive species; and (3) monitoring human activities through regulations and non-regulatory programs that incorporate community involvement in the stewardship of sanctuary resources.

The long-term productivity related to the No Action and Proposed Action alternatives is based on the goals of the sanctuary and the suite of Action Plans structured to achieve these goals. This includes improving ecosystem-based management as a driving force for management-driven scientific research in Hawai‘i, fostering increased awareness and public stewardship of marine ecosystems through community engagement and education and outreach activities, understanding and addressing the impacts from climate change on the marine environment, and by fostering and facilitating cooperation among all stakeholders to build a shared vision and unified effort for the protection and long-term productivity of marine resources.

9.9. Irreversible and Irretrievable Commitments of Resources

NEPA requires an analysis of the extent to which the proposed project’s primary and secondary effects would commit nonrenewable resources to uses that future generations would be unable to reverse. The No Action and Proposed Action would require minor commitments of both renewable and nonrenewable energy and material resources for the management and research activities associated with the sanctuary. The sanctuary would also commit substantial resources, staff time, and funds for conservation and management activities. Nonrenewable resources that would be used during management and research activities include fuel, water, power, and other resources necessary to maintain and operate the vessels and the sanctuary office.

9.10. Cumulative Impact Analysis

A cumulative impact is an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 C.F.R. §1508.7; NOAA 1999). Cumulative impacts can result from individually minor but collectively significant actions taking place over time (40 C.F.R. §1508.7).

The Council on Environmental Quality (CEQ) guidance for considering cumulative effects states that NEPA documents “should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant” (CEQ 1997). Projects considered below are similar to the proposed action, large enough to have far-reaching effects, or are in proximity to the proposed action with similar types of impacts.

9.10.1. Cumulative Methodology

For this section, past, present, and future foreseeable projects are assessed throughout Hawaii. Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects (CEQ 1997). The projects listed are either existing or are anticipated to occur in the reasonably foreseeable future (5 years) within Hawaii. The potential effects of these actions have been considered in combination with the impacts of the proposed action (alternative 3) to determine the overall cumulative impact on the resources.

9.10.2. Offshore Development

There are a number of offshore development projects considered here that could directly or indirectly impact the marine resources of Hawaiʻi, although most will likely have no direct impact on the marine resources within the existing and proposed sanctuary boundaries. Offshore development is central to sustainable energy development in Hawaiʻi. Over the last decade, several renewable ocean energy projects have been piloted or proposed in Hawaiʻi. In Kāneʻohe Bay, the Navy has deployed three moorings, called PowerBuoys made by Ocean Power Technologies, which capture wave energy and transmit electricity to shore through an underwater cable. The Environmental Assessment (EA) of the pilot project, prepared by the Navy in 2003, determined that the buoys in Kaneohe Bay would have no significant impact to the environment, considering the following resources: shoreline physiography, oceanographic conditions, marine biological resources, terrestrial biological resources, land and marine resource use compatibility, cultural resources, infrastructure, recreation, public safety, and visual resources. The EA cites such precautions as using an armored, shielded cable for underwater transmission to limit effects on marine life and an elevated land cable to avoid disturbing a burial site. By employing best management practices, the EA explains the project is unlikely to affect endangered species and may benefit benthic organisms by providing more substrate. No historical properties were found to be affected and recreation and human health and safety were found to be unaffected as well.

A 500-kW pilot project for an oscillating water column (OWC) ocean-wave energy converter developed by Oceanlinx has been proposed for Pa'uwela Point off Maui. The Natural Energy Laboratory Hawaiʻi Authority on the island of Hawaiʻi is host to Ocean Thermal Energy Conversion (OTEC) projects and other OTEC projects have been proposed off of Oʻahu (Gill 2013). No offshore wind projects have been proposed or developed but the State of Hawaiʻi holds 17% of the nation's wind resources with areas of high wind between the islands of Hawaiʻi, Maui, Lānaʻi and Molokaʻi (Offshore Wind Energy, Renewable Energies 2013).

In 2011, the Hawaiian Electricity Company (HECO) released a request for proposal (RFP), as required by Hawaiʻi Public Utilities Commission (PUC), for at least 200 MW of renewable energy to be supplied to Oʻahu and an undersea cable to connect Oʻahu's electrical grid to other islands. In July of 2013, the PUC required HECO to remove the undersea cable RFP until it was determined that the proposed cable to run between Maui and Oʻahu on the seafloor was in the public's interest (Renewable Energy and Undersea Cable System RFP 2013). In response, the State of Hawaiʻi Department of Business, Economic Development and Tourism (DBEDT) released a report in September 2013 determining that the cable would cost $700 million and save ratepayers $425 million over 30 years (Yonan 2013). In late 2014 NextEra Energy, Inc. and Hawaiian Electric Industries, Inc. entered a merger agreement to promote affordable clean energy in Hawaii. NextEra Energy, Inc., has proposed a route from Honolulu Harbor to Māʻalaea

Bay passing between Lānaʻi and Molokaʻi. The PUC has yet to approve the cable project (Yonan 2013).

9.10.3. Aquaculture

There are currently two aquaculture projects located within the sanctuary that could directly or indirectly impact the marine resources of Hawaii, although most will likely have no direct impact on the marine resources within the existing and proposed sanctuary boundaries. In 1999, Cates International launched a biconical sea cage, the SeaStation 3000 that produced 70,000 Pacific threadfin fingerlings (aka moi) for sport fishing (Davidson 2006). Currently, Blue Ocean Mariculture supports an active aquaculture farm near Kona, Hawaiʻi. Their hatchery facility is located at the Natural Energy Laboratory of Hawaii Authority (NELHA). They produce Hawaiian Kampachi™ for distribution in Hawaiʻi and the U.S. mainland. The State of Hawaiʻi operates a loan program to encourage the development of additional aquaculture initiatives in the marine environment.

If not managed and operated correctly, aquaculture has the potential to negatively impact the marine environment. Open water aquaculture can degrade water quality, spread parasites and diseases, and cause negative interactions with other marine species. Aquaculture activities authorized under a permit issued by the State of Hawaiʻi Department of Land and Natural Resources, the State of Hawaiʻi Department of Health, the U.S. Army Corps of Engineers, or the National Marine Fisheries Service are exempt from sanctuary regulations prohibiting dredging, drilling into, or otherwise altering in any way the submerged lands. Thus the proposed action will not contribut to the impacts of aquaculture activities.

9.10.4. Marine Traffic and Transportation

Hawaiʻi has six commercial harbors that support the shipment of goods and passengers to and between the populated Hawaiian Islands. The primary ports include Honolulu, Barbers Point, Hilo, Kawaihae, Kahului, and Nawiliwili. Pearl Harbor Naval Base, which is closed to commercial traffic, is six nautical miles west of Honolulu Harbor. Two off-shore mooring berths that serve the oil refineries in Campbell Industrial Park are located off Barbers Point. The populated Hawaiian Islands waters and channels are the thoroughfare for cargo, military, fishing, and recreational vessels. In 2011 there were 14,073 registered vessels in Hawaiʻi (State of Hawaiʻi Data Book 2011). Inter-island vessels (2,390) transported 3,220,416 cargo tonnage and overseas vessels (884) carried 6,487,553 cargo tonnage into the Port of Honolulu in 2011 (State of Hawaiʻi Data Book 2011). Passenger cruise ship traffic included 420,649 arrivals and 778,405 departures at Honolulu Harbor in 2011 (State of Hawaiʻi Data Book 2011).

Under the proposed action, vessels would have to adhere to regulations regarding approach and discharge while transiting Special Sanctuary Management Areas. Additionally, vessels may be subject to regulations from other state and federal agencies. However commercial boat harbors are not included within the sanctuary boundaries so the proposed action will not impact marine traffic and transportation within harbors.

9.10.5. Marine Managed Areas

Marine managed areas are key tools for maintaining sustainable reef ecosystems by limiting or promoting particular resource uses and activities and raising awareness on issues of reef

sustainability (Kendall and Poti 2011). Both state and federal agencies are involved in managing marine areas. Many of the different marine managed areas were created through independent processes with different objectives and management authorities.

That National Park Service manages four distinct marine areas as a park of the National Park system in in Hawaiʻi: Kalaupapa National Historical Park on Molokaʻi, World War II Valor in the Pacific National Monument on Oʻahu, and Kaloko-Honokohau National Historical Park and the Pu`ukoholā Heiau National Historic Site on Hawaiʻi Island. Pu`ukoholā Heiau National Historic Site is the only National Park with marine boundaries that overlay sanctuary boundaries.

There are fourteen types of marine management areas managed by the State of Hawaiʻi in the populated Hawaiian Islands. These zones each have unique rules established by statute or rulemaking. They are classified as Marine Life Conservation Districts, Fisheries Management Areas, Marine Laboratory Refuges, Public Fishing Areas, a Wildlife Sanctuary, an Island Reserve, an Herbivore Management Area, Community Based Subsistence Fisheries, a Limu Management Area, Stewardship Areas, Coral Priority Sites, Natural Area Reserves, Designated Ocean Recreation Management Areas, Undesignated Ocean Recreation Management Areas, and the State Register of Historic Places.

Table 43 describes the size and locations of all existing marine managed areas throughout the population Hawaiian Islands. This table was compiled from a number of sources including the State of Hawaii Department of Land and Natural Resources (DLNR), State of Hawaii Division of Aquatic Resources (DAR), State of Hawaii Division of Forestry and Wildlife (DOFAW), State of Hawaii Division of Boating and Ocean Recreation (DOBOR), and the State Historic Preservation Division (SHPD).

The proposed action provides an added beneficial effect to marine resources and have a negligible effect on uses. This results in a less than significant incremental beneficial effect, but no cumulative effects. Overall, the existing marine managed areas could have a beneficial impact on the marine resources of Hawaii. Some marine managed areas are designed to protect marine resources and improve water quality. Marine managed areas with boundaries closer to the shoreline likely have more impact on local communities and fishing practices.

Typically, the further a marine managed area extends into the ocean, the more likely it will have an impact on ocean users. Additionally, marine managed areas that extend into deeper waters will more likely affect certain types of fishing activities, general vessel traffic, and potentially tourist and recreational activities. Several marine managed areas listed in Table 43 have fishing restrictions such as gear restrictions, no take zones, or anchoring restrictions. These restrictions may reduce fishing opportunities while providing an overall beneficial effect on water quality and marine species. Marine managed areas affecting vessel traffic, docking, and controlling access would reduce the likelihood of water quality degradation from spills or vessel discharges contributing to a beneficial cumulative impact.

Marine Managed Area (Island)	Date	Project Sponsor	Description	Approximate Size
National Parks				
Kalaupapa National Historical Park (Moloka‘i)	1980	NPS	Located midway along the north coast of the island of Moloka‘i, was the location from 1866-1969 of the isolated Hansen’s disease (leprosy) community, and the purpose of the park is for preserving and interpreting its site and values.	165,760 acres
Kaloko-Honokohau National Historical Park (Hawaii)	1978	NPS	Located on the western coast of the island of Hawaii near the town of Kailua-Kona, site of an ancient Hawaiian settlement and provides a center for the preservation, interpretation, and perpetuation of traditional native Hawaiian activities and culture. Park includes the Kaloko Fishpond, Puuoina Heiau, and numerous wetlands.	1,160 acres
Puukohola Heiau National Historic Site (Hawaii) *	1972	NPS	Located on the northwestern coast of the island of Hawaii, contains a historically significant temple associated with Kamehameha the Great and the property of John Young who fought for Kamehameha the Great during the period of his ascendancy to power.	86 acres
World War II Valor in the Pacific National Monument (O‘ahu)	2008	NPS	Located at Pearl Harbor on O‘ahu, the park preserves and interprets the site, as well as honors all of the civilians, soldiers, and other sailors who were killed on December 7, 1941 during the attack on Pearl Harbor	10.5 acres
Marine Life Conservation Districts				
Haunama Bay (O‘ahu) *	1967	DLNR	Located on the southeastern coast of O‘ahu, Hanauma Bay was formed by two of the many craters that created Koko Head. The bay’s outer part is the result of one crater, and the inner part is what remains of the second. The craters’ seaward rims were eventually eroded by wave action.	101 acres
Pupukea (O‘ahu) *	1983	DLNR	Pūpūkea-Waimea MLCD is important as a center for marine recreation, conservation, and fishery replenishment. It is located offshore of both beach parks, and includes two major swimming areas, Shark’s Cove and Three Tables.	
Waikiki (O‘ahu) *	1988	DLNR	The Waikiki MLCD is located at the Diamond Head end of Waikiki Beach and extends from the groin at the end of Kapahulu Avenue to the west wall of the Natatorium, from the highwater mark seaward a distance of 500 yards or to the edge of the fringing reef, whichever is greater.	76 acres
Kealakekua Bay (Hawaii)	1969	DLNR	Located on the western coast of Hawai’i near the village of Captain Cook, Kealakekua Bay’s	315 acres

Marine Managed Area (Island)	Date	Project Sponsor	Description	Approximate Size
			waters are nearly pristine, and its diversity of marine life is spectacular. A sheer cliff borders the northern coastline, and on its face numerous lava tube opening are visible, some of which are ancient Hawaiian burial caves.	
Lapakahi (Hawaii) *	1979	DLNR	Located on the northwestern coast of Hawai'i, Lapahaki is divided into two subzones: Subzone A included Koai'e Cove, and Subzone B includes the waters 500 feet outside of Subzone A and extending southward along the shoreline adjacent to the park, from the high water mark to a distance of 500 feet offshore.	146 acres
Old Kona Airport (Hawaii)	1992	DLNR	Old Kona Airport is located on the western coast of Hawai'i just west of Kailua-Kona town, and includes the waters offshore of the Old Kona Airport State Park and adjacent private properties.	217 acres
Waialea Bay (Hawaii) *	1985	DLNR	Located in the southern portion of Kawaihae Bay, on the western coast of Hawai'i, Waialea Bay is a popular site for snorkel and SCUBA activities because of its diversity of marine life.	35 acres
Waiopae Tidepools (Hawaii)	2003	DLNR	Located on the Southeastern coast, the Waiopae Tidepools are easily accessible and home to an abundance of coral and fish life.	N/A
Honolua-Mokuleia Bay (Maui) *	1978	DLNR	Honolua Bay is located on the northwester coast of Maui, about 10 miles north of Lahaina; Mokuleia Bay is adjacent to Honolua to the southwest.	45 acres
Manele-Hulopoe (Lānaʻi) *	1976	DLNR	Manele and Hulopoe are adjacent bays on the southern coast of Lānaʻi, separated by a volcanic cone.	309 acres
Molokini Shoal (Maui) *	1977	DLNR	Molokini is a crescent shaped islet located 3 miles off Maui's southwestern coast. It is the southern rim of an extinct volcanic crater; the shallow inner cove is the crater's submerged floor.	77 acres
Fisheries Management Areas				
Kahului Harbor (Maui)	1984	DLNR	Kahului Harbor is the primary port on the northern coast of Maui. The Fisheries Management Area is bounded seaward by a line between the seaward edges of the breakwaters	9 acres
Kaunakakai Harbor (Molokaʻi) *	1990	DLNR	Kaunakakai Harbor is located on the southern coast of the island of Molokaʻi. Portions of the commercial harbor designated "Area 1A" and "Area 1B" are separated by a line extending from the Channel Range Lights, and portions of the small craft harbor are designated "Area 2″.	35 acres

Manele Harbor (Lānaʻi) *	1984	DLNR	Manele Harbor is a small boat harbor on the southern coast of Lānaʻi. Area 1 refers to the shoreline portion of the entrance channel and basin, bounded seaward by a line connecting the seaward tip of the three groins along the shoreline. Area 2 refers to the breakwater portion of the entrance channel.	4 acres
Waikiki-Diamond Head (Oʻahu) *	1978	DLNR	The Waikiki-Diamond Head Shoreline Fisheries Management Area extends from the Ewa wall of the Waikiki War Memorial Natatorium to the Diamond Head Lighthouse, from the highwater mark out to a minimum seaward distance of 500 yards, or to the seaward edge of the fringing reef if one occurs beyond 500 yards.	236 acres
AlaWai Canal (Oʻahu)	1923?	DLNR	Ala Wai Canal is located immediately north of Waikiki, and includes the Manoa-Palolo drainage canal at the mouth of Manoa and Palolo Streams. Kapalama Canal is located at the mouth of Kapalama Stream, north of Sand Island.	> 1 acre
Heeia Reef (Oʻahu)	1961	DLNR	Heʻeia Kea Wharf is located at Heʻeia Kea Boat Harbor on Kaneʻohe Bay, Oʻahu.	> 1 acre
Waialua Bay (Oʻahu) *	1974	DLNR	That portion of Waialua Bay at Haleiwa bounded by lines drawn 100 yards seaward of and parallel to the Haleiwa Harbor Breakwater and 100 yards seaward of and parallel to the Haleiwa Beach Groin, and inland by a line ten yards downstream of and parallel to the Anahulu Bridge.	38 acres
Honolulu Harbor (Oʻahu)	1911	DLNR	Honolulu Harbor is the primary port on the southern coast of Oʻahu.	373 acres
Pokai Bay(Oʻahu)	1974	DLNR	That portion of Pokai Bay including the Pokai Boat Harbor and the Waianae Small Boat Harbor, the seaward boundary a straight line from Kaneilio Point to Lahilahi Point, and the northwestern boundary a straight line extending southwest from the point immediately seaward of Waianae High School.	212 acres
Hilo Harbor (Hawaii)	1970	DLNR	"Hilo Harbor" refers to that portion of the bay in Hilo bounded seaward by the breakwater, and a line from the tip of the breakwater southwestward to Alealea Point. "Wailoa River" is that part of Wailoa River bounded by a line drawn across the mouth of the river and the footbridge at the mouth of Waiakea Pond, and includes Waiolama Canal upstream to the highest wash of the tidal water. "Wailuku River" is that part of Wailuku River between the Mamalahoa Highway bridge and Wainaku Avenue bridge.	1501 acres

Kawaihae (Hawaii) *	1989	DLNR	Kawaihae Harbor is located at Kawaihae, South Kohala, on the northwest coast of the island of Hawaii. Restrictions apply to the south small boat basin.	2 acres
Puako Bay & Reef (Hawaii) *	1985	DLNR	The Puako Bay and Puako Reef Fisheries Management Area includes that portion of the reef from the shoreline at the westernmost edge of the boat ramp, along a line drawn parallel with the ramp seaward to the edge of the fringing reef north of Puako Point, then southwesterly following the fringing reef a minimum seaward distance of 250 yards or to the edge of the fringing reef if one occurs beyond 250 yards, to a line due west of the small cove at the southern end of Puako Beach Road.	337 acres
Kailua Bay (Hawaii)	1984	DLNR	The Kailua Bay Fisheries Management Area includes that portion of Kailua Bay enclosed by a straight line drawn from Kukaili-moku Point to the seawall of the Royal Kona Resort. The area is split into two subsections, Zone A and Zone B with varying permitted activities.	10 acres
Keauhou Bay (Hawaii)	1992	DLNR	The Keauhou Bay Fisheries Management Area is that portion of the bay bounded by a straight line drawn from Haiku'ua Point to Kaukala'ela'e Point.	6 acres
Kiholo Bay (Hawaii) *	1997	DLNR	The Kiholo Bay Fisheries Management Area includes that part of Kiholo Bay enclosed by a straight line drawn from Nawaikulua Point to Hou Point as shown, including the lagoon known as Waina-nali`i Pond, but not Luahinewai Pond.	655 acres
Kona Coast (Hawaii)	1991	DLNR	Kona Coast refers to the following four Fisheries Management Area Zones on the southwestern portion of Hawaii, each bounded by two lines extending seaward at right angles from shore and marked by signs on shore: (a) the "Wawaloli Zone", from south of Wawaloli Beach to south of Wawahi-waa Point; (b) the "Papawai Bay Zone", from Keahuolu Point to the northwestern end of the runway of the Old Kona Airport; (c) the "Kailua Bay Zone", from Kukailimoku Point near the Kailua lighthouse, to the former swimming pool at the Kona Inn Shopping Village; and (d) the "Red Hill Zone", from Puu Ohau ("Red Hill") to Onouli. The seaward boundary is at a depth of 100 fathoms (600 ft).	1738 acres
South Kona (Hawaii)	1998	DLNR	The waters off the coast of South Kona between the Ki`ilae-Keokea boundary and the Kapua-Kaulanamauna boundary. It is prohibited to fish for or take opelu with fish or animal bait, except with hook and line.	

West Hawaii (Hawaii) *	1999	DLNR	The West Hawaii Regional Fishery Management Area (FRA) extends along the west coast of the Island of Hawaii from Ka Lae, Ka'u (South Point) to 'Upolu Point, North Kohala, and from the highwater mark on shore seaward to the limit of the State's management authority. It includes Fish Replenishment Areas and Netting Restricted Areas along the coast.	39,456 acres
Hanamaulu Bay (Kaua'i)	1978	DLNR	The regulated region of the Hanamaulu Bay Fisheries Management Area is that portion of the bay, from the highwater mark seaward, bounded by a straight line from the tip of the breakwater westward to a point on the shoreline.	90 acres
Nawiliwili Harbor (Kaua'i)	2002	DLNR	The regulated region of the Nawiliwili Harbor Fisheries Management Area is that portion of the harbor, from the highwater mark seaward, bounded by a straight line from the southernmost tip of the western pier northeast to the corner formed where pier 1 meets the eastern pier.	33 acres
Port Allen (Kaua'i)	2002	DLNR	The regulated region of the Port Allen Fisheries Management Area is that portion of the Port Allen waters, from the highwater mark seaward, bounded by a straight line from the tip of the main breakwater northward to the bend in the breakwater of the small boat harbor.	24 acres
Kapaa &Waikaea Canals (Kaua'i)	1923	DLNR	Kapaa and Waikaea Canals are located in the city of Kapaa on the east coast of Kaua'i. Fishing is restricted to certain permitted activities.	
Waimea Recreational Pier (Kaua'i)	1978	DLNR	Waimea Recreational Pier is a public fishing pier located in Waimea Bay on the southern coast of Kaua'i. The Waimea Recreational Pier is a facility of the Division of State Parks.	3 acres
Marine Laboratory Refuge				
Coconut Island (O'ahu)	1953	DLNR	The Hawaii Marine Laboratory Refuge consists of the reefs and bay waters surrounding Coconut (Moku-o-loe) Island located in Kaneohe Bay, from the highwater mark on the island seaward to twenty-five feet beyond the outer edges of the reefs.	73 acres
Public Fishing Areas				
Wahiawa (O'ahu)	1981	DLNR	The Wahiawa Public Fishing Area includes a portion of the privately-owned Wahiawa Reservoir (Lake Wilson) in the central portion of O'ahu. The Wahiawa State Freshwater Park is located along the South Fork of the Reservoir and includes a boat launching ramp and vehicle-trailer parking areas.	

Waikaea (Hawaii) (brackish)	1981	DLNR	The Waiakea Public Fishing Area includes that portion of the Waiakea fish pond in the Wailoa River State Park in Hilo, south of the footbridge over Wailoa River, including the flood control channel and Mahohuli fish pond. A boat launching ramp is located within the park.	
Kokee (Kaua‘i)	1981	DLNR	The Kokee Public Fishing Area includes certain streams, reservoirs and ditches in the Kokee State Park on Kaua‘i.	
Wailua (Kaua‘i)	2007	DLNR	The Wailua Reservoir Public Fishing Area is located off Kuamo’o Road approximately five miles mauka of Kuhio Hwy, above the city of Wailua on Kaua’i.	
Wildlife Sanctuary				
Paiko Lagoon (O‘ahu) *	1981	DLNR-DOFAW	The Paiko Lagoon Wildlife Sanctuary includes all of the State owned land areas adjacent to Paiko Lagoon, and water areas within Paiko Lagoon.	26 acres
Island Reserve				
Kahoolawe Island (Kahoolawe)	1993	DLNR	Kaho’olawe Island Reserve includes the island of Kaho’olawe and surrounding waters seaward to a distance of two nautical miles.	49,876 acres
Herbivore Management Area				
Kahekili (Maui) *	2009	DLNR	Kahekili Herbivore Fisheries Management Area is located off north Ka’anapali. The northern boundary is a straight line extending 1292 yards west from Honokowai Beach Park, the southern boundary is a straight line extending 335 yards west from Hanaka’o’o Beach, and the seaward boundary is a straight line connecting the seaward endpoints of the northern and southern boundaries.	452 acres
Community Based Subsistence Fisheries				
Haena (Kaua‘i) *	2006	DLNR	The Ha‘ena communit-based subsistence fishing area is located on the north shore of Kaua‘i off Ha‘ena district from Na Pali State Park to Wainiha extending to 1 mile off the shoreline.	
Milolii (Hawaii)	2005	DLNR		
Limu Management Area				
Ewa (O‘ahu)	2006	DLNR	The Ewa Limu Management Area is located in the waters off Ewa Beach on the south shore of O’ahu, and extends from the western edge of the gunnery range to Mu’umu’u Street, from the shoreline 150 feet seaward.	
Coral Priority Sites				
West Maui (Maui) *	2010	DAR	The West Maui coral priority site extends from Honolua to south of Ka‘anapali.	
South Kohala (Hawaii) *	2010	DAR	Located on the Kohala coast, on the northwest coast of Hawaii Island, the coral priority site extends from North of Kawaihae to just south of ‘Anaeho‘omalu.	

Natural Area Reserve				
`Ahihi-Kina`u (Maui-coastal) *	1973	DOFAW	Hot, dry, and sparsely vegetated, the reserve is unique in that its boundaries contain the most recent ‘a’a lava flow on Maui, here on the dry south flank of Haleakala. It also included a marine component: the surrounded reef systems shelter a complex assemblage of organisms, most of the endemic to the Hawaiian archipelago.	776 acres (marine area)
Kanaio (Maui)	1991	DOFAW	This reserve is located in rough lava terrain on the southeast slope of Haleakala. The reserve protects a remnant of the native dry land forest that once covered the leeward slope of Haleakala.	
Hanawi (Maui)	1986	DOFAW	This reserve is located on the wet slopes on the north flank of Haleakala. It contains a rare subalpine grassland as well as montane and lowland semi-wet and wet grasslands and forests.	
West Maui (Maui) *	1986	DOFAW	The reserve includes a diverse set of ecosystems, and contains extremely important watershed sites which contain the headwaters of perennial streams. It is made up of four noncontiguous sections: Honokowai, Kahakuloa, Panaewa, and Lihau.	
Nakula (Maui)	2011	DOFAW	This reserve is located on the south slope of Haleakala and is a potential reintroduction site for endangered birds.	
Hono O Na Pali (Kaua‘i-coastal)	1983	DOFAW	Located on the western side of Kaua‘i, this reserve contains two adjacent mountain valley systems that terminate in sea cliffs. Sea cliffs, coastal, stream, wet forest, wet shrub land, montane bogs, and grassland communities are represented.	
Kuia (Kaua‘i)	1981	DOFAW	Located on the western side of Kaua‘i, this reserve is characterized by gradual to moderate slopes cut by intermittent streams. There are two rare ecosystems, a koa-‘ohi’a mixed montane mesic forest and a Kaua‘i diverse lowland mesic forest. Kuia also contains lowland dry shrub lands and montane wet forests.	
Pu`u O `Umi (Hawaii-coastal)	1987	DOFAW	This reserve covers the west upper slopes and summits of the Kohala Mountains down to the dry coastal sea cliffs.	
Laupahoehoe (Hawaii)	1983	DOFAW	Found on the northern slopes of Mauna Kea, in the cloud belt, this reserve is characterized by gentle and moderate slopes cut by young intermittent streams.	
Pu`uMaka`al a (Hawaii)	1981 and 2010	DOFAW	This reserve protects montane wet ‘ohi’a and koa forests. The forest provides important habitat for some of Hawai’i’s rarest birds, as well as several rare plants.	

Kipahoehoe (Hawaii-coastal)	1983	DOFAW	This reserve is located on the narrow section of land running down the southwest slopes of Mauna Loa. The reserve protects many different ecosystems.	
Manuka (Hawaii-coastal)	1983	DOFAW	This is the largest reserve in the State's system, extending from sea level to 5,000 feet elevation. As such, it features a broad range of habitats.	
Mauna Kea Ice Age (Hawaii)	1981	DOFAW	Located in the upper, southern flank of Mauna Kea, this reserve contains a rare alpine Aeolian desert and the only alpine lake in Hawai'i. Rare native invertebrates and evidence of Pleistocene glaciation can be found here.	
Kahauale`a (Hawaii)	1987 and 2010	DOFAW	This reserve can be found on the gentle slopes of Kilauea, a site of much recent volcanic activity.	
Waiakea 1942 Lava Flow (Hawaii)	1974	DOFAW	This reserve provides an example of a recent lava flow being colonized by 'ohi'a. It is located on the sloping northeast flank of Mauna Kea.	
Pu'uMaka'ala Ext CDUAs (Hawaii)	1981	DOFAW	Ka'ala is the highest point on the island of O'ahu (4,020 ft.) and is found in the northern section of the Waianae Mountain Range. The reserve contains some of the rarest plants in Hawai'i.	
Mount Ka`ala (O'ahu)	1985	DOFAW	This reserve encompasses an isolated, cloud-shrouded mountain plateau with slopes extending down to sea cliffs. The reserve is one of the few areas left undisturbed by feral ungulates. It contains wet and dry ecosystems and coastal dry grasslands, including lowland and montane wet and mesic forests.	
Oloku`i (Moloka'i-coastal)	1985	DOFAW	This reserve is located in the mountains of northern Moloka'i. It is an important part of the Moloka'i watershed and contains forest bird habitat	
Pu`uAli`i (Moloka'i-coastal)	1981	DOFAW	The reserve is located in the northwestern part of the island and protects rare Hawaiian plants, animals, and ecosystems of the lowland mesic zone.	
Pahole (O'ahu)	1983	DOFAW	The dry, windswept coastal dunes of Ka'ena are found at the most western point of O'ahu. Situated at the base of the Waianae Mountains, the reserve protects coastal dry shrub lands and rare coastal plants. It is also a nesting area for the Laysan albatross and is regularly visited by Hawaiian monk seals. Humpback whales and several species of seabirds often can be spotted offshore from this reserve.	
Ka`ena Point (O'ahu-coastal)	1973	DOFAW	The reserve is unique in that its boundaries contain the most recent 'a'a lava flow on Maui, here on the dry south flank of Haleakala. It also included a marine component: the surrounded reef systems shelter a complex assemblage of organisms, most of the endemic to Hawi'i.	

Designated Ocean Recreation Management Areas				
Kanaohe Bay Waters (O‘ahu)	1994	DOBOR	Located on the windward coast of O‘ahu, this area allows SCUBA diving, snorkeling and other activities and regulates commercial activities.	19,777 acres
Haleiwa Restricted Zones (O‘ahu) *	1994	DOBOR	Located on the north shore of O‘ahu, this area allows swimming, bathing, surfing and body surfing and regulates the use of thrill crafts.	157 ares
Waimea Bay Restricted Area (O‘ahu) *	1994	DOBOR	Located on the north shore of O‘ahu, this area allows swimming, bathing and surfing, among other activities.	21 acres
Sharks Cove, Three Tables Point & Waimea Ocean Waters (O‘ahu) *	1994	DOBOR	Located on the north shore of O‘ahu, this area restricts vessel speed.	26 acres
Sunset Beach Restricted Area (O‘ahu) *	1994	DOBOR	Located on the north shore of O‘ahu, this area allows surfing, kayaking and windsurfing, among other activities.	315 acres
Kawela Bay Restricted Area (O‘ahu) *	1994	DOBOR	Located on the north shore of O‘ahu west of Kahuku Point, this area restricts vessel speed.	46 acres
Kualoa Ocean Water Restricted Zones (O‘ahu)	1994	DOBOR	Located on the windward coast of O‘ahu, this area allows windsurfing and scuba diving, among other activities, and regulates commercial thrill crafts and sailing.	28 acres
Kailua Ocean Waters Restricted Zones (O‘ahu)	1994	DOBOR	Located on the windward coast of O‘ahu, this area allows windsurfing other manually propelled vessels, among other activities.	10 acres
Waimanalo Ocean Waters Restricted Zones (O‘ahu)	1994	DOBOR	Located on the windward coast of O‘ahu, this area allows swimming and bathing, among other activities.	4 acres
Makapu‘u Ocean Waters Restricted Zones (O‘ahu) *	1994	DOBOR	Located on the southern end of the windward coast of O‘ahu, this area allows for swimming and bathing, among other activities, and regulates vessel speed.	67 acres

Kaneohe Commercial High Speed Boating Zone (O‘ahu)	1994	DOBOR	Located on the windward coast of O‘ahu, this area regulates commercial high speed boating activities.	7,331 acres
Hanauma Bay Restricted Zone (O‘ahu) *	1994	DOBOR	Located on the south shore of O‘ahu, this area allows snorkeling and swimming, among other activities.	83 acres
Maunalua Bay Restricted Waters (O‘ahu) *	1994	DOBOR	Located on the south shore of O‘ahu, this area regulates commercial operations.	2,344 acres
Waialae-Kahala Restricted Areas (O‘ahu) *	1994	DOBOR	Located on the south shore of O‘ahu, this area allows swimming, bathing and water sports equipment.	11 acres
Diamond Head Restricted Area (O‘ahu) *	1994	DOBOR	Located on the south shore of O‘ahu, this area allows sufing, sailboarding and other manually prepared vessels, among other activities.	130 acres
Waikiki Ocean Waters Restricted Zones (O‘ahu)	1994	DOBOR	Located on the south shore of O‘ahu, this area regulates commercial thrill craft and vessel speed.	1,231 acres
South Shore Parasail Area (O‘ahu)	1994	DOBOR	Located on the south shore of O‘ahu, this area allows parasailing.	14,014 acres
Kahakaaulana Islet (Harris Island) Commercial Zone (O‘ahu)	1994	DOBOR	Located on the south shore of O‘ahu, this area allows windsurfing and diving, among other activities, and regulates commercial thrill craft and sailing.	42 acres
Reef Runway Zone (O‘ahu)	1994	DOBOR	Located on the south shore of O‘ahu, this area regulates recreational thrill crafts.	737 acres
Koko Head & Makapu‘u Commercial High Speed Boating Zone (O‘ahu) *	1994	DOBOR	Located on the south shore of O‘ahu, this area regulates commercial high speed boats.	9,936 acres
Napili Bay Restricted Area (Maui) *	1994	DOBOR	Located on the west coast of Maui, this area allows swimming and surfing, among other activities.	23 acres

Lahaina-Kaanapali Offshore Restricted (Maui) *	1994	DOBOR	Located on the west coast of Maui, this area allows parasailing, among other activities.	13,748 acres
Kaanapali Commercial Thrill Craft Areas (Maui) *	1994	DOBOR	Located on the west coast of Maui, this area regulates commercial thrill craft.	9 acres
Olowalu Beach Resetricted Area (Maui) *	1994	DOBOR	Located on the west coast of Maui, this area allows swimming, snorkeling, SCUBA diving and shore fishing, among other activities.	50 acres
Kaanapali Commercial Water Sledding Zone (Maui) *	1994	DOBOR	Located on the west coast of Maui, this area regulates commercial water sledding.	217 acres
Maui Humpback Whale Protected Waters (Maui) *	1994	DOBOR	Located on the west coast of Maui, this area regulates vessels operations.	70,989 acres
Hookipa Restricted Zone (Maui)	1994	DOBOR	Located on the north coast of Maui, this area allows swimming, surfing and fishing, among other activities.	28 acres
Baldwin Park-Paia Bay Restricted Area (Maui)	1994	DOBOR	Located on the north shore of Maui, this area allows swimming, diving and fishing, among other activities.	159 acres
Papaula Point Restricted Zone (Maui)	1994	DOBOR	Located on the north coast of Maui, this area allows fishing and diving, among other activities.	39 acres
Kanaha Beach Park Restricted Zones (Maui)	1994	DOBOR	Located on the north coast of Maui, this area allows swimming, among other activities.	18 acres
Hilo Bay Recreational Thrill Craft Zone (Hawaii)	1994	DOBOR	Located on the east coast of Hawaii Island, this area regulates recreational thrill crafts.	118 acres
Waiakea Access Corridor (Hawaii)	1994	DOBOR	Located on the east coast of Hawaii Island, this area allows beach access for recreational thrill craft and waterski activities, among other activities.	1 acre

Puhi Bay-Leleiwi Point Restricted Zones (Hawaii)	1994	DOBOR	Located on the east coast of Hawaii Island, this area allows swimming, diving, surfing, and canoeing, among other activities.	55 acres
Hoanuanu Bay Swimming Zone (Hawaii)	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	6 acres
Kahaluu Bay Swimming Zone (Hawaii)	1994	DOBOR		
Kalaepaakai Point Commercial Thrill Craft Zone (Hawaii)	1994	DOBOR		
Oneo Bay Swimming Zone (Hawaii)	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	20 acres
Kailua Bay Boating Zone (Hawaii)	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows parasailing and recreational thrill crafts, among other activities.	215 acres
Kailua Pier Restricted Zones (Hawaii)	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and boating, among other activities.	8 acres
Honokohau Swimming Zone (Hawaii)	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	1 acre
Kua Bay Swimming Zone (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming, among other activities.	6 acres
Kahuwai Bay Restricted Zone (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area regulates vessel speed.	7 acres
Kiholo Bay Speed Zone (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area regulates vessel speed.	2 acres

Anaehoomalu Bay Restricted Zones (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	14 acres
Makaiwa Bay Swimming Zone (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	5 acres
Hapuna Bay Swimming Zone (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	3 acres
Kaunaoa Bay Restricted Zones (Hawaii) *	1994	DOBOR	Located on the west coast of Hawaii Island, this area allows swimming and diving, among other activities.	15 acres
Hanalei River Mouth & Anini Beach Launching Ramp (Kaua‘i) *	1994	DOBOR	Located on the north shore of Kaua‘i, this area allows swimming and bathing, among other activities.	3 acres
Anini Beach Ocean Waters (Kaua‘i) *	1994	DOBOR	Located on the north shore of Kaua‘i, this area regulates commercial sailboard instruction.	223 acres
Hanalei Bay Ocean Waters (Kaua‘i) *	1994	DOBOR	This area is located on the north shore of Kaua‘i.	770 acres
Haena Ocean Waters (Kaua‘i) *	1994	DOBOR	Located on the north shore of Kaua‘i, this area allows swimming, snorkeling and other recreational activities.	127 acres
Na Pali Coast Ocean Waters (Kaua‘i)	1994	DOBOR	Located on the north shore of Kaua‘i, this area regulates vessel operations.	36,810 acres
Hanamaulu Bay Restricted Zones (Kaua‘i)	1994	DOBOR	Located on the south shore of Kaua‘i, this area allows swimming and bathing, among other activities, and regulates vessel speed.	112 acres
Nawiliwili Bay Restricted Zones (Kaua‘i)	1994	DOBOR	Located on the south shore of Kaua‘i, this area allows general ocean recreation.	45 acres
Nukumoi Restricted Area (Kaua‘i)	1994	DOBOR	Located on the south shore of Kaua‘i, this area allows swimming and bathing, among other activities.	3 acres

Koloa Landing Restricted Area (Kaua‘i)	1994	DOBOR	Located on the south shore of Kaua‘i, this area allows swimming and diving, among other activities.	4 acres
Salt Pont Park Restricted Area (Kaua‘i)	1994	DOBOR	Located on the south shore of Kaua‘i, this area allows swimming and bathing	3 acres
Wailua River Restricted Area (Kaua‘i)	1994	DOBOR		
State and National Register of Historic Places				
Hanalei Pier (Kaua‘i) *		SHPD		
Na Pali Coast Archeological district (Kaua‘i)	1984 (State and National)	SHPD	The Na Pali Coast Archeological District is located on the northwest coast of Kaua‘i.	
Kaniakapupu (O‘ahu)	1986 (State and National)	SHPD	Kaniakapupu is located on the south shore of O‘ahu in Nuuanu.	
Kapapa Island Complex (O‘ahu)	1981 (State) 1972 (National)	SHPD	Kapapa Island is located off the windward coast of O‘ahu in Kaneohe Bay.	
Kukuipilau Heiau (O‘ahu)	1984 (State and National)	SHPD	Kukuipilau Heiau is located on the windward coast of O‘ahu in Kailua.	
Nuuanu Petroglyph Complex (O‘ahu)	1979 (State) 1973 (National)	SHPD	Nuuanu Petroglyph Complex is located on the south shore of O‘ahu	
Waianae District (O‘ahu)	1974 (National)	SHPD	Wai‘anae District is located on the west side of O‘ahu.	
Kealakekua Bay Historical District (Hawaii)	1973(National)	SHPD	Located south of Kona on Hawaii Island, Kealakekua Bay Historical District is the site of both a MLCD and a State Historical Park.	
Cook Landing Site (Kaua‘i)		SHPD		
Kukui Heiau (Kaua‘i)	1984 (State and National)	SHPD	The Na Pali Coast Archeological District is located on the northwest coast of Kaua‘i.	

Table 43. Marine managed areas in the populated Hawaiian Islands.
NOTE: Zones that fall inside the current Sanctuary boundaries are marked with an *

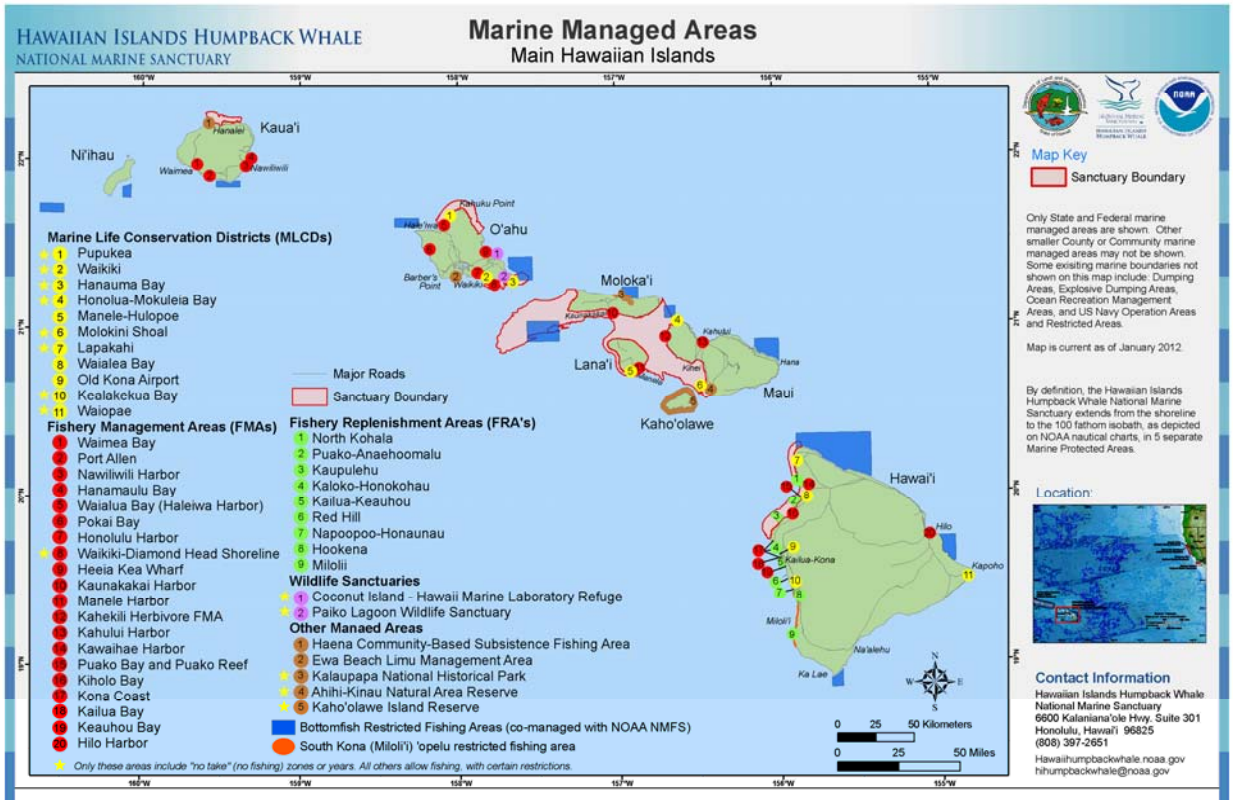


Figure 28. Map of Marine Managed Areas in the Populated Hawaiian Islands.

10. Action Plans

This section is the 2014 draft management plan for the Hawaiian Islands Humpback Whale National Marine Sanctuary (sanctuary), now proposed as the *Hawaiian Islands National Marine Sanctuary - Nā Kai ʻEwalu*. A sanctuary management plan is a site-specific planning and management tool that describes the sanctuary's goals, objectives, guides current and future activities, outlines staffing and budget needs, and sets priorities and performance measures for resource protection, research and education programs.

The National Marine Sanctuaries Act (NMSA) requires the Office of National Marine Sanctuaries (ONMS) to periodically review and evaluate the progress in implementing the management plan and goals for each sanctuary, with special focus on the effectiveness of site-specific techniques and strategies. ONMS must revise management plans and regulations as necessary to fulfill the purposes and policies of the NMSA (16 U.S.C. § 1434(e)) to ensure that sanctuary sites continue to best conserve, protect, and enhance their nationally significant natural and cultural resources.

The process to develop the draft management plan for the sanctuary began in the summer of 2010 when the sanctuary conducted a 90-day public scoping process. During that time, sanctuary management conducted a series of public meetings to solicit feedback from the public about how to proceed with management. In total, several hundred community members, stakeholders, and agency representatives attended ten public scoping meetings held on the island of Hawaiʻi, Oʻahu, Kauaʻi, Maui, Molokaʻi, and Lānaʻi. Individuals and stakeholders who were unable to attend the public scoping meetings also had the opportunity to submit written comments online or in writing. A total of 12,375 public submissions were submitted to the sanctuary by agencies, organizations, elected officials and community members.

The sanctuary advisory council (council) reviewed the public scoping comments and established working groups to further examine the following nine priority issues:

- Ecosystem Protections: Species and Habitats
- Humpback Whale Protections
- Climate Change
- Water Quality
- Maritime Heritage
- Native Hawaiian Culture
- Ocean Literacy
- Offshore Development
- Enforcement

The working groups were made up of council members, community and user group representatives, and technical experts. Working group meetings were open to the public and facilitated public participation by gathering input from relevant constituent groups. Each working group produced a technical report, which included recommendations for management actions that the sanctuary should take to address those issues. Together the reports contained over 150

recommendations for sanctuary management activities. Sanctuary staff considered all of the proposed activities when developing the draft management plan.

The working group reports overwhelmingly illustrated the need for a more holistic approach to managing marine resources within the sanctuary. The *Ecosystem Protections Recommendation Report* specifically recommended ecosystem-based management as an appropriate approach to effectively managing the marine environment. The *Native Hawaiian Culture Recommendation Report* provided guidance about integrating traditional Native Hawaiian management perspectives into an ecosystem-based management framework. The activities described in the draft management plan reflect these recommendations and describe how the sanctuary proposes to transition from single-species management of humpback whales to an ecosystem-based management approach.

The management activities in the management plan are organized into fifteen action plans. These action plans are designed to directly address current priority resource management issues and guide management of the sanctuary over the next five to ten years. The action plans are sorted into five thematic areas that serve to organize and structure the plans as seen in Table 44 below.

Action Plan	Desired Outcome
Implementing Ecosystem Protection	
Understanding and Managing Specis and Habitats	A resilient marine ecosystem able to respond to and recover from change, that supports sustainable ecosystem functions and services, and healthy populations of biologically, culturally, and economically significant marine species and habitats.
Resilience to a Changing Climate	A climate resilient sanctuary maintained through innovative management approaches and supported by an informed public.
Water Quality Protection	Water quality standards and levels of compliance that support healthy ecosystems, habitats and marine resources, as well as human activities that are compatible with resource protection.
Perpetuating Cultural Heritage	
Living and Evolving Cultural Traditions	Hoʻohawaiʻi: foster the uniqueness of Hawaiʻi through the understanding of both historical and contemporary local knowledge about coastal and marine environments, and the perpetuation of customary environmental practices and principles within the sanctuary.
Maritime Heritage	NOAA, the State of Hawaiʻi, partner agencies, businesses and local communities are engaged in the identification and appreciation of maritime heritage resources in Hawaiʻi to effectively preserve these resources for the benefit of current and future generations.
Transitioning Towards Sustainability	
Community Partnerships	Informed and empowered human communities that are actively engaged in dialogues and initiatives to facilitate an integrated management approach that perpetuates a healthy co-existence between humans and the marine environment.
Ocean Literacy	An ocean literate public with increased awareness, knowledge and appreciation of natural and cultural marine resources in order to promote and enhance ocean stewardship.
Sustainable Use	Vibrant coastal communities and economies that promote the sustainable use of the marine environment.

Sanctuary Focus Areas	
Niʻihau	The preservation of healthy coastal and marine ecosystems, and the rich cultural history of Niʻihau.
Pīlaʻa	A replicable model for applying both traditional Hawaiian and western science-based management practices to restore the health of nearshore ecosystems in the Pīlaʻa ahupuaʻa.
Southern Maui Nui	Establish a research area in the waters of the Māʻalaea area of Maui island to better understand and improve water quality.
Maunalua Bay	The community's kuleana of Maunalua Bay characterized by healthy coral reef and sea grass habitats, abundant coral reef marine life and high water quality standards is achieved by caring for this place with future generations in mind.
Ensuring Management Effectiveness	
Operational Foundation	Effective and well-planned operations, human resources and adequate physical infrastructure to support effective management of the sanctuary.
Compliance and Enforcement	A high level of compliance achieved through the adherence to sanctuary regulations, guidelines, and best practices resulting in increased protection of the marine environment within the sanctuary.
Emergency Preparedness and Damage Assessment	Increased protection of sanctuary resources from both natural hazards and human-caused incidents or injuries, through coordinated emergency response and damage assessment.
Assessing Progress	A performance evaluation framework to continually gauge the sanctuary's progress in meeting its management goals and objectives.

Table 44. Action plans grouped in thematic areas with desired outcomes.

Each action plan consists of a desired outcome and overview, objectives and activities, outputs and outcomes, and performance measures.

The desired outcome describes the future state of the sanctuary that you would expect to see if the action plan were fully implemented.

The overview provides background information, particularly related to the need for action and the potential role of sanctuary programs in addressing the topic, and describes how the sanctuary staff will address the issues through management.

The management actions proposed in each action plan are organized by objectives and subdivided into activities.

The objective describes the process to achieve the desired outcome by focusing on a particular aspect or process of sanctuary programs or operation.

An activity is the direct and specific action taken by sanctuary managers and staff to address a particular issue and achieve the related objective and desired outcome. Activities are organized into categories (blue banners), which are found consistently throughout all of the action plans. A proposed output and an outcome are described for each of the activities.

The output is the direct result from the successful implementation of the related activity. The outcome describes an improvement or change that can be attributed to the successful implementation of an activity or group of activities.

The performance measures can be used by ONMS and sanctuary staff to evaluate successful implementation of each action plan. These measures will demonstrate baseline (current) and future progress toward achieving the desired outcomes stated for each action plan. As part of the effort to improve overall resource management effectiveness, ongoing and routine performance evaluation has become a national priority for ONMS and the sanctuary. Both location-specific and national programmatic efforts are under way to better gauge the sanctuary's ability to meet its stated objectives and to address the issues identified in this management plan.

The total estimated cost to fully implement the sanctuary manage plan over the next five years is $24,103,225. Table 45 below displays the estimated costs of implementing each action plan, by year. The purpose of the budget estimates (approximate calculations) is to help ONMS establish management priorities and allocate annual funds for the sanctuary. The availability of funds can vary from year to year and as a result of possible changes in federal funding levels, certain sanctuary programs may require modification or deferred implementation to reflect budgetary reality. The estimate costs were developed to encompass core operations and programmatic costs. Core operations costs include staff and contract labor, training, transportation and travel, utilities, property rental, printing, supplies, equipment, vessels, and vessel maintenance.

Action Plan	Estimated Annual Cost					Action Plan 5-Year Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Implementing Ecosystem Protection						
Understanding and Managing Species and Habitats	$994,774	$1,394,006	$1,273,120	$970,816	$1,218,655	$5,851,371
Resilience to a Changing Climate	$50,882	$117,660	$66,708	$61,152	$53,245	$349,647
Water Quality Protection	$242,874	$230,232	$190,314	$178,192	$189,290	$1,030,902
Perpetuating Cultural Heritage						
Living and Evolving Cultural Traditions	$91,155	$360,824	$213,313	$192,416	$141,565	$999,273
Maritime Heritage	$216,918	$425,908	$171,566	170,464	$169,970	$1,154,826
Transitioning Towards Sustainability						
Community Partnerships	$186,327	$235,850	$233,369	$204,624	$188,255	$1,048,425
Ocean Literacy	$351,848	$288,956	$229,990	$236,320	$242,650	$1,349,764
Sustainable Use	$132,613	$194,404	$88,944	$82,432	$171,580	$669,973
Sanctuary Focus Areas						
Niʻihau	$235,973	$276,236	$165,462	$111,216	$120,750	$909,637
Pīlaʻa	$155,942	$197,584	$101,261	$70,336	$95,105	$620,228
Maunalua Bay	$158,620	$106,053	$114,995	$94,864	$102,005	$576,537
Southern Maui Nui	$59,431	$98,527	$46,979	$42,896	$44,045	$291,878
Ensuring Management Effectiveness						
Operational Foundation (fixed costs)	$396,889	$422,126	$455,678	$472,479	$497,683	$2,244,855
Operational Foundation (variable costs)	$832,858	$1,004,244	$904,264	$977,984	$994,060	$4,713,410
Compliance and Enforcement	$306,528	$382,024	$317,190	$304,640	$322,460	$1,632,842
Emergency Preparedness and Damage Assessment	$81,782	$102,184	$65,400	$67,200	$67,160	$383,726
Assessing Progress	$70,040	$48,548	$59,841	$26,432	$71,070	$275,931
Total Estimated 5-Year Cost						**$24,103,225**

Table 45. Total estimated costs to fully implement action plans by year.

Table 46 illustrates the hierarchy among components of the action plans, the sanctuary goals and guiding principles, and the ONMS mission (see Section 4 Purpose and Need).

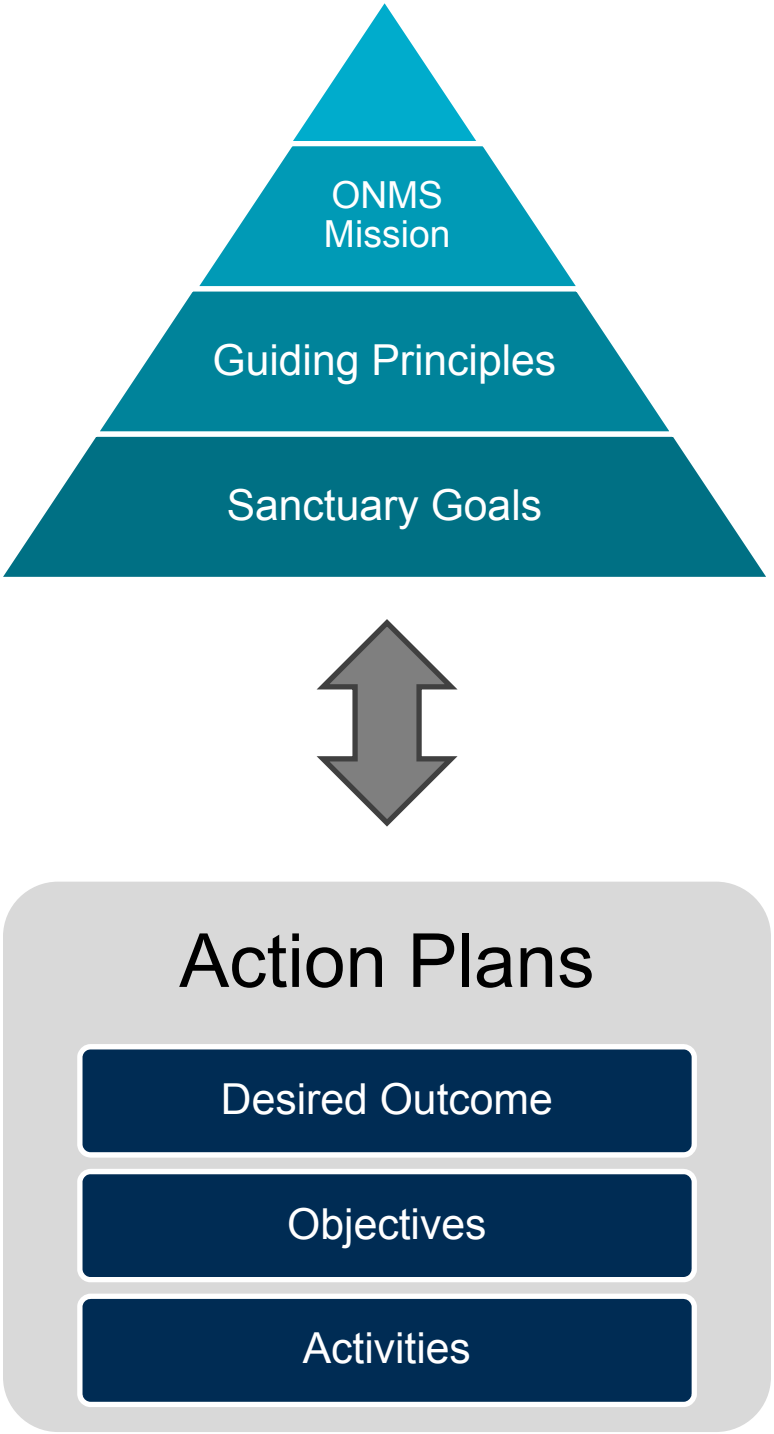
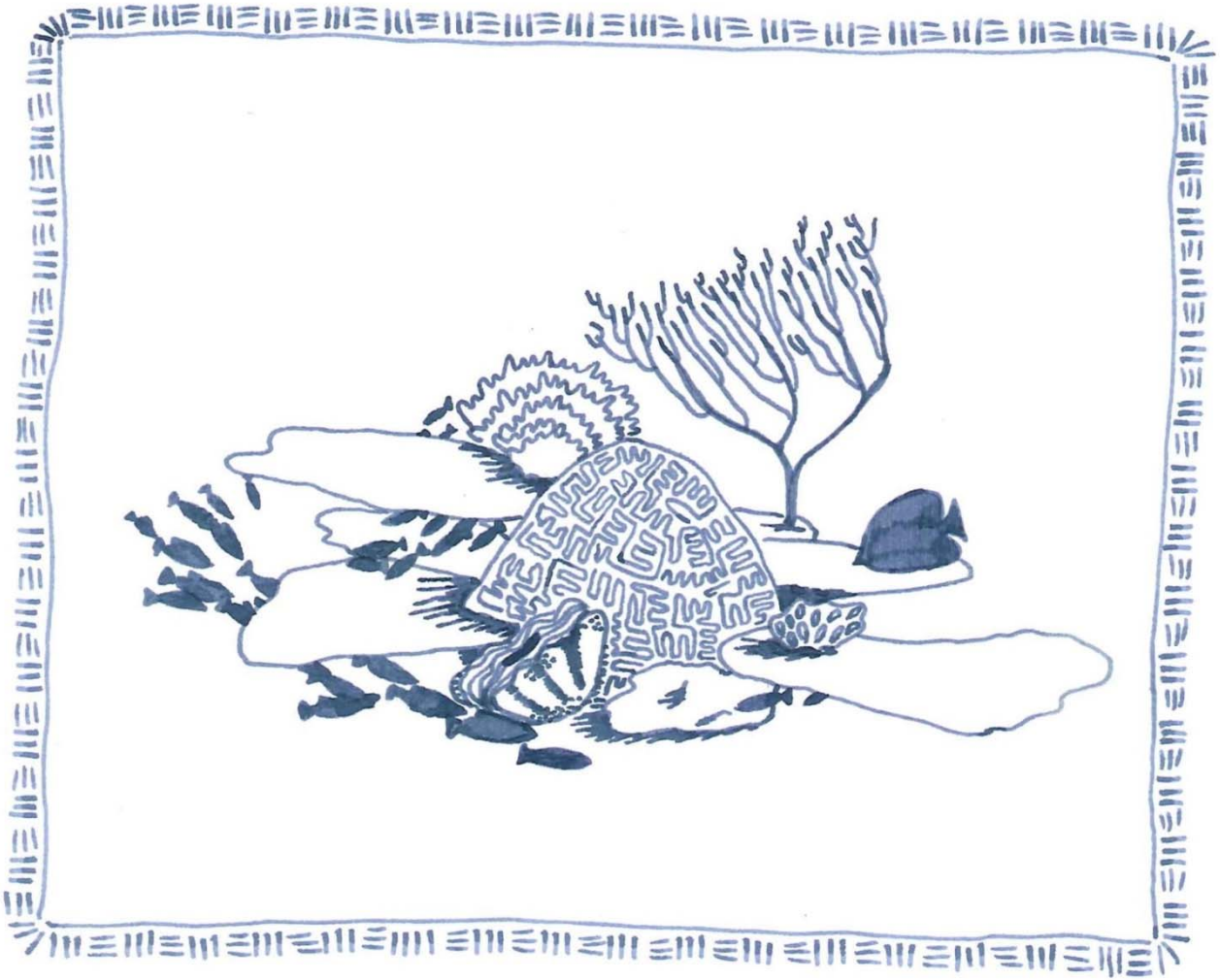


Table 46. Relationship between Action Plans and overall management framework.

10.1. Implementing Ecosystem Protection



The *Implementing Ecosystem Protection* thematic area describes how the sanctuary will adopt an ecosystem-based management approach to protect ecosystems within the sanctuary. Sanctuary waters include unique features and support significant ecosystems that are in need of additional protection. Shallow and mesophotic coral reefs, along with native algal and seagrass beds are home to a variety of species that comprise marine ecosystems that have some of the highest endemism rates in tropical waters worldwide. Unsustainable human use, impacts to water quality, and existing and expected impacts from climate change, threaten the resilience and health of these ecosystems. By implementing measures to plan for, mitigate and regulate impacts, the sanctuary, in partnership with co-managing agencies, communities and the broader public, can support the integrity and resilience of these special natural resources

Through formal comments from stakeholders and the sanctuary advisory council, the sanctuary co-managers received recommendations to adopt an ecosystem-based management approach. This approach is also consistent with guidance from the National Ocean Policy which directs resource management agencies to utilize ecosystem-based management with an adaptive management framework (National Ocean Policy, Executive Order 13547). Statutes such as the Endangered Species Act, Marine Mammal Protection Act and the Hawaiian Islands Humpback Whale National Marine Sanctuary Act have effectively afforded protections for individual species, however other species, habitats and ecosystems also deserve priority management attention because of their ecological, cultural, and economic importance to the Hawaiian Islands.

The three action plans in the *Implementing Ecosystem Protection* thematic area are: *Understanding and Managing Species and Habitats* (ER), *Resilience to a Changing Climate* (RC), and *Water Quality Protection* (WQ). These action plans outline the actions that the sanctuary will take to support a healthy and resilient marine ecosystem in Hawaiʻi. The *Understanding and Managing Species and Habitats* action plan specifically seeks to support the maintenance of healthy ecosystem functions and services and provide support for marine species and habitats that are biologically, culturally, and economically significant. The *Resilience to a Changing Climate* action plan presents a suite of tools to assess and protect sanctuary resources and to support the needs of adjacent human communities that are particularly vulnerable to climate change impacts. The *Water Quality Protection* action plan focuses on actions that will improve water quality while still allowing for human use activities that are compatible with resource protection. Collectively, these three action plans address impacts and target the most important and broad-based components of a marine ecosystem for protection - habitats, species and water.

Implementing Ecosystem Protection

10.1.1. Understanding and Managing Species & Habitats

Kau i Kāpua ka poʻe polohuku ʻole.

Those without resources will land at Kāpua.

Without resources one gets nowhere.

Desired Outcome

A resilient marine ecosystem able to respond to and recover from change, that supports sustainable ecosystem functions and services, and healthy populations of biologically, culturally, and economically significant marine species and habitats.

Overview

An ecosystem-based management approach will protect and conserve ocean habitats and species as well as protect and promote sustainable human uses. Sanctuary management will draw on both traditional Native Hawaiian concepts of management and western ecological knowledge to create an integrated management framework. This holistic approach to resource management creates more flexibility when identifying management priorities. Adaptive management calls for continuously assessing management actions to allow for better informed and improved future resource management decisions.

Many marine habitats in the populated Hawaiian Islands have been impacted by human interactions, continue to be disturbed, and are in need of restoration. Other marine areas need to be maintained in a healthy and resilient condition. This transition to an ecosystem-based management approach will allow the sanctuary to promote responsible use of marine resources and reduce threats. This approach will also consider significant habitats, keystone and indicator species, and groups of species that serve important biological, cultural, and economic functions. The identification and proper management of threats and impacts to habitats and species is a key component to maintaining overall ecosystem health and human well-being.

The sanctuary will continue to focus on the conservation and protection of humpback whales as the signature species of the sanctuary and will also support the conservation of other protected species, by effectively partnering with the community and other managing agencies and broadening the scope of existing programs (e.g. applying large whale entanglement response to other species). This plan outlines an ecosystem-based management framework that includes continuously evaluating and assessing priority habitats and species that may need immediate attention in an adaptive management framework.

The sanctuary may use a suite of management tools, including education and outreach, community-based management plans, research and monitoring, ecosystem service valuation, and development of best management practices to improve management of habitats and species. In addition, the sanctuary can also play an important role as a coordinating body and participate in multi-agency initiatives to reduce stressors and address threats to the ecosystem such as marine debris and invasive species.

The *Understanding and Managing Species and Habitats Action Plan* outlines the activities the sanctuary will take to better understand and protect species and habitats within the sanctuary. Currently the sanctuary has one Research Specialist on staff and is looking to add a Research Coordinator position. Given the limited capacity of staff and wide scope of research questions within the sanctuary, staff would actively seek to collaborate with key research partners to gather information on the status of species and habitats within the sanctuary and prioritize significant ecosystems for management actions. A cornerstone of research activities would be to identify threats to marine species and habitats, including but not limited to invasive species, entanglement, and vessel collisions. With this research, the sanctuary would implement activities to address those threats. Within the expanded, ecosystem-wide scope of research and management, the sanctuary will continue to manage humpback whales, including ongoing humpback whale response efforts. Sanctuary staff will also seek to better understand, assess and evaluate ecosystem services to better inform natural and cultural resource management decision-making, environmental damage assessments, and education and outreach materials. The success of sanctuary management will also depend on compliance by an educated and informed public so the sanctuary will continue to engage in trainings and outreach activities to improve awareness, change attitudes and behavior and build a sense of stewardship.

Related Goals

Goal 1
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 2
Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective SH-1:

Assess, evaluate and develop management approaches to protect and enhance key habitats, and by doing so contribute to more resilient ecosystems within the sanctuary.

Activity		Output	Outcome
Gather Information			
SH-1.1.	Collaborate with key research partners and institutions to evaluate and prioritize key habitats, and understand the status and threats to those habits that are biologically, culturally, and economically significant priorities for the sanctuary to focus on for additional management actions.	Clearly articulated framework that identifies and evaluates priority habits within the sanctuary, using established and agreed upon metrics (criteria) for prioritizing habitats that require additional management protections.	Priority habitats identified and evaluated for addressing human use impacts and associated threats.
Place-Based Planning			
SH-1.2.	Partner with key research institutions to develop a research and monitoring plan to better understand the distribution, status and threats to key sanctuary habitats and species (shallow and mesophotic coral, algae etc).	Research and monitoring plan developed, including the identification of priority sites or habitats, to better understand and inform management approaches to addressing impacts on those resources.	Targeted research and monitoring programs developed to better understand and address impacts to key habitats in the sanctuary, and contribute to building resilient ecosystems in the sanctuary.
SH-1.3.	Develop and implement regional sanctuary program research implementation plan to achieve research goals of regional sanctuary sites.	Regional research implementation plan developed and implemented.	
Reciprocal Learning			
SH-1.4.	Facilitate information sharing and learning among experts, including traditional cultural practitioners and western scientists, communities, agencies and organizations engaged in habitat science and management.	Forums and meetings for the development, improved understanding and integration of traditional Hawaiian and science-based management models, approaches and information requirements.	Increase integration of traditional and western science in management decisions.

Activity	Output	Outcome
Enhance Management		
SH-1.5. Define appropriate types and levels of engagement for the sanctuary to support the implementation of other NOAA and State of Hawai‘i resource management priorities and initiatives (e.g., ORMP) for protecting key habitats in and adjacent to sanctuary waters.	Defined partnership roles for engagement by the sanctuary in supporting other NOAA and State of Hawaii planning and resource protection priorities.	Collaborative and coordinated management of key habitats that meet the objectives of different management initiatives.

Objective SH-2:

Develop collaborative resource management partnerships to better identify, understand and address threats to priority habitats within the sanctuary.

Activity		Output	Outcome
Gather Information			
SH-2.1.	Identify, prioritize and conduct a compatibility analysis on human use activities in the sanctuary to better understand and prioritize those that may pose a threat to priority habitats within the sanctuary, and should be considered for additional management action.	Human use compatibility analysis, habitat threat assessment and evaluation report with recommendations for management actions to address threats to key habitats in the sanctuary.	Enhanced understanding of human use activities and their impacts on key habits to prioritize future management actions.
Enhance Management			
SH-2.2.	Coordinate with the State of Hawai'i to implement a day-use mooring buoy plan and buoy placement in strategic locations within the sanctuary to help minimize impacts from vessel anchoring to coral reef habitats and the seafloor.	Implementation of a day-use mooring buoy plan in targeted areas.	Reduced impacts on habitats within the sanctuary by addressing sources of impacts.
SH-2.3.	Partner with lead agencies and NGOs on addressing both the vectors and eradication of aquatic invasive species that are impacting key habitats in the sanctuary.	Prioritized set of actions developed and implemented to minimize the impacts of aquatic invasive species	
SH-2.4.	Evaluate and prioritize ways the sanctuary can further support efforts to reduce marine debris that is impacting key habitats in and adjacent to the sanctuary.	Prioritized set of actions developed to reduce marine debris (e.g. beach cleanups).	
SH-2.5.	Coordinate with federal and state agencies, as well as local, national and international organizations, by participating in a range of forums that build an improved understanding of how to effectively manage key habitats in the sanctuary by drawing on lessons learned, tested models and case studies.	Participation in working groups, task forces, workshops, and meetings to enhance information sharing and improving the understanding of how to manage key habitats such as coral reefs in the sanctuary.	Enhanced and expanded array of approaches to managing threats and ensuring resilience of key habitats in the sanctuary.

Activity	Output	Outcome
Enhance Collaboration		
SH-2.6. Assist, support and coordinate citizen science programs, including coral reef monitoring, that provide on-going data and fill data gaps necessary to inform management decision making and used to address impacts to key habitats in the sanctuary.	Enhanced capacity of citizen science programs (e.g., Eyes of the Reef, Makai Watch, and Team OCEAN), and improved access to a long term data and information that fills data gaps and is used to inform management decision making.	Increased engagement by public in identifying and reducing threats.

Objective SH-3:

Assess human use impacts and appropriate management approaches in order to protect priority marine species that required targeted protection and may serve as key indicators of ecosystem health of the sanctuary.

Activity		Output	Outcome
Gather Information			
SH-3.1.	Collaborate with key research institutions and agencies to identify, evaluate, and prioritize key marine species and functional groups (that interact with each other) within the sanctuary that are biologically, culturally, and economically significant and should be considered for additional management protection.	Clearly articulated framework that identifies, evaluates and prioritizes keystone and indicator species, as well as important functional groups of species, that tell the story of the health of priority ecosystems within the sanctuary.	Species and functional groups identified and evaluated as indicators of the health of the ecosystem in the sanctuary and require further protective measures.
Assess Resources			
SH-3.2.	Facilitate research and monitoring amongst already established and potential new partners to assess humpback whales including behavior, population dynamics, health, distribution, biogeography and other ecological parameters, throughout the range of the populated Hawaiian Islands.	Add to existing data and provide new data on humpback whales to better understand the status, health and behavior of this resource.	Increased understanding of humpback whales that contributes to more effective management approaches.
Enhance Collaboration			
SH-3.3.	Collaborate with researchers, agencies and institutional partners and community groups to evaluate and adapt citizen science and other volunteer programs to better contribute to the scientific understanding of humpback whales and other priority marine species.	Improved citizen science programs designed to better meet data needs and contribute to species management (e.g., Ocean Count).	Increased understanding of human interactions and threats to species, and improved management.
SH-3.4.	Collaborate with commercial and recreational user groups to analyze marine wildlife watching patterns in order to identify potential impacts to humpback whales, spinner dolphins, sea turtles, and monk seals from interactions with visitors and recreational user groups.	Increased understanding of marine wildlife watching patterns and human behaviors and interactions with marine species and the potential impacts on species of concern.	

Objective SH-4:

Identify and reduce threats and damage from commercial and recreational ocean users to priority marine species within the sanctuary.

Activity		Output	Outcome
Resource Protection			
SH-4.1.	Continue to lead, assess and document response efforts to disentangle whales and respond to vessel-whale interactions as part of the *Large Whale Response Program.*	Established, safe and timely whale response efforts led by the sanctuary.	Improved and expanded response to priority marine species in distress.
SH-4.2.	Provide expertise, resources and support for responding to the disentanglement and rescue of other priority marine species in distress including, but not limited to, monk seals, sea turtles and other cetaceans in and around the waters of Hawaii, nationally and internationally.	Response support and expertise made available and expanded to additional priority marine species.	
Gather Information			
SH-4.3.	Evaluate options for reducing vessel collisions and approach interactions by vessels (e.g., speed limits, vessel traffic lanes) with priority marine species.	Management framework to address threats to priority marine species from vessel activity.	Reduce harmful, and sometimes fatal, interactions between vessels and species.
Enhance Collaboration			
SH-4.4.	Partner with federal and state agencies to address bycatch and entanglement of protected species from fishing and other marine use gear by collaborating with ocean users to create best management practices, and evaluate and implement mitigation measures.	Increased collaboration to address bycatch and entanglement.	Reduced threats and mortality of marine species from bycatch and entanglement.
SH-4.5.	Collaborate with management agencies on issues relating to threat reduction and mitigation for priority marine species (e.g., marine turtles, monk seals, and spinner dolphins) from threats in addition to bycatch and entanglement.	Active involvement in decision-making processes across agencies (e.g., working groups, task forces, workshops, meetings) to address a range of threats to marine species.	Coordinated management resulting in threat reduction to priority marine species.

Activity	Output	Outcome
Enhance Collaboration		
SH-4.6. Collaborate on and facilitate pilot projects to assess effects of and potential mitigation of close approach and human contact interactions for spinner dolphins in recognized resting areas (e.g., bays and harbors).	Pilot project established to monitor and better understand the success of protection efforts implemented in spinner dolphin resting areas.	Increased understanding of impacts of human-dolphin interactions.
Build Capacity		
SH-4.7. Train existing and new responders in response techniques and protocols as part of the *Large Whale Response Program*, and other marine mammal and turtle response.	Large whale and priority marine species response training.	Improved and increased response efforts to reduce impacts on marine species.

Objective SH-5:

Understand and assess the role of ecosystem services and their value within the sanctuary to better inform policy, planning, management.

Activity	Output	Outcome
Gather Information		
SH-5.1. Coordinate with universities and research institutions to develop a database of existing ecosystem valuation studies of the marine environment in Hawai‘i to better inform policy and planning within the sanctuary.	Database of valuation studies in Hawai‘i to better understand the relationship between the sanctuary's priority resources and the value that they have within an ecosystem-based context.	Understanding of the function(s) of the parts of the ecosystem that contribute to a healthy and productive ecosystem as a whole, which in term informs the prioritization and targeting of management efforts.
Assess Resources		
SH-5.2. Estimate the value of ecosystem services within the sanctuary by using transferable information (extrapolations) from existing studies in a comparable location or context to better understand individual resources, the role they play and contribution they make to a functioning ecosystem in the sanctuary.	Benefit transfer studies for marine resources within the sanctuary to better understand the function(s) of individual marine resources within the context of the ecosystem(s) of the sanctuary.	Effective resource protection that considers the impacts from human use activities on the whole system not just targeted species or habitats.
SH-5.3. Conduct quantitative assessments (economic valuation) and qualitative assessments (multidimensional evaluation methods) of ecosystem services provided by sanctuary resources to fill gaps in the transferable information studies.	Develop assessments that fill gaps in critical ecosystem service valuation in regards to priority resources within the sanctuary.	

Activity	Output	Outcome
Capacity Building		
SH-5.4. Facilitate information exchanges between marine scientists, managers, social scientists, economists, Native Hawaiians, and other interested stakeholders to assist in fostering an understanding of the ecosystem valuation process.	An understanding of what can be achieved through the use of ecosystem valuation and how the results can be applied.	More effective natural and cultural resource protection that considers the impacts from human use activities on the whole system not just targeted species or habitats.
Planning and Organizing		
SH-5.5. Assemble ecosystem service valuation information to develop a conceptual model of what ecosystem valuation looks like within the sanctuary and use that to inform decision making.	Conceptual model used to inform management decisions.	Making decisions and taking management actions based on an ecosystem-based model specific to the sanctuary.
SH-5.6. Introduce concepts of valuation assessments, including indigenous sciences and traditional Native Hawaiian use and non-use valuation concepts, in education and outreach activities to demonstrate the importance of healthy and intact marine ecosystems in Hawai‘i.	Education and outreach materials, trainings and programs informed by Native Hawaiian perspectives and ecosystem valuation.	Increased awareness among the public, agency decision makers and resource managers about the value of indigenous science and the ecosystem services that marine environments provide.
SH-5.7. Work with resource management agencies to include valuation assessments of ecosystem services to determine liability and cost of environmental damages (including cascading effects).	Environmental damage assessments that include ecosystem valuation.	Integration of ecosystem valuation into natural resource damage assessments in the sanctuary.

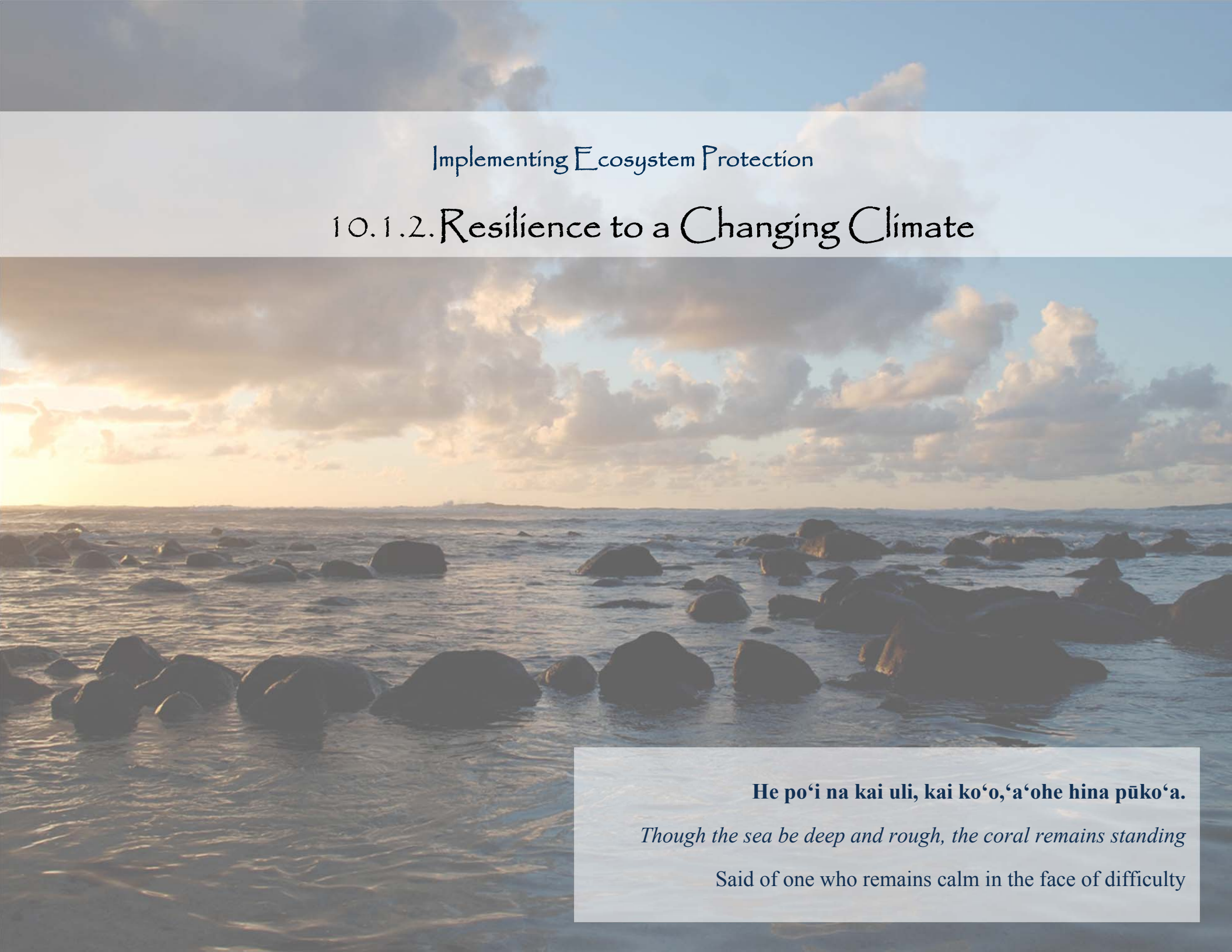
Objective SH-6:

Conduct and enhance education and outreach on marine habitats and species to improve the understanding and appreciation of the need for protecting sanctuary resources for now and future generations and directly contribute to the efforts of sanctuary management.

Activity		Output	Outcome
Improve Communication			
SH-6.1.	Develop education and outreach materials to effectively communicate information about the components that make up a healthy ecosystem within the sanctuary, and how an intact system contributes to the overall health of the marine environment, the ecosystem services it provides and the contribution it makes to the well being of humans.	Education and outreach materials on the significance of marine habitats and species to ecosystem health.	Increased public awareness of marine habitats and species resulting in opportunities for individuals to take responsibility for reducing threats to habitats and species.
SH-6.2.	Increase efforts to educate ocean users on how to report, record and document both vessel collisions with and strandings of marine species.	Dissemination of information on reporting collisions and strandings.	Improved reporting on marine species collisions and strandings.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Understanding and Managing Species and Habitats	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	SH-1.2. Partner with key research institutions to develop a research and monitoring plan to better understand the distribution, status and threats to mesophotic coral in the sanctuary.	Within 1 year, a research and monitoring plan has been developed that answers key management questions about the status of mesophotic coral in the sanctuary, and informs adaptive management responses to trends in the status (health) of the mesophotic coral over time.
		SH-2.1. Identify, prioritize and conduct a compatibility analysis on human use activities in the sanctuary to better understand and prioritize those that may pose a threat to priority habitats within the sanctuary, and should be considered for additional management action.	Within 2 years, a compatibility analysis has been completed on human use activities within the sanctuary that becomes the basis of and informs new management on priorities and approaches to address impacts from incompatible uses.
		SH-3.3. Collaborate with researchers, agencies and institutional partners to evaluate and adapt citizen science and other volunteer programs to better contribute to the scientific understanding of humpback whales and other priority marine species.	Within 2 years, the Sanctuary Ocean Count volunteer program data collection portfolio has been expanded from humpback whales to other priroity protected species.
		SH -4.3. Evaluate options for reducing vessel collisions and approach interactions by vessels (e.g., speed limits, vessel traffic lanes) with priority marine species.	Within 3 years, a management framework has been developed to effectively reduce vessel collisions and other harmful vessel interactions with priroity protected species.
		SH-5.5. Assemble ecosystem service valuation information to develop a conceptual model of what ecosystem valuation looks like within the sanctuary and use that to inform decision making.	Within 4 years, a conceptual model of ecosystem valuation of the sanctuary has been developed and is being used to inform and move management decisions towards a more ecosystem-based management approach.



Implementing Ecosystem Protection

10.1.2. Resilience to a Changing Climate

He poʻi na kai uli, kai koʻo,ʻaʻohe hina pūkoʻa.

Though the sea be deep and rough, the coral remains standing

Said of one who remains calm in the face of difficulty

Desired Outcome

A climate resilient sanctuary maintained through innovative management approaches and supported by an informed public.

Overview

Climate change refers to variability in the climate of the earth. While the process of climate change has occurred naturally for thousands of years, recent changes have been attributed to observed increases in human induced greenhouse gas concentrations. In Hawai‘i, the changing climate is predicted to increase sea level, change weather and precipitation patterns, and increase ocean temperature (Alber, 1998; Haw. Rev. Stat. §286). The associated greenhouse gases (e.g., CO_2) inducing climate change will also contribute to increased acidification of the ocean (Feely 2011).

Global and regional changes to the marine environment may have significant consequences for ecological and cultural resources within the sanctuary. Increased sea level and extreme weather events are already accelerating coastal erosion and sediment runoff, which in turn impact water quality. Changes in precipitation and saltwater intrusion induced by sea level rise, will adversely affect species and habitats that are sensitive to salinity shifts, especially in estuarine and freshwater habitats. Increased ocean temperature may cause reef building coral to bleach, become stressed and eventually die. Ocean acidification may slow or halt the calcification of several calciferous species including coral, coralline algae and mollusks and dissolve calcium carbonate structures on the reef. Declines in the abundance and health of calciferous plankton could negatively impact species throughout higher levels of the food chain (NOAA 2011). At the same time, coastal communities contending with rising seas may pursue mitigation approaches such as shoreline alterations (e.g., hardening shoreline surfaces) that will have additional ecological impacts.

A comprehensive effort to better understand the impacts of climate change to the ecosystems within the sanctuary, and effectively plan for adaptive management practices, is needed to manage sanctuary resources. This plan is consistent with and supports larger agency efforts towards NOAA’s Climate Goal (*Understand climate variability and change to enhance society’s ability to plan and respond*) as well as enhance compliance with Executive Order 13423 (*Strengthening Federal Environmental, Energy, and Transportation Management*) and Executive Order (*Preparing the United States for the Impacts of Climate Change*). This plan also supports Hawaii Revised Statues § 226-109 Climate Change Adaptation Priority Guidelines that encourages “collaboration and cooperation among county, state, and federal agencies, policy makers, businesses, and other community partners to plan for the impacts of climate change and avoid, minimize, or mitigate loss of life, land and property for future generations.” The plan also supports response strategies outlined in the 3rd U.S. National Climate Assessment released in 2014. The sanctuary will work with a range of partners to implement the activities in this action plan including the University of Hawaii Sea Grant program, the Pacific Islands Climate Change Cooperative, the Environmental Protection Agency, and other state and federal agencies.

The *Resilience to a Changing Climate Action Plan* describes the steps the sanctuary will take to identify potential climate threats to marine resources and dependent communities, as well as the actions the sanctuary will take to plan for and mitigate potential impacts. Sanctuary staff plan to engage with the well-coordinated network of climate change organizations and university departments currently evaluating and planning for climate threats to natural and cultural marine resources in Hawai‘i. The sanctuary will follow the climate change planning model developed by Office of National Marine Sanctuaries for “Climate Smart Sanctuaries.” This process outlines steps a sanctuary should take to engage key stakeholders and technical experts, identify threats, and plan for change. To promote a wider understanding of and preparedness for climate impacts beyond sanctuary boundaries, sanctuary staff will work to integrate climate messaging into outreach materials and communication messages.

Related Goals

Goal 1
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 2
Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 4
Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Goal 5
Use collaborative and adaptive management approaches to optimize effectiveness.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective RC-1:

Identify and better understand existing and potential climate impacts to marine resources, and dependent human communities, so that climate impacts can better be addressed through targeted sanctuary management actions.

Activity	Output	Outcome
Gather Information		
RC-1.1. Collaborate with existing climate change monitoring programs to monitor physical and biological indicators of climate change within and adjacent to the sanctuary (e.g., salinity, pH, temperature, currents, and sea level rise).	Biological and physical climate indicators to inform possible management responses to climate impacts to marine resources.	Better informed management approach to understand primary climate threats, impacts, and response capacity of marine resources and human communities in and adjacent to the sanctuary.
RC-1.2. Make use of climate models that illustrate biological and physical change in the marine environment over time.	Change models used to inform management decision making now and into the future.	
Assess Resources		
RC-1.3. Characterize and map the adaptive capacity of species and habitats to climate change.	Assessment and specialization of the adaptive capacity of species and habitats to respond to change.	Improved ability to inform and prioritize management actions based on natural and cultural resource vulnerability.
RC-1.4. Work with Native Hawaiian communities to identify natural and cultural resources that are vulnerable to climate change (e.g., fishponds, lo'i, limu).	Vulnerability assessment of natural and cultural resources.	
RC-1.5. Complete a cumulative impact analysis to synthesize existing information on the main climate drivers and non-climate stressors, and how they collectively impact ecosystems, cultural resources, and coastal communities.	Cumulative impact analysis of climate and non-climate stressors.	Management that better responds to the interactions and impacts of climate and non-climate stressors.

Objective RC-2:

Tailor sanctuary management actions to build both resilient natural and human systems that have the capacity to respond, recover, or adapt to climate change impacts in the coastal and marine environment.

Activity	Output	Outcome
Build Capacity		
RC-2.1. Establish a sanctuary advisory council climate change working group to engage key stakeholders, technical experts, and advisory council members in climate change adaptation planning.	A stakeholder based climate change working group established to prioritize climate change management approaches to building resilient natural and human systems.	An improved understanding of human and natural systems and how they respond to climate stressors in order to better manage for change.
RC-2.2. Provide training for sanctuary staff and partners on how to build a management framework to better understand and increase resilience of priority marine ecosystems within the sanctuary to change.	Staff and partners trained in climate change adaptation to better understand the process to build the adaptive capacity of human and natural systems.	
Place-Based Planning		
RC-2.3. Develop a green operations plan that establishes operating standards for energy use, sustainable product use, waste disposal, water use and management at sanctuary offices and facilities.	Establish green infrastructure operating standards to be applied to sanctuary facilities.	Improved management of climate impacts created by sanctuary facilities.
Improve Communication		
RC-2.4. Conduct outreach to the general public about existing and potential climate impacts to marine resources and communities adjacent to the sanctuary as part of ocean literacy initiatives.	Information distributed to the public on potential climate impacts to marine resources and communities integrated into outreach materials.	An educated public aware of climate impacts and actions they can take to decrease their carbon footprint and enhance adaptive capacity.
RC-2.5. Incorporate climate issues and management responses into communications to provide relevant and timely information to stakeholders on climate change.	Climate messages that speak specifically to the general public and build awareness integrated into communications.	

Activity	Output	Outcome
Enhance Collaboration		
RC-2.6. Establish a series of sentinel sites within the sanctuary that function as indicator sites and tell the story of the health of the sanctuary in relationship to climate change, and monitor specific biological resources and physical parameters.	Sentinel sites identified and profiled as indicators of climate change impacts.	The creation of an, collaborative coordinated, and integrated climate change approach across agencies to be more effective at addressing climate change impacts to marine resources and communities.
RC-2.7. Engage with other agencies and institutions in the Pacific Islands region on climate change planning efforts to develop integrated management approaches to maximize resiliency of coastal and marine resources, and human communities.	Expanded role of the sanctuary to contribute to, support and participate in integrated local and regional climate change initiatives.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Resilience to a Changing Climate	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	RC-1.5. Complete a cumulative impact analysis to synthesize existing information on the main climate drivers and non-climate stressors, and how they collectively impact ecosystems, cultural resources, and coastal communities.	Within 2 years, a cumulative impact analysis has been completed to synithesize and better understand the collective impacts of both climate and non-climate stressors on key ecosystem indicators in the sanctuary, and provide a snapshot of areas of both resilience and vulnerability.
		RC-2.1. Establish a sanctuary advisory council climate change working group to engage key stakeholders, technical experts, and advisory council members in climate change adaptation planning.	Within 3 years, a sanctuary advisory council climate change working group has been established and developed a recommended framework for a climate change adaptation plan.

10.1.3. Water Quality Protection

Mōhala i ka wai ka maka o ka pua.

Unfolded by the water are the faces of the flowers.

Flowers thrive where there is water,

as thriving people are found where living conditions are good.

Desired Outcome

Water quality standards and levels of compliance that support healthy ecosystems, habitats and marine resources, as well as human activities that are compatible with resource protection.

Overview

Establishing and maintaining water quality standards is essential to the health of marine ecosystems, people and watersheds (mauka to makai). Coordinated management strategies and watershed-based management approaches are needed to reduce the threats and impacts to water quality in the marine environment. Marine pollution, such as discharge from vessels, can negatively impact water quality. Both point and non-point sources of land-based pollution, including wastewater and storm water runoff, can carry pollutants such as sediment, nutrients, pathogens, toxic substances (including heavy metals and pesticides), and suspended solids and debris from residential, urban, agricultural, and commercial sources. These inputs can negatively impact, the health and resilience of marine resources such as coral reefs, and the communities that depend on them. Mauka and coastal best management practices can be implemented to help prevent or reduce pollution from the upland areas within a watershed that enter and impact the ocean environment.

While the authority of the sanctuary is limited to the marine environment, there are opportunities to raise awareness and fill management gaps, while supporting and providing synergies within the existing management efforts and authorities of other county, state and federal agencies. For instance, collaborative partnerships with county, state and federal agencies can contribute to the enhancement of water quality monitoring programs. Sanctuary staff will work with partners to identify appropriate roles to support sound watershed and coastal planning, along with other efforts to help protect water quality in targeted areas within the sanctuary. Additionally, the sanctuary has a strong contingency of active volunteers who will enhance current efforts of state and federal agencies in supporting citizen-base water quality monitoring, while raising community awareness of water quality through education and outreach programs. This plan supports efforts of the Clean Water Act (CWA), Marine Debris Act Amendments of 2012 (H.R. 1171), Hawaii Marine Debris Action Plan, and State of Hawaii Department of Health priorities. The perpetuation of healthy water quality is fundamental to the perpetuation of a healthy kai (ocean).

The *Water Quality Protection Action Plan* proposes activities to protect and enhance water quality within the sanctuary. In order to achieve this goal, the sanctuary will strengthen existing partnerships and formalize new partnerships with key agencies including the Hawai‘i Department of Health. The sanctuary will engage technical experts in developing a formal monitoring plan to track changes in water quality over time and prioritize areas for management actions. In addition to calling on experts, the sanctuary will continue to build upon their successful volunteer initiatives by engaging the public in citizen science water quality monitoring. In considering native Hawaiian perspectives, the sanctuary will support community-based programs in and adjacent to the sanctuary, including fishpond restoration and operation, to address human impacts on watersheds. With the cultural and scientific knowledge on water quality gathered in these efforts, the sanctuary will collaborate to develop outreach materials.

Related Goals

Goal 1
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 2
Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 4
Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Goal 5
Use collaborative and adaptive management approaches to optimize effectiveness.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective WQ-1:

Increase collaborative partnerships to address land-based and marine-based pollution in order to protect and enhance water quality that contributes to sustaining a healthy and fully functioning coral reef ecosystem in the sanctuary.

Activity	Output	Outcome
Enhance Collaboration		
WQ-1.1. Develop a memorandum of agreement (MOA) with State of Hawai‘i Department of Health, and other agencies and partners as appropriate, to strengthen cooperation in watershed and water quality management that ultimately impacts coral reef ecosystems in the sanctuary.	Memorandum of agreement with State of Hawai‘i Department of Health.	Increased coordination across various organizations resulting in more effective water quality management and higher levels of compliance with State of Hawaii water quality standards.
WQ-1.2. Work with the State of Hawai‘i Department of Health to provide support for assessing compliance with *State Water Quality Standards* through cooperative programs (i.e., citizen scientist water quality monitoring programs).	Integrated approach to monitoring, evaluating compliance and protecting water quality.	
WQ-1.3. Coordinate with relevant county, state, and federal agencies to develop a response plan to assess, review and respond to sources of impacts in a timely manner whose origins maybe outside the sanctuary (i.e., point source pollution) that may impact water quality within the sanctuary.	Coordinated effort to develop a plan to response to incidence or catastrophic events that contribute to water quality in the sanctuary.	

Objective WQ-2:

Develop water quality research and monitoring partnerships to identify priority areas for improved water quality management by the sanctuary.

Activity	Output	Outcome
Gather Information		
WQ-2.1. Engage experts to identify existing water quality-related research and monitoring programs to identify water quality monitoring gaps, and priority areas and hot spots for developing new water quality monitoring programs in sanctuary waters.	Inventory of water quality programs, research gaps priority areas for new monitoring programs.	Increased understanding of research and management needs and gaps to improve water quality in the sanctuary.
WQ-2.2. Identify appropriate roles and priority needs and programs for citizen-science water quality monitoring in collaboration with agency partners and sanctuary volunteers.	Citizen-science monitoring program development to assess water quality providing useful data that are integrated into agency efforts.	Multi-stakeholder partnerships to fill research and monitoring gaps and raise awareness about water quality protection issues.
WQ-2.3. Collaborate with fishpond caretakers and cultural practitioners to support water quality monitoring in traditional Hawaiian fishponds within or adjacent to the sanctuary.	Water quality monitoring data collected within Hawaiian fishponds to understand change and trends over time.	Increased understanding and abilitiy to respond to impacts to water quality in fishponds.
WQ-2.4. Assess the feasibility of incorporating pump-out stations at other small boat harbors adjacent to the sanctuary as a way to reduce direct vessel discharge into sanctuary waters.	Interagency workshop to assess location and feasibility of pump-out station plans for harbors in the sanctuary.	Additional pump-out stations.

Objective WQ-3:

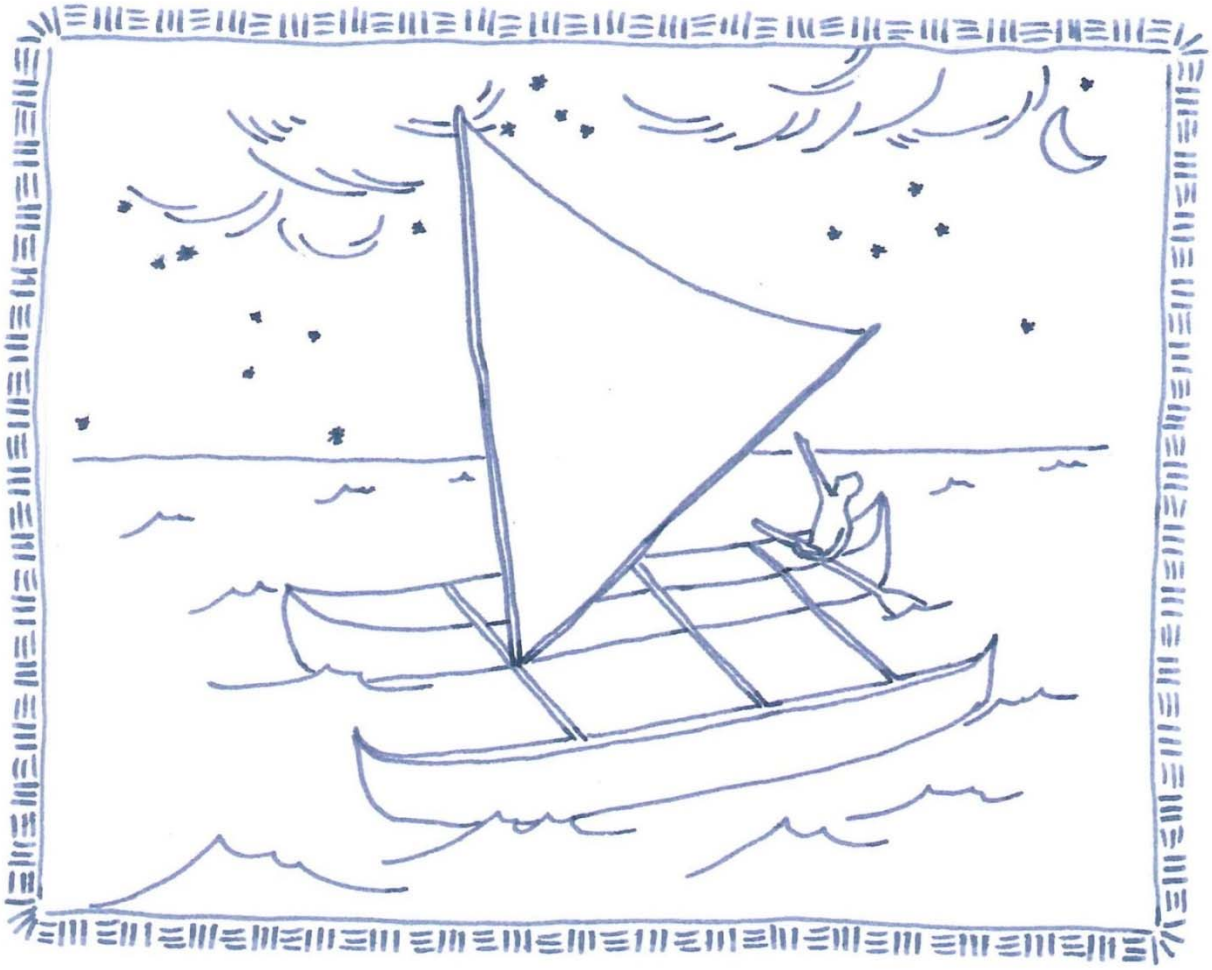
Expand sanctuary education and outreach to build better awareness about, and engagement in, collectively addressing and contributing to high water quality standards in the sanctuary.

Activity	Output	Outcome
Improve Communication		
WQ-3.1. Develop outreach materials and programs for residents, volunteers, visitors, and decision-makers on human use threats to water quality, and best practices to reduce those threats.	Water quality-related outreach materials and programs.	Influence behavior resulting in responsible water quality practices.
WQ-3.2. Educate recreational and commercial vessel operators about best management practices in regards to vessel discharge (e.g., bilge and human waste) as well as disposal of solid waste in order to improve water quality in the sanctuary.	Outreach materials and programs for commercial and recreational vessel operators on best management practices.	Vessel operators knowledgeable and implementing best management practices to reduce impacts on water quality.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Water Quality Protection	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	WQ-1.1. Develop a memorandum of agreement (MOA) with State of Hawai‘i Department of Health, and other agencies and partners as appropriate, to strengthen cooperation in watershed and water quality management that ultimately impacts coral reef ecosystems in the sanctuary.	Within 3 years, a formalized, cooperative partnership has been established with the State of Hawaii to address watershed and water quality impacts on coral reef ecosystems in the sanctuary.
		WQ-2.2. Identify appropriate roles and priority needs and programs for citizen-science water quality monitoring in collaboration with agency partners and sanctuary volunteers.	Within 5 years, one citizen-science program for monitoring water quality has been established on each island with a sanctuary presence.
		WQ-3.2. Educate recreational and commercial vessel operators about best management practices in regards to vessel discharge (e.g., bilge and human waste) as well as disposal of solid waste in order to improve water quality in the sanctuary.	Within 2 years, two trainings have been developed and conducted, one on O‘ahu and one on Maui, to educate vessel operators about sewage and solid waste disposal options.

10.2. Perpetuating Cultural Heritage



The *Perpetuating Cultural Heritage* thematic area describes the actions that the sanctuary will take to integrate cultural and maritime heritage resource conservation into sanctuary planning efforts. Cultural and maritime heritage preservation has special importance in Hawai‘i, where the indigenous host culture exists side-by-side with modernization, globalization and cultural diversification. Hawai‘i reflects strong local traditions, multicultural connections and major historic events, which have shaped the region. These resources, including cultural, historical and archaeological properties, and cultural landscapes all represent the physical legacy of this complex heritage.

The Hawai‘i State Constitution (Article XII, Section 7) protects indigenous and cultural gathering rights as a specific classification of rights in regards to coastal access and resources granted to Native Hawaiians. The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural, and religious purposes and possessed by ahupua‘a tenants who are descendants of Native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

The existing state and federal preservation laws intended to protect cultural, archaeological, and historical resources (the most relevant being Hawai`i Revised Statute Chapter 6-E, National Historic Preservation Act, Abandoned Shipwreck Act, and the Sunken Military Craft Act) are generally unfamiliar to the public and seldom followed. Multiple examples of illegal damage and removal of publicly-owned historic properties from sanctuary waters have been recorded. No federal or state agency has single-handedly addressed maritime cultural landscapes for the main Hawaiian Islands. The sanctuary aims to support existing state and federal preservation laws and seeks a better way of cooperating with communities to protect and preserve cultural and maritime heritage resources, as well as marine stewardship and preserving human ties to the marine environment.

The two action plans in the *Perpetuating Cultural Heritage* thematic area are Living and *Evolving Cultural Traditions* (CT) and *Maritime Heritage* (MH). These action plans describe how the sanctuary seeks to identify and effectively preserve cultural and historical traditions, knowledge, and resources. The *Living and Evolving Cultural Traditions* action plan promotes the understanding of both historical and contemporary local knowledge about marine environments, and perpetuates the use of customary environmental practices and principles within the sanctuary. Similarly, the *Maritime Heritage* action plan describes activities to identify maritime heritage resources in Hawai‘i in order to effectively preserve these resources for the benefit of current and future generations

Perpetuating Cultural Heritage

10.2.1. Living and Evolving Cultural Traditions

I ulu no ka lālā i ke kumu.

The branches grow because of the trunk.

Without our ancestors we would not be here.

Desired Outcome

Hoʻohawaiʻi: foster the uniqueness of Hawaiʻi through the understanding of both historical and contemporary local knowledge about coastal and marine environments, and the perpetuation of customary environmental practices and principles within the sanctuary.

Overview

The sanctuary's commitment to ecosystem-based management provides an opportunity to integrate customary knowledge and practices along with contemporary science to inform management. In order to effectively manage the biocultural resources in Hawaiʻi, it is important to include cultural perspectives and place-based information and solutions that uniquely reflect each island and community. This approach embodies Hawaiian values that connect people to the environment, and these values ultimately inform and direct appropriate environmental management practices.

The sanctuary staff has unique relationships with communities and Native Hawaiian practitioners. These relationships are developed through a strong network of partners including the community-based sanctuary advisory council, and extensive public participation in education and outreach venues on different islands. The sanctuary learns from organizations and entities that are committed to perpetuating cultural heritage, and aligns sanctuary programs appropriately. Ultimately, the sanctuary will strive to serve as a coordinated link between communities and agencies, and create opportunities to integrate place-based knowledge into all aspects of marine resource management.

To implement the activities in this action plan, the sanctuary will continue to coordinate and formalize partnerships with the Office of Hawaiian Affairs (OHA), the State Aha Moku committee, and the Native Hawaiian Civic Club Association. Sanctuary staff will develop programs and management approaches to ensure these traditional cultural practices are maintained for future generations. Cultural practices, both as resource management techniques and spiritual acts, are critical to cultural heritage because they keep history and moʻokūʻauhau (genealogy) alive. They describe the people of a place as well as the environments in which these practices were developed. Sanctuary management aims to honor these values and practices because they collectively provide a foundation for the cultural heritage of Hawaiʻi.

The *Living and Evolving Cultural Traditions Action Plan* proposes activities to understand and perpetuate both current and traditional Hawaiian cultural practices and knowledge in the management of the sanctuary. Sanctuary staff will improve their understanding of placed-based knowledge and cultural practices, especially as they relate to traditional resource management in the sanctuary. The sanctuary will incorporate these traditional perspectives into current sanctuary management to more effectively protect the specific biocultural resources around the Hawaiian Islands. To promote the incorporation of traditional Hawaiian perspectives in general ocean use and resource management, the sanctuary will facilitate the communication of Hawaiian cultural heritage, including surfing, voyaging and ahupua‘a management. To implement the activities in this action plan, the sanctuary will continue to coordinate and formalize partnerships with the Office of Hawaiian Affairs (OHA), the State Aha Moku committee, and the Native Hawaiian Civic Club Association.

Related Goals

Goal 2
Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 3
Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.

Goal 4
Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective CT-1:

Understand traditional Hawaiian cultural perspectives as related to the natural environment and customary environmental management practices.

Activity		Output	Outcome
Gather Information			
CT-1.1.	Partner with Hawaiian organizations and academia to build an understanding of different place-based cultural perspectives on and relationships with natural resources.	Network of knowledge sources that functions as a learning exchange.	Increased understanding of placed-based knowledge and traditional resource management approaches.
CT-1.2.	Collaborate with appropriate entities to assess existing information and ongoing research on biocultural resources and customary natural resource management practices in Hawai'i.	Literature review and database of existing studies.	
CT-1.3.	Partner to identify and support current community efforts to capture and apply place-based knowledge to more effectively manage resources within the sanctuary.	Documentation of place-based knowledge.	
Enhance Collaboration			
CT-1.4.	Conduct workshops to facilitate communication and direct interaction between diverse groups of academia and agencies, including traditional and Western science.	Workshops or other informal meeting opportunities.	Traditional and science-informed management approaches strengthened through collaborations with local experts.
CT-1.5.	Involve practitioners and researchers from diverse backgrounds to inform data collection and management solutions for sanctuary projects.	A database to access cultural knowledge.	
Build Capacity			
CT-1.6.	Continue language training for staff to ensure correct pronunciation and increased understanding of 'ōlelo Hawai'i (Hawaiian language).	'Ōlelo Hawai'i training incorporated into staff development.	Sanctuary staff are more competent and able to perpetuate 'ōlelo Hawai'i pronunciation and understanding, as well as more familiar with cultural practices.
CT-1.7.	Provide opportunities for staff to participate in cultural experiences as related to coastal and marine environments of the sanctuary.	Staff participation in cultural experiences, including service projects.	

Objective CT-2:

Incorporate traditional Hawaiian management practices into sanctuary resource management approaches to ensure place-based management efforts are more relevant to each specific biocultural setting around the Hawaiian Islands.

Activity		Output	Outcome
Place-Based Planning			
CT-2.1.	Coordinate and facilitate the development of a replicable and adaptable model for place-based community planning efforts that make use of traditional Hawaiian management practices and science-based management.	Place-based community planning, including data products and spatial management plans.	Management initiatives to address impacts to the marine environment that are place-based and informed by culturally appropriate information and management approaches.
CT-2.2.	Develop partnerships with discrete communities and learning institutions to identify coastal and near shore areas to conduct, evaluate and document field-based learning experiences based on traditional ecological management approaches.	Selection of field-based learning sites (e.g., Pila'a) to partner with communities on learning institutions on different traditional management approaches to ecosystem management.	
CT-2.3.	Identify community facilitators who can effectively understand, communicate, and incorporate local knowledge, and engage in place-based planning processes.	Network of local facilitators who are engaged with sanctuary projects.	
Assess Resources			
CT-2.4.	Coordinate to inventory cultural places (e.g., Hawaiian fishponds) and traditional location names.	Spatial database of cultural places emphasizing practitioner involvement and capacity building.	Increased community involvement in the identification, assessment, and monitoring of cultural resources resulting in increased recognition and protection of these resources and places.
CT-2.5.	Coordinate with partners to assess and document coastal and freshwater springs, estuaries, sea caves, and anchialine ponds within or adjacent to the sanctuary, recognizing their significance as wahi pana and sites of cultural practice.	Spatial database for shoreline places.	
CT-2.6.	Coordinate with partners to create a spatial database of historical and biocultural shoreline resources within the sanctuary (e.g., opihi and limu) recognizing their significance for traditional gathering practices and supporting subsistence lifestyles.	Spatial database for shoreline biocultural resources.	

Activity	Output	Outcome
Place-Based Planning		
CT-2.7. Coordinate with partners (i.e., voyaging organizations) to describe the navigational seascape across the populated Hawaiian Islands.	Spatial database initiated on traditional sea routes (e.g., navigational heiau, land-based guides).	Increased understanding of navigational seascapes as an important part of Native Hawaiian heritage.
CT-2.8. Integrate cultural resources into the sanctuary science plan so that the relevance to cultural heritage is optimized (i.e., include significant resources in research efforts) and impacts are minimized (e.g., from monitoring activities).	Research plan reviewed by the Native Hawaiian subcommittee of the sanctuary advisory council, and additional subject matter experts.	Cultural resources integrated into sanctuary planning.
CT-2.9. Explore the feasibility of aligning sanctuary boundaries with traditional Hawaiian ahupua'a boundaries on all islands.	Sanctuary boundaries aligned with ahupua'a boundaries as appropriate.	Integration of traditional management boundaries into sanctuary boundaries.

Objective CT-3:

Facilitate the communication of cultural perspectives on the interconnectedness between traditional Hawaiian practices and natural resource management.

Activity		Output	Outcome
Build Capacity			
CT-3.1.	Partner with Native Hawaiian practitioners to broadly disseminate guidance on cultural heritage and traditional resource management to partner agencies.	Outreach materials and trainings on integrating cultural heritage into management (e.g., *Aloha ʻĀina Guidance Document*).	Coordination with partner agencies to comprehensively integrate place-based cultural perspectives and practices into resource management.
CT-3.2.	Communicate about current sanctuary projects, processes and lessons learned with NOAA staff to support sanctuary-wide initiatives on integrating traditional place-based management approaches (e.g., ONMS maritime cultural landscape approach).	Information sharing for NOAA staff (e.g., webinars).	
CT-3.3.	Communicate about current sanctuary projects, processes and lessons learned with agencies and partners throughout Hawaiʻi, to provide updates and highlight potential collaborations with other place-based projects.	Regular information exchanges with agencies and partners throughout Hawaiʻi.	
Improve Communication			
CT-3.4.	Perpetuate the importance of integrated land and marine resource management in the sanctuary by highlighting the traditional ahupuaʻa management approach.	Disseminate outreach materials including information about traditional ahupuaʻa management.	Heightened understanding of cultural management of natural resources.
CT-3.5.	Perpetuate broad understanding of surfing as a thriving aspect of cultural heritage focusing on the State of Hawaiʻi Surf Reserve on the north shore of Oʻahu for the general public.	Signage, outreach and increased presence at surf locations.	Hawaiian marine cultural heritage perpetuated.
CT-3.6.	Work with partner organizations to increase efforts to perpetuate broad understanding of the Hokulea's World Wide Voyage as a thriving aspect of cultural heritage in Hawaiʻi for the general public.	Executing the ONMS workplan to support Hokulea's World Wide Voyage.	

Activity		Output	Outcome
Best Management Practices			
CT-3.7.	Identify and incorporate existing protocols for managing sensitive cultural information, including guidelines established by the National Historic Preservation Act (Section 304), and other relevant resources, into considerations for managing sanctuary resources.	Compilation of and adherence to existing protocols and guidelines.	Improved treatment of sensitive cultural information by the sanctuary and other management agencies.
CT-3.8.	Gather input from the Native Hawaiian subcommittee of the sanctuary advisory council (SAC) and other sources to inform Best Management Practices (BMP) for the use of sensitive knowledge about traditional practices and places.	Gatherings and workshops to establish best management practices standards for use in sanctuary management.	
CT-3.9.	Broadly disseminate guidance and best management practices to agencies and other interested stakeholders regarding the handling and use of sensitive cultural information.	Best management practices handbook and trainings for sensitive information use.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Living and Evolving Cultural Traditions	(3) Enhance nation-wide public awareness, understanding, and appreciation of marine and Great Lakes ecosystems and maritime heritage resources through outreach, education, and interpretation efforts.	CT1.4. Conduct workshops to facilitate communication and direct interaction between diverse groups of academia and agencies, including traditional and Western science.	Within 2 years, two workshops have been held on traditional Hawaiian cultural perspectives and natural resource management.
		CT-2.6. Coordinate with partners to create a spatial database of historical and biocultural shoreline resources within the sanctuary (e.g., opihi and limu) recognizing their significance for traditional gathering practices and supporting subsistence lifestyles.	Within 4 years, an inventory has been compiled of historical and cultural shoreline resources within the sanctuary.
		CT-3.9. Broadly disseminate guidance and best management practices to agencies and other interested stakeholders regarding the handling and use of sensitive cultural information.	Within 5 years, a best management practices guidebook has been developed for the handling and transfer of cultural information, and distributed to partner agencies.

10.2.2. Maritime Heritage

Ka ulu lāʻau ma kai.

The forest on the seaward side.

Refers to the masts of the ships that came into the harbors of Lahaina or Honolulu.

Desired Outcome

NOAA, the State of Hawai'i, partner agencies, businesses and local communities are engaged in the identification and appreciation of maritime heritage resources in Hawai‘i to effectively preserve these resources for the benefit of current and future generations.

Overview

Maritime heritage resources include a diversity of cultural, historical, and archaeological assets. To interpret the maritime heritage resources where actual physical elements exist, maritime cultural landscapes are used as the interpretive framework through which we understand the cultural significance of marine areas within a broader context. The people of Hawai‘i have a very intimate connection to the sea. Communities have been formed and been shaped by their marine environment. This close connection has left behind a variety of properties and important locations such as coastal trails, plantation landings, inter-island steamships and many of the historic and cultural resources in Hawai‘i. Major events like World War II left behind naval shipwrecks and submerged aircraft. These cultural resources, both pre and post-western contact, comprise a unique record of the past and reflect the human role in the marine ecosystem. Many resources continue to be significant to Hawaiian cultural practitioners today and are often valued by both commercial and non-commercial ocean users, including divers and fishermen.

In the past, consideration of these maritime heritage resources has usually been on an individual site-by-site basis. Management agencies are now engaging in a more holistic and comprehensive appreciation of their significance, seeing these individual sites in the context of larger cultural landscapes. For instance, there may be Native Hawaiian navigation landscapes, cultural access and gathering landscapes, and aquaculture landscapes. There may also be historic period whaling landscapes, naval World War II landscapes, marine transportation landscapes, and ocean recreation landscapes to be considered. Maritime heritage resources associated with these themes contribute to our understanding of cultural landscapes and the value of the marine environment. However, the educational and socio-economic potential for these resources has not been realized. The existing state and federal preservation laws intended to protect such sites (the most relevant being Hawai‘i Revised Statutes Chapter 6E, National Historic Preservation Act (NHPA), Abandoned Shipwreck Act, and the Sunken Military Craft Act) are generally unfamiliar to the public and may or may not be complied with. The protection of historical, cultural, and archaeological resources is an important part of the National Marine Sanctuaries Act (NMSA). Today the sanctuary supports existing state and federal preservation laws and seeks a better way of cooperating with communities in marine stewardship and preserving our many human ties to the marine environment.

The *Maritime Heritage Action Plan* outlines how the sanctuary seeks to characterize and preserve maritime heritage resources within sanctuary waters. Sanctuary staff plan to coordinate with local experts to create a maritime heritage resource inventory to inform priority management areas. The sanctuary will collaborate to monitor and assess these maritime heritage resources to determine change over time. The sanctuary will seek to increase awareness about these critical resources by targeting education at youth groups, university students, and ocean users (i.e. recreational divers). Staff will also continue to host trainings and workshops for ocean managers to enhance their knowledge of maritime heritage resources and related laws.

Related Goals

Goal 1

Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 4

Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Goal 6

Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective MH-1:

Characterize maritime heritage resources found in sanctuary waters.

Activity	Output	Outcome
Gather Information		
MH-1.1. Gather maritime heritage resource information related to cultural landscapes of Hawai‘i, both pre- and post-western contact.	Inventory of maritime heritage resources (e.g., articles, publications, and manuscripts).	A more diverse inventory of maritime heritage resources for potential management actions.
MH-1.2. Characterize cultural resources within the sanctuary using available data including National Register of Historic Places (NRHP) criteria, *Aloha ‘Āina Guidance Document*, and community input.	Report characterizing maritime heritage resources within the sanctuary.	
MH-1.3. Create GIS-based maritime heritage resource inventory tool suitable for sanctuary planning, and formulate agreement to share data with appropriate agencies.	Maritime heritage resource inventory tool.	
Assess Resources		
MH-1.4. Conduct or facilitate remote sensing surveys to locate potential maritime heritage resource sites within sanctuary waters.	Data collected by magnetometer, ROV, and side scan sonar.	A more comprehensive understanding of maritime heritage resources in the sanctuary through assessments.
MH-1.5. Conduct or facilitate initial diving resource assessments to characterize and prioritize new maritime heritage discoveries.	Photographs, measured sketches, and diver site data.	
MH-1.6. Establish sustainable, periodic maritime heritage resource monitoring program for measuring impacts at selected locations in the sanctuary.	Multi-island dive and assessment program.	
MH-1.7. Continue to facilitate archaeological and cross-disciplinary site investigations of selected locations within the sanctuary in collaboration university and agency partners.	Site archaeological survey data in conformance with state and federal guidelines.	
MH-1.8. Work with the State Historic Preservation Division to nominate appropriate resource sites and districts within or adjacent to sanctuary waters to the state and national registers of historic places.	NRHP and HRHP nomination applications.	Increased recognition of historic places within the sanctuary.

Objective MH-2:

Raise awareness and appreciation for the significance of maritime heritage resources within and adjacent to sanctuary waters.

Activity	Output	Outcome
Improve Communication		
MH-2.1. Create and disseminate specific maritime heritage outreach materials to the general public featuring maritime heritage resources and resource preservation.	Outreach materials (e.g., websites and brochures).	Increased appreciation for the maritime heritage of the Hawaiian Islands through sanctuary outreach efforts.
MH-2.2. Engage schools and youth groups in maritime heritage outreach opportunities including presentations, waterfront and ship visits, and diving tours of near shore heritage sites.	Increased engagement opportunities for students.	
MH-2.3. Assess the statewide contribution of maritime heritage diving sites and maritime heritage messaging to the recreational diving industry.	An assessment of the value of maritime heritage sites.	
MH-2.4. Educate the sport diving community on diving protocols for selected (non-sensitive) public-access sites and engage them in resource preservation and monitoring.	Engagement of sport diving community.	Increased engagement with the dive industry, including voluntary compliance.
MH-2.5. Promote pilot shipwreck trail project by engaging local dive shops.	Successful implementation of shipwreck trail.	
Build Capacity		
MH-2.6. Establish and lead Nautical Archaeology Society (NAS) courses for public sport divers.	NAS courses hosted.	Increased maritime heritage educational opportunities.
MH-2.7. Support initiatives to increase the capacity of UH science divers in maritime archeology in collaboration with UH Marine Option Program (MOP).	Contribution to Maritime Archaeology Survey Techniques (MAST) course, the annual maritime heritage symposium, and MOP.	
MH-2.8. Facilitate Heritage Awareness Diving seminars (HADS) for dive shops and dive industry operators.	Dive trainers and shop staff introduced to heritage preservation benefits and protocols.	Increased appreciation and understanding of maritime heritage.
MH-2.9. Engage existing university and community college academic departments (e.g., anthropology, archaeology, and history) in maritime heritage resource survey and preservation.	Academic programs introduced to opportunities in the maritime heritage field.	

Objective MH-3:

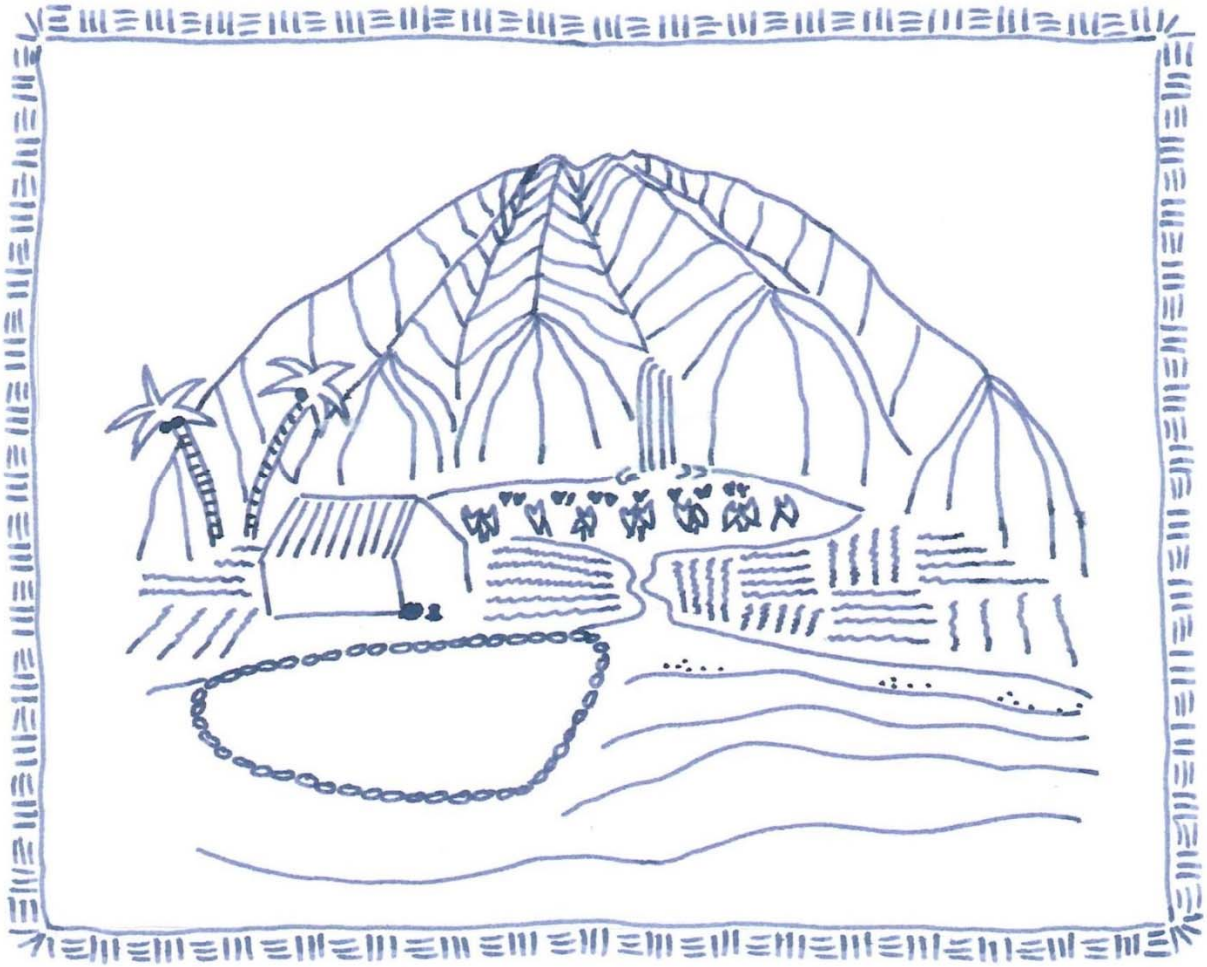
Preserve and protect for future generations the maritime heritage resources found within sanctuary waters.

Activity	Output	Outcome
Enhance Collaboration		
MH-3.1. Facilitate a regular maritime heritage resource protection inter-agency workshop to enhance awareness about the value and legal status of maritime heritage resources and increase the capacity of partner agencies.	Regular inter-agency workshops on maritime heritage resources.	More effective and efficient preservation and protection of maritime heritage resources.
MH-3.2. Facilitate a local training program for law enforcement personnel to enhance their knowledge of maritime heritage resources and related laws.	Maritime heritage enforcement training.	
MH-3.3. Establish an agreement between Office of National Marine Sanctuary (ONMS) and the State of Hawai‘i for more efficient management of maritime heritage resources within the sanctuary, including data development and sharing agreements as well as survey and inventory activities.	Agreement between ONMS and the State of Hawai‘i for increased cooperation and coordination.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Maritime Heritage	(3) Enhance nation-wide public awareness, understanding, and appreciation of marine and Great Lakes ecosystems and maritime heritage resources through outreach, education, and interpretation efforts.	MH-1.3. Create GIS-based maritime heritage resource inventory tool suitable for sanctuary planning, and formulate agreement to share data with appropriate agencies.	Within 3 years, a GIS-based inventory tool has been developed and populated with heritage resource data from archives and fieldwork.
		MH-1.5. Promote pilot shipwreck trail project by engaging local dive shops.	Within 2 years,the sanctuary has developed a partnership with at least three Maui dive shops to develop, desgin and start to implement the heritage trail concept.
		MH-3.1. Facilitate a regular maritime heritage resource protection inter-agency workshop to enhance awareness about the value and legal status of maritime heritage resources and increase the capacity of partner agencies.	Every 2 years, one interagency maritime heritage resource preservation workshop has been held to increase the information exchange and improve management approaches for protection of maritime heritage resources.
		MH-3.2. Facilitate a local training program for law enforcement personnel to enhance their knowledge of maritime heritage resources and related laws.	Every 5 years, one maritime heritage resource protection enforcement training workshop has been facilitated by sanctuary staff.

10.3. Transitioning Towards Sustainability

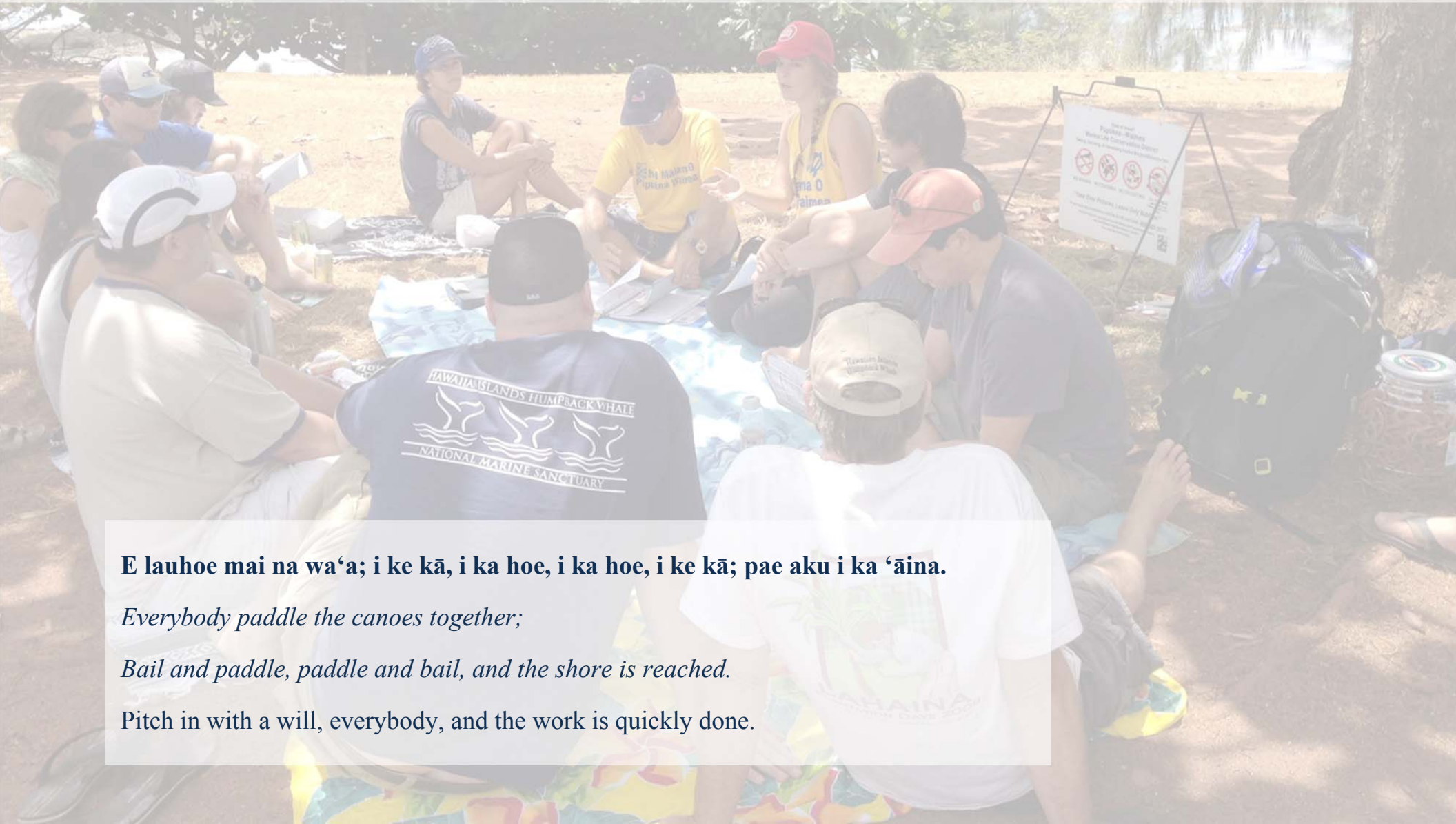


The *Transitioning Towards Sustainability* thematic area describes how the sanctuary plans to engage with stakeholders and communities to achieve mutually beneficial outcomes. Oceans are integral to the lives, lifestyles, and livelihoods of the people of Hawai‘i. The social climate in Hawaii is changing, leading to expanding interest and actions by stakeholders and community members to become actively involved in understanding, caring for, restoring, and stewarding coastal areas. As a place-based management agency, the sanctuary program strives to be integrated into the communities that are adjacent to the sanctuary boundaries and whose waters are part of these communities. The sanctuary program can be a partner with businesses and communities to effectuate change toward a collective vision for the future.

The State of Hawai‘i defines sustainability as a Hawai‘i that respects the culture, character, beauty and history of the state’s island communities, strikes a balance among economic, social and community, and environmental priorities, and meets the needs of the present without compromising the ability of future generations to meet their own needs (Hawai‘i 2050 Sustainability Plan, 2008). In 2005, the state began a two-year effort to develop the *Hawai‘i 2050 Sustainability Plan*, a statewide initiative to address natural resource use, population change, economic development, water and social issues. The plan seeks to ensure that natural resources are responsibly and respectfully used, replenished and preserved for future generations, and island cultures and values are thriving and perpetuated. The *Hawai`i Green Growth Initiative* is a group of Hawai‘i leaders working together across government, business, academia and civil society to achieve targets in energy, food and ecosystem security for a sustainable, resilient and prosperous future in the Hawaiian Islands.

The four action plans in the *Transitioning Towards Sustainability* thematic area are *Community Partnerships* (CP), *Ocean Literacy* (OL), *Sustainable Use* (SU), and *Ecosystem Benefits and Values* (BV). All of the action plans describe how the sanctuary seeks to engage the public to promote responsible stewardship of the marine environment. The *Community Partnerships* action plan specifically outlines opportunities for stakeholders and communities to engage in sanctuary programs through the statewide volunteer program, the community-based sanctuary advisory council, and various natural and cultural resource management initiatives. The *Ocean Literacy* action plan describes how the sanctuary is going to integrate ecosystem-based management into an already thriving and successful education and outreach program to promote and enhance ocean stewardship. The *Sustainable Use* action plan describes how the sanctuary will collaborate with local businesses and tour operators in Hawai‘i to specifically promote the sustainable use of the marine environment. And finally, the *Ecosystem Benefits and Values* describes how the sanctuary will assess the economic, socio-cultural, and ecological benefits provided by marine resources, and integrate that information into management planning and education programs.

10.3.1. Community Partnerships



E lauhoe mai na waʻa; i ke kā, i ka hoe, i ka hoe, i ke kā; pae aku i ka ʻāina.

Everybody paddle the canoes together;

Bail and paddle, paddle and bail, and the shore is reached.

Pitch in with a will, everybody, and the work is quickly done.

Desired Outcome

Informed and empowered human communities that are actively engaged in dialogues and initiatives to facilitate an integrated management approach that perpetuates a healthy co-existence between humans and the marine environment.

Overview

The transition of the sanctuary from a single-species focus to an ecosystem-based management approach presents a tremendous opportunity for a higher level of community engagement and an added responsibility to reach out to a more diverse set of stakeholders. An ecosystem-based management approach allows for enhanced agency-community partnerships to address broader marine resource issues, and to work together in areas of mutual concern. This increased potential for enhanced collaboration can build local community capacity to effectively address areas of common interest. The sanctuary recognizes that each community and island is unique, where no single approach fits all, calling for the need for flexibility, transparency, open engagement, and ground-up collaboration. Community partnerships promote collaboration between sanctuary staff and the community to exchange and increase knowledge in a manner that is reciprocal and mutually beneficial. In addition, the sanctuary will engage in a participatory approach for community-based management that integrates traditional and western management perspectives.

Coastal communities around the state are increasingly recognizing the value of collaborating with local organizations and state and federal agencies, to become more engaged stewards of their environment. The sanctuary can build upon its 20-year history of successful community involvement and partnerships to complement and support community efforts in order to attain shared visions and goals. As a place-based program with resident staff on the islands of Hawaiʻi, Maui, Oʻahu, and Kauaʻi, the sanctuary has established strong relationships on each island that will continue to be strengthened. Additionally, the community-based sanctuary advisory council will continue to play an instrumental role in facilitating the dialogue between sanctuary staff, communities and ocean use stakeholder groups. Sanctuary staff will continue to foster active volunteers to become committed ocean stewards, who are an indispensable resource to the sanctuary, while promoting a reciprocal learning experience. Additionally, the sanctuary will collaborate with communities by providing training to increase their knowledge and understanding of sanctuary resources, and facilitate coordination and communication with federal and state agencies.

The *Community Partnerships Action Plan* describes the different ways that the sanctuary will engage communities and stakeholders in Hawai‘i. The sanctuary plans to work directly with communities located adjacent to the sanctuary to target programs and specific initiatives to meet community needs and build replicable models of community-based ecosystem management. The sanctuary will continue to provide resources, such as moon and tide calendars, and support opportunities for traditional learning exchange. Volunteer programs will continue to be critical to sanctuary management and sanctuary staff will continue to identify and coordinate new and innovative opportunities to engage volunteers, as well as recognize their commitment to sanctuary programs. The community-based Sanctuary Advisory Council will continue to provide recommendations to sanctuary management on cultural and marine resource protection issues. Sanctuary staff will help facilitate council operations and working groups and provide avenues for council members to provide advice.

Related Goals

Goal 3

Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.

Goal 4

Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Goal 6

Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective CP-1:

Work collaboratively with communities on implementing both traditional and science-based management approaches to enhance learning and stewardship opportunities and increase protection of resources within the sanctuary.

Activity		Output	Outcome
Enhance Collaboration			
CP-1.1.	Collaborate with targeted individual communities to determine how sanctuary programs can support site-specific community-based initiatives, processes and approaches to natural resource management.	Framework for the sanctuary to support site-specific community plans.	Increased capacity for effective community engagement in management of marine and cultural resources within the sanctuary.
CP-1.2.	Continue to build replicable planning models of community-based ecosystem management that use both traditional Hawaiian practices along with science-informed western management approaches.	Management processes and models to be adopted by and adapted to other communities beyond the initial pilot project.	
Build Capacity			
CP-1.3.	Provide support to build the capacity of communities to engage in effective management of marine and cultural resources within the sanctuary.	Trainings, workshops or other forums to effectively build the skills and knowledge capacity of local communities to engage in cooperative management processes.	Increased capacity for effective community engagement in marine resource management.
Reciprocal Learning			
CP-1.4.	Assist communities in creating place-based moon and tide calendars, seasonal calendars, and other products to better understand reproductive and life history cycles of fisheries resources and to inform management and best practices.	Creation of calendars and other products as a management tool.	Enhanced community capacity resulting from shared lessons learned about ecosystem-based management and other best practices.
CP-1.5.	Develop learning exchange opportunities between Hawaiian island communities and the greater Pacific islands communities to foster a greater understanding of place-based and traditional management approaches.	Development of resource tools and opportunities for sharing lessons learned and best management practices applied in islands nations.	

Objective CP-2:

Increase engagement of communities in stewardship opportunities and active participation in sanctuary management by enhancing and expanding the sanctuary's volunteer program.

Activity		Output	Outcome
Build Capacity			
CP-2.1.	Develop and implement an incremental program for recruitment and training of new volunteers on each of the islands, including a retention plan for maintaining an informed and committed volunteer base.	Program development and implementation resulting in increased number of trained volunteers.	Expanded volunteer base to support effective sanctuary management.
CP-2.2.	Acknowledge volunteer time, skills, accomplishments, and dedication to the sanctuary through a regular and on-going volunteer recognition program.	Enhanced volunteer recognition program including awards and appreciation events.	Long-term retention of experienced volunteers and ocean stewards to support sanctuary initiatives.
CP-2.3.	Provide continuing education and training opportunities and materials for volunteers on current issues and approaches to ecosystem-based management, to further their engagement and expertise, and enhance their interpretative skills.	Well-trained volunteers, presentations, and volunteer information guides.	Provide opportunities to fill sanctuary management gaps by providing volunteers with additional opportunities for engagement in effective management of marine and cultural resources within and around the sanctuary.
CP-2.4.	Pursue opportunities for sanctuary volunteers to participate in activities collaborating within as well as with partner organizations and community-based projects.	Expanded list and position development of volunteer opportunities by the sanctuary and partner organizations and agencies.	
CP-2.5.	Develop "train the trainer" programs to engage sanctuary volunteers to become leaders of stewardship activities, and train and take leadership responsibilities over other volunteers.	Trained volunteers to lead projects to increase volunteer engagement.	

Objective CP-3:

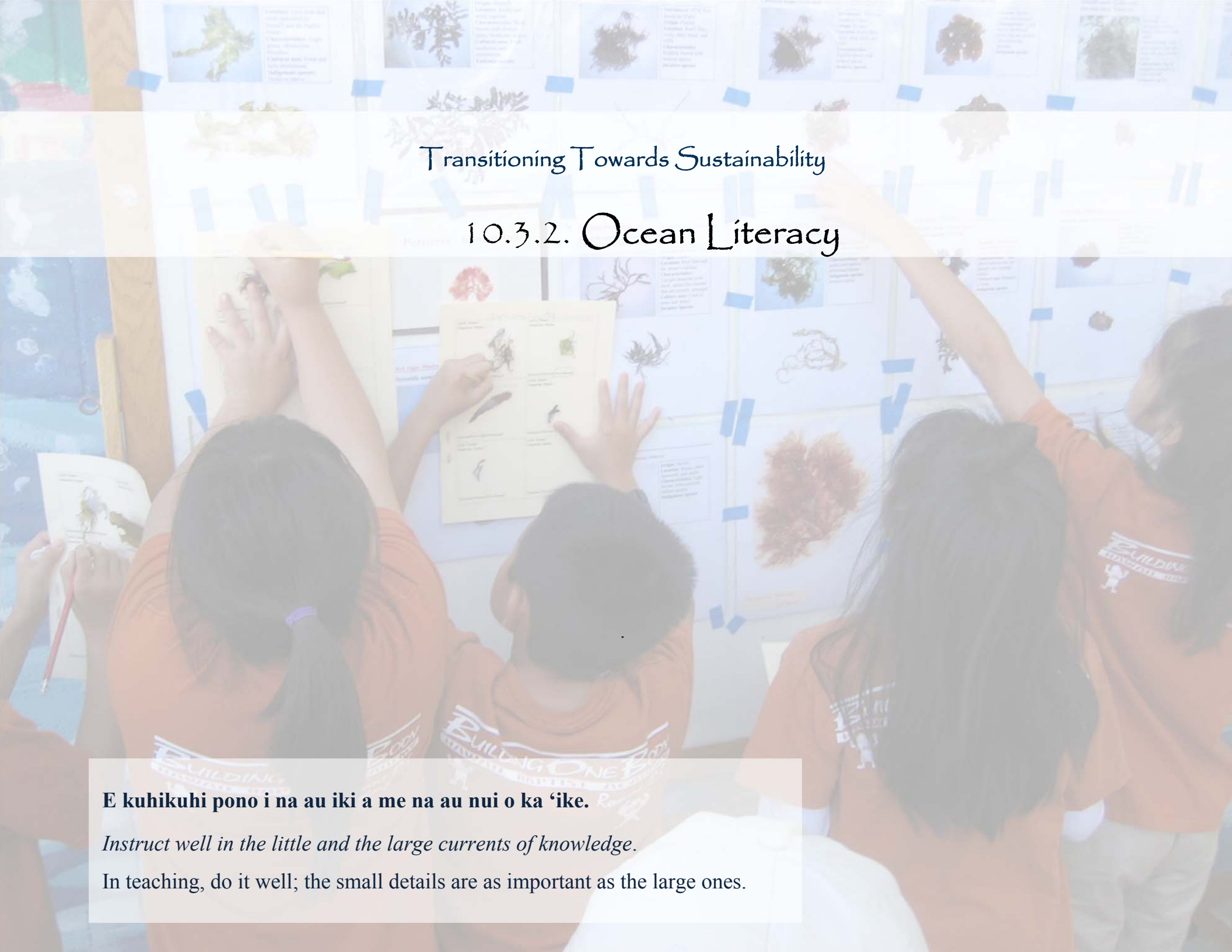
Facilitate dialogue with communities and stakeholders through the community-based sanctuary advisory council (SAC) as a platform for staying current with sanctuary activities and issues and making recommendations to sanctuary management that reflect the collective interests of the SAC.

Activity	Output	Outcome
Planning and Organizing		
CP-3.1. Coordinate the sanctuary advisory council operations, including organization of regular meetings.	Operational support to the council.	Well-coordinated, active, and engaged advisory council making recommendations on sanctuary decisions.
CP-3.2. Ensure the sanctuary advisory council has multiple avenues and opportunities to discuss important cultural and marine resource protection issues in the sanctuary.	Operational support of subcommittees and working groups.	
CP-3.3. Periodically review and update *Sanctuary Advisory Council Charter* and assess council membership.	Council membership that ensures appropriate and relevant community and stakeholder representation; reviewed council charter every 5 years	Sanctuary advisory council that embodies relevant representation to address current and emerging sanctuary issues.
Enhance Collaboration		
CP-3.4. Increase coordination efforts between sanctuary, Papahānaumokuākea Marine National Monument (PMNM), and the National Marine Sanctuary of American Samoa (NMSAS) sanctuary advisory councils.	Participation and presentations at meetings leading to enhanced information exchange.	Improved coordination between sanctuary advisory councils in the Pacific Islands Region to become a more functional region.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Community Partnerships	(3) Enhance nation-wide public awareness, understanding, and appreciation of marine and Great Lakes ecosystems and maritime heritage resources through outreach, education, and interpretation efforts.	CP-1.2. Continue to build replicable planning models of community-based ecosystem management that use both traditional Hawaiian practices along with science-informed western management approaches.	Within 2 years, a place-based pilot project in one community located adjacent to the sanctuary has been designed, a partnership established, and the pilot ready for the early stages of implementation.
		CP-2.4. Pursue opportunities for sanctuary volunteers to participate in activities collaborating within as well as with partner organizations and community-based projects.	Within 2 years, three new opportunities for sanctuary volunteers have been identified and articulated on each island with a sanctuary presence.
		CP-3.1. Coordinate the sanctuary advisory council operations, including organization of regular meetings.	Twice a year, the community-based sanctuary advisory council has met.

10.3.2. Ocean Literacy



E kuhikuhi pono i na au iki a me na au nui o ka ‘ike.

Instruct well in the little and the large currents of knowledge.

In teaching, do it well; the small details are as important as the large ones.

Desired Outcome

An ocean literate public with increased awareness, knowledge and appreciation of natural and cultural marine resources in order to promote and enhance ocean stewardship.

Overview

Ocean literacy refers to "the understanding of the ocean's influence on you, and your influence on the ocean" (NOAA NOS 2010). NOAA has collaborated with a consortium of partners in the Ocean Literacy Network to develop a series of ocean literacy essential principals and fundamental concepts to help guide education efforts and bring them in line with the National Science Education Standards. An Environmental Literacy Plan has been developed for the State of Hawaii by the Hawaii Environmental Education Alliance and the sanctuary will seek opportunities to incorporate these efforts in the curriculum of public schools in Hawaii. Effective local ocean literacy encourages public involvement in resource protection, increases knowledge about Hawai'i's marine resources in Hawai'i, creates an informed public, and helps nurture future marine science and resource management professionals.

There are limited opportunities for students to learn about marine science in schools in Hawai'i. As such, the sanctuary offers formal education programs to help teachers integrate marine science lessons into their existing curriculum. Sanctuary staff also provide lectures and classroom visits to further engage students. Outside of the classroom, the sanctuary provides place-based experiences where students can participate in afterschool and summer programs. Older students are also invited to apply for internships to learn more about careers in marine conservation and ocean science.

In addition, outreach to the general public is an important means to provide information about the sanctuary and how to protect and become stewards of natural marine resources. The sanctuary employs a number of methods to reach out to the public, including visitor centers, exhibits, interpretive signage, events, presentations, media outlets, brochures, websites and social media. The transition to ecosystem-based management will broaden the scope of the sanctuary's education and outreach programs. Sanctuary staff will work closely with volunteers, partners, and educators to develop programs that reflect a more holistic approach to management. Reaching out to new user groups and audiences requires establishing new partnerships and collaborations to engage in marine conservation education efforts across the state.

The *Ocean Literacy Action Plan* describes the education, outreach, and communications activities that the sanctuary plans to undertake to increase public awareness about the marine environment and ecosystem-based management. The sanctuary will integrate new key messages about marine ecosystems into existing outreach materials and activities and engage with partners to develop new displays and exhibits for public areas and visitor centers. Improvements to the existing website and increased presence on social media will serve to broaden awareness about the sanctuary. Sanctuary communications will leverage existing media resources and employ innovative media tools, including producing news segments and participating in film festivals, to engage new audiences. Sanctuary staff will continue to provide formal and informal education opportunities to students and teachers, including internship programs for students and a student-based Sanctuary Ocean Count program. The sanctuary will consider opportunities to expand Ocean Awareness Training (OAT) to additional islands and to offer trainings tailored for specific audiences.

Related Goals

Goal 2

Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 6

Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective OL-1:

Target audiences with specific messages to enhance their understanding of ecosystem-based management to change the relationship of users with the sanctuary.

Activity		Output	Outcome
Improve Communication			
OL-1.1.	Develop targeted messages for visitors, ocean users, and local communities about the ecosystem of the sanctuary.	Specific targeted outreach messages to affect behavior.	Expand sanctuary messages to new and broader audiences with timely and relevant information to strengthen their relationship and awareness of the sanctuary.
OL-1.2.	Showcase ecosystem-based management as the centerpiece for new displays and exhibits in order to redefine the sanctuary from managing humpback whales to ecosystem-based management.	Targeted messaging integrated into displays and exhibits at key sanctuary viewing points for visitors, ocean users, and local communities.	
OL-1.3.	Host a dynamic website that is relevant and reliable resource to understand ecosystem-based management.	Updated and dynamic messages available on the sanctuary website.	
OL-1.4.	Create a real-time information exchange about current events in the sanctuary through the use of social media to reach a wider audience on a continuous basis.	Real-time messaging system that keeps people informed about current events.	

Objective OL-2:

Create meaningful and relevant learning and engagement opportunities for a range of individuals to better understand and support management at the sanctuary.

Activity	Output	Outcome
Build Capacity		
OL-2.1. Integrate Hawaii and sanctuary messages into hands on experiential learning, in the classroom and out in the field, for both students and teachers to make the sanctuary relevant to their learning experiences.	Development of ecosystem-based context through place-based activities, experiential learning, training modules, and materials.	Integrate the concept of ecosystem-based management and the role of communities into the educational experience.
OL-2.2. Increase opportunities for teachers to participate in workshops that are geared towards improving and understanding the marine and coastal ecosystem in Hawaii and communicating those messages and learning experiences in the classroom.	Training, workshops, and materials for teachers focusing on increasing ocean literacy.	
OL-2.3. Host interns in the sanctuary office to build future leadership for marine conservation.	Meaningful and relevant career opportunity experiences for students.	Building awareness of academic and career opportunities in the marine science field.
Special Projects		
OL-2.4. Expand and tailor a series of interdisciplinary workshops (*Ocean Awareness Training*) to target audiences such as communities and ocean user groups on all islands with a sanctuary presence.	Development of content for targeted audiences and the implementation of the workshops.	Increase understanding of participants' relationship to the coastal and marine environment and their role in marine conservation.
OL-2.5. Develop a recognized certification program for individuals who complete a series interdisciplinary workshops that signals their level of knowledge about the coastal and marine environment in Hawaii.	The development and marketing of a certification program.	
OL-2.6. Evaluate opportunities to improve the effectiveness of the sanctuary volunteer humpback whale monitoring program (*Sanctuary Ocean Count*) on multiple islands and consider collaborative opportunities to expand to new communities on Molokaʻi, Lānaʻi and Maui.	An improved and more effective *Sanctuary Ocean Count* program.	Broad community engagement in sanctuary monitoring programs to increase awareness about sanctuary resources.

Objective OL-3:

Enhance media communications to amplify current and emerging issues within the sanctuary as well as to keep the sanctuary in the awareness of the broader public.

Activity	Output	Outcome
Improve Communication		
OL-3.1. Develop and implement an integrated communications plan across a wide range of media sources and tools to engage sanctuary constituents and the general public.	Coordinate approach to reaching the broader public through a communications plan that lists a range media sources and tools.	Coordinated and streamlined process for more effective dissemination of sanctuary messages to a broader audience.
OL-3.2. Improve and add to video and photography libraries so that they are readily available and accessible for distribution to local and national media outlets.	Inventory of photos readily available for distribution.	Increased awareness about the ocean and profile for the sanctuary and its role in ecosystem-based management through print media, television, and film.
OL-3.3. Participate in local and national film festivals that promote environmental conservation and ocean stewardship to bring attention to the sanctuary.	Increase exposure of the sanctuary to broader audiences at local and national film festivals.	
Build Capacity		
OL-3.4. Provide communications training to staff, council members and volunteers so that they can effectively communicate sanctuary messages to the media, constituents and the public as a whole.	Staff, council members and volunteers trained communicating sanctuary messages to a range of audiences.	Increased exposure to a broader range of audiences about the sanctuary and the role of management.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Ocean Literacy	(3) Enhance nation-wide public awareness, understanding, and appreciation of marine and Great Lakes ecosystems and maritime heritage resources through outreach, education, and interpretation efforts.	OL-1.1. Develop targeted messages for visitors, ocean users, and local communities about the ecosystem of the sanctuary.	Within 3 years, targeted messages on ecosystem protection directed at visitors, ocean users, and local communities have been incorporated into the outreach and education materials and exhibits used by the sanctuary.
		OL-2.3. Host interns in the sanctuary office to build future leadership for marine conservation.	Every year, at least two formal internship opportunities have been offered on each island with a sanctuary presence.
		OL-2.4. Expand and tailor a series of interdisciplinary workshops (Ocean Awareness Training) to target audiences such as communities and ocean user groups on all islands with a sanctuary presence.	Within 5 years, at least one *Ocean Awareness Training* has been offered on every island with a sanctuary presence.
		OL-2.6. Evaluate opportunities to improve the effectiveness of the sanctuary volunteer humpback whale monitoring program (Sanctuary Ocean Count) on multiple islands and consider collaborative opportunities to expand to new communities on Molokaʻi, Lānaʻi and Maui.	Within 3 years, at least five new *Ocean Count* sites have been established and volunteers trained for Molokaʻi, Lānaʻi and Maui.

10.3.3. Sustainable Use

E ʻai I kekāhi, e kāpī kekāhi.

Eat some, salt some.

Said to young people: Eat some now and save some for another time.

Desired Outcome

Vibrant coastal communities and economies that promote the sustainable use of the marine environment.

Overview

The sustainable use of ocean ecosystems is an important component of an ecosystem-based management framework. Sustainable use of the marine environment ensures that the natural, cultural and historic resources found in sanctuary waters are not unnecessarily impacted, depleted or permanently damaged. The facilitation of the sustainable use of marine resources and habitats is compatible with resource protection, and is part of the purpose set forth in the National Marine Sanctuaries Act. The National Ocean Policy and the Hawai‘i State Constitution also call for the sustainable use of the ocean ecosystems in Hawai‘i.

To promote sustainable use of an ecosystem-based sanctuary, it is necessary to understand the types and patterns of use and how these uses may impact resources in the sanctuary, as well as the communities the sanctuary serves. Community input, indigenous science, cultural knowledge, socioeconomic values and biocultural connections have often been missing from natural resource management and need to be better incorporated (Watson 2012). New and different expertise and engagement with a broader range of stakeholder groups are needed by the sanctuary to engage in the reciprocal learning process needed to effectively promote sustainable use.

The sanctuary seeks to promote the sustainable use of marine resources in Hawai‘i by supporting programs and businesses that prioritize sustainable use of the marine environment and resource protection. The sanctuary has already been engaged in a number of collaborations and initiatives to achieve this goal. Starting in 2013, the sanctuary engaged with the Hawai‘i Tourism Authority (HTA) to expand ocean awareness training for business owners who operate within the sanctuary. The sanctuary also supports initiatives such as the one at Turtle Bay Resort on the north shore of O‘ahu to conserve marine resources through public education and conservation initiatives. On Maui, sanctuary staff and volunteers support programs at Whalers Village and offer interpretive lectures at the Whalers Village Museum to enhance the visibility of the sanctuary programs and encourage resource protection.

The *Sustainable Use Action Plan* describes how the sanctuary plans to work directly with ocean-based businesses and tour operators to increase awareness about marine resources within the sanctuary and encourage best management practices. The sanctuary will support existing voluntary recognition programs and explore opportunities to develop a sanctuary smart hotels initiative. Additionally, the sanctuary will offer customized trainings for ocean-based businesses and tour operators to encourage voluntary compliance. Other proposed activities include promotional videos and sanctuary apps to promote sustainable use of the marine environment by both residents and visitors.

Related Goals

Goal 1
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 3
Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective SU-1:

Make the sanctuary an integral part of the visitor experience by enhancing their appreciation for and engagement with sanctuary resources.

Activity		Output	Outcome
Enhance Collaboration			
SU-1.1.	Engage and develop a working relationship with ocean-based businesses and tour operators, who conduct their activities within or adjacent to the sanctuary to develop, disseminate, and implement best management practices.	Best management practices for businesses established and implemented by businesses and tour operators.	Businesses and tour operators actively implementing best management practices.
Develop Tools			
SU-1.2.	Identify existing voluntary recognition programs that are consistent with sanctuary goals and consider potential opportunities for collaboration and expansion.	Inventory of relevant voluntary recognition programs in Hawai‘i (e.g., Dolphin SMART, Fish Friendly Business Alliance, Hawai‘i Green Business Program).	Sustainable use of sanctuary resources by businesses realized through voluntary recognition programs.
SU-1.3.	Collaborate with the hospitality industry to develop a sanctuary smart hotels initiative to recognize hotels that promote sustainable use practices that are consistent with sanctuary goals.	Voluntary recognition program established for Hawai‘i hotel industry to ensure the sanctuary remains the centerpiece for the need for best practices.	
Build Capacity			
SU-1.4.	Offer customized training for ocean-based businesses and tour operators, who carry out activities within and adjacent to the sanctuary, to build their awareness about the impacts of the uses and ways to improve their activities on the ocean.	Customized training for businesses and tour operators (e.g., Ocean Etiquette for Business).	Business practices improved from increased awareness of the significance of resources within sanctuary waters.
SU-1.5.	Develop a recognized certification program for individuals who complete a series of customized trainings for ocean-based businesses and tour operators that signals their level of knowledge about the coastal and marine environment in Hawaii.	The development and marketing of a certification program.	

Objective SU-2:

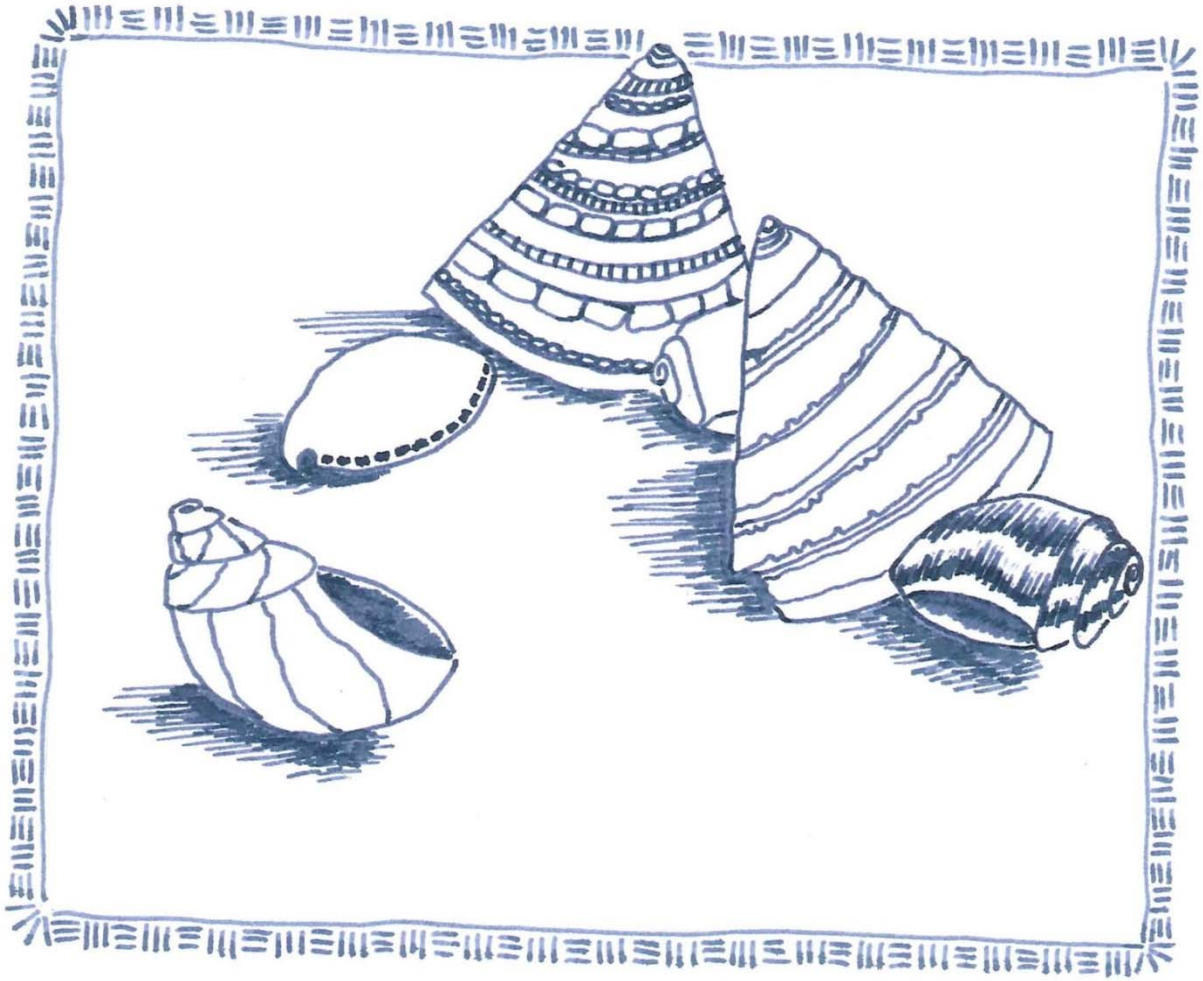
Outreach to the travel and tourism industry and visitors to bring about an awareness and understanding to make the sanctuary an integral part of the visitor experience to enhance their appreciation and engagement with ocean resources.

Activity	Output	Outcome
Improve Communication		
SU-2.1. Strengthen relationships with the visitor industry (i.e., Hawaii Tourism Authority) to develop and promote communication materials that target visitors to Hawai‘i to better understand the role of the sanctuary in enhancing their experience.	Development of visitor communication materials featuring sanctuary messages (e.g., arrival video), that bring awareness to the importance of a healthy marine environment to the visitor experience.	Increased awareness of natural and cultural resources within the sanctuary resulting in a better understanding and behavioral change by visitors and tourism-based businesses.
SU-2.2. Collaborate with hotels and businesses to incorporate sanctuary messages into their promotional materials, including social media, that conveys the importance about the importance of a healthy marine environment to the visitor experience.	Increased visibility of the sanctuary and value to visitors through promotional materials.	
SU-2.3. Develop a sanctuary app to allow tourists and visitors to readily access information on sanctuary events, ocean etiquette, volunteer opportunities and sanctuary resources so that visitors better understand the depth and breadth of the role of the sanctuary in Hawaii..	Sanctuary app developed and disseminated for use that connects visitors to sanctuary events and activities.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Sustainable Use	(5) Facilitate human use in sanctuaries to the extent such uses are compatible with the primary mandate of resource protection, through innovative public participation and interagency cooperative arrangements.	SU-1.3. Collaborate with the hospitality industry to develop a sanctuary smart hotels initiative to recognize hotels that promote sustainable use practices that are consistent with sanctuary goals.	Within 5 years, a pilot voluntary recognition program has been developed and marketed by hotels in Hawai‘I that promote sustainable use activities.
		SU-1.4. Offer customized training for ocean-based businesses and tour operators, who carry out activities within and adjacent to the sanctuary, to build their awareness about the impacts of the uses and ways to improve their activities on the ocean.	Within 4 years, six *Ocean Awareness Training* for Business courses have been offered on islands with a sanctuary presence and best management practices are adopted as a standard by recipient businesses.

10.4. Sanctuary Focus Areas



The *Sanctuary Focus Areas* thematic area describes actions that will be taken at specific sanctuary locations to assess and implement the appropriate place-based management approaches and improve the overall health of the marine environment. All national marine sanctuaries are unique places worthy of special protection. However, different physical locations within the sanctuary have differing degrees of ecosystem health, human use and community needs, and cultural settings. Therefore, the sanctuary is proposing specific place-based management actions that best address the management needs of those individual areas. The waters around Niʻihau island, and the waters off of Pīlaʻa on Kauaʻi island, Southern Maui Nui between southeast Lānaʻi and southwest Maui, and Maunalua Bay off Oʻahu island, were selected for special place-based management actions because they each represent a unique environment within the sanctuary. Niʻihau island provides a unique example of a sentinel site for research within the sanctuary. The coral reef in front of Pīlaʻa has been exposed to runoff that has severely degraded the ecosystem. The sanctuary plans to explore how traditional management, coupled with western science informed management, can work to alleviate stress and contribute to recovery of the reef. The waters in the southern Maui Nui area are vulnerable to pollution from wastewater and vessel discharge. Various efforts are in place to help reduce vessel discharge, but more information and action is needed. Sanctuary engagement in this effort will include monitoring water quality and promoting alternatives to vessels discharging wastewater within the sanctuary, such as the use of pump out stations. Communities that live adjacent to Maunalua Bay are actively engaged in a range of conservation and restoration efforts. The sanctuary can provide additional support for site-based learning initiatives to enhance community stewardship and increase overall protection of the Bay.

The three action plans in the *Sanctuary Focus Areas* thematic area are *Niʻihau* (SN), *Pīlaʻa* (SP), and *Southern Maui Nui* (SM). Each plan in this thematic area describes specific management actions that sanctuary staff, in collaboration with partners, will take to protect unique ecosystems and special places within the sanctuary. Many of these actions are pilot projects that could eventually be replicated elsewhere in the sanctuary. The *Niʻihau Action Plan* describes specific action that sanctuary management will take to preserve the unique environment and rich cultural history of Niʻihau. The *Pīlaʻa Action Plan* describes the application of both traditional Hawaiian and western science-based management practices to restore and maintain the nearshore ecosystems. The *Southern Maui Nui Action Plan* describes actions to address vessel discharge and improve water quality in the southern Maui Nui area. The *Maunalua Bay Action Plan* describes how the sanctuary seeks to conserve and restore marine resources in Maunalua Bay through strong community partnerships and cooperative place-based planning and education.

10.4.1. Ni‘ihau

Aina Nui o Ni‘ihau piliwale mai o Lehua

Great is the land of Ni‘ihau and Lehua is nearby.

Desired Outcome

The preservation of healthy coastal and marine ecosystems, and the rich cultural history of Ni‘ihau.

Overview

Early indications are that the coastal and marine waters surrounding Ni‘ihau and Lehua are unique, biologically rich, and a largely undisturbed ecosystem that may serve as important natural and cultural transition zone between the main Hawaiian Islands and the Northwest Hawaiian Islands. Though the special features of Ni‘ihau and Lehua have long been recognized by residents, the cultural and natural resources of Ni‘ihau have largely remained a mystery to outsiders and unexplored by western science. The efforts to further understand and protect coastal and marine resources at Ni‘ihau must be done in a way that respects, and is compatible with, the unique culture of the community at Ni‘ihau.

The robust and intact coastal and marine ecosystems surrounding Ni‘ihau and Lehua are the least impacted by human activities than any of the other inhabited Hawaiian Islands. They have the highest fish biomass of the populated Hawaiian Islands and are important habitats for many marine species, including protected species. These ecosystems are natural sentinels of change and may serve as a reference point and a model for assessing and understanding direct and indirect human impacts in the populated Hawaiian Islands.

At the encouragement of the community that lives on Ni‘ihau, the sanctuary assessed the needs, value, and desires for protection and is proposing to incorporate waters around Ni‘ihau and Lehua into the sanctuary. By becoming a part of the sanctuary, the resources and communities of Ni‘ihau and Lehua will have access to additional opportunities offered by sanctuary designation such as research, outreach, and added resource protection to assist in the perpetuation and support of this special Native Hawaiian culture and place. The sanctuary will partner with the Niihauan community and contribute in a stewardship role to the protection of Ni‘ihau and Lehua’s natural marine and coastal resources for the both the cultures that depend on them, and as a trust resource. Through these efforts, the sanctuary will be able to interpret this special place for the public, in a way that respects the community that lives at Ni‘ihau, by sharing knowledge of the ecosystems and cultures that have remained relatively intact, and isolated yet a mystery to much of the outside world.

The *Ni'ihau Action Plan* describes site-specific activities to assess and manage marine resources around Ni'ihau and Lehua. It will be important to better understand the socioeconomic drivers and cultural practices and values on Ni'ihau in order for conservation to enhance economic opportunities in a manner that is culturally sensitive and respectful of local traditions. The sanctuary will engage with local residents and scientists to assess marine habitats, species of concern, and cultural resources, through a process that integrates traditional knowledge and science-based management. The sanctuary will also monitor water quality around Ni'ihau and Lehua to determine change over time. Among these efforts, an emphasis will be on placed-based learning and opportunities to enhance local educational opportunities.

Related Goals

Goal 1
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 2
Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 3
Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.

Goal 4
Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Objective SN-1:

Conduct research to identify, evaluate and better understand the marine resources of Ni‘ihau and Lehua.

Activity		Output	Outcome
Gather Information			
SN-1.1.	Partner with universities and resource management agencies to identify and characterize locations and distribution of marine habitats, species of concern and cultural resources of Ni‘ihau and Lehua, using local knowledge and modern science.	Site characterization that includes an inventory and detailed maps of habitats, species of concern and cultural resources of Ni‘ihau and Lehua.	Better understanding of the need for priority areas to improve resource management through a site characterization.
SN-1.2.	Establish and program to evaluate water quality and assess threats of marine and land based sources of pollution surrounding Ni‘ihau and Lehua.	Site characterization on the state of and threats to water quality at Ni‘ihau and Lehua.	
SN-1.3.	Investigate the socioeconomic value and importance of coastal and marine activities, both commercial and recreational, at Ni‘ihau and Lehua.	Site characterization of the socioeconomic value of resources of Ni‘ihau and Lehua.	
Build Capacity			
SN-1.4.	Develop partnership with the community of Ni’ihau to explore and identify opportunities to involve residents of Ni‘ihau in natural resource research and monitoring, based on their resource management priorities, while incorporating cultural sensitivity and scientific soundness in the design of the program.	Research and monitoring protocols developed for a citizen monitoring program specific to the needs of Ni‘ihau, that involves Ni‘ihau residents (e.g. monk seal haul-out monitoring).	Efficient research supported by community engagement.

Objective SN-2:

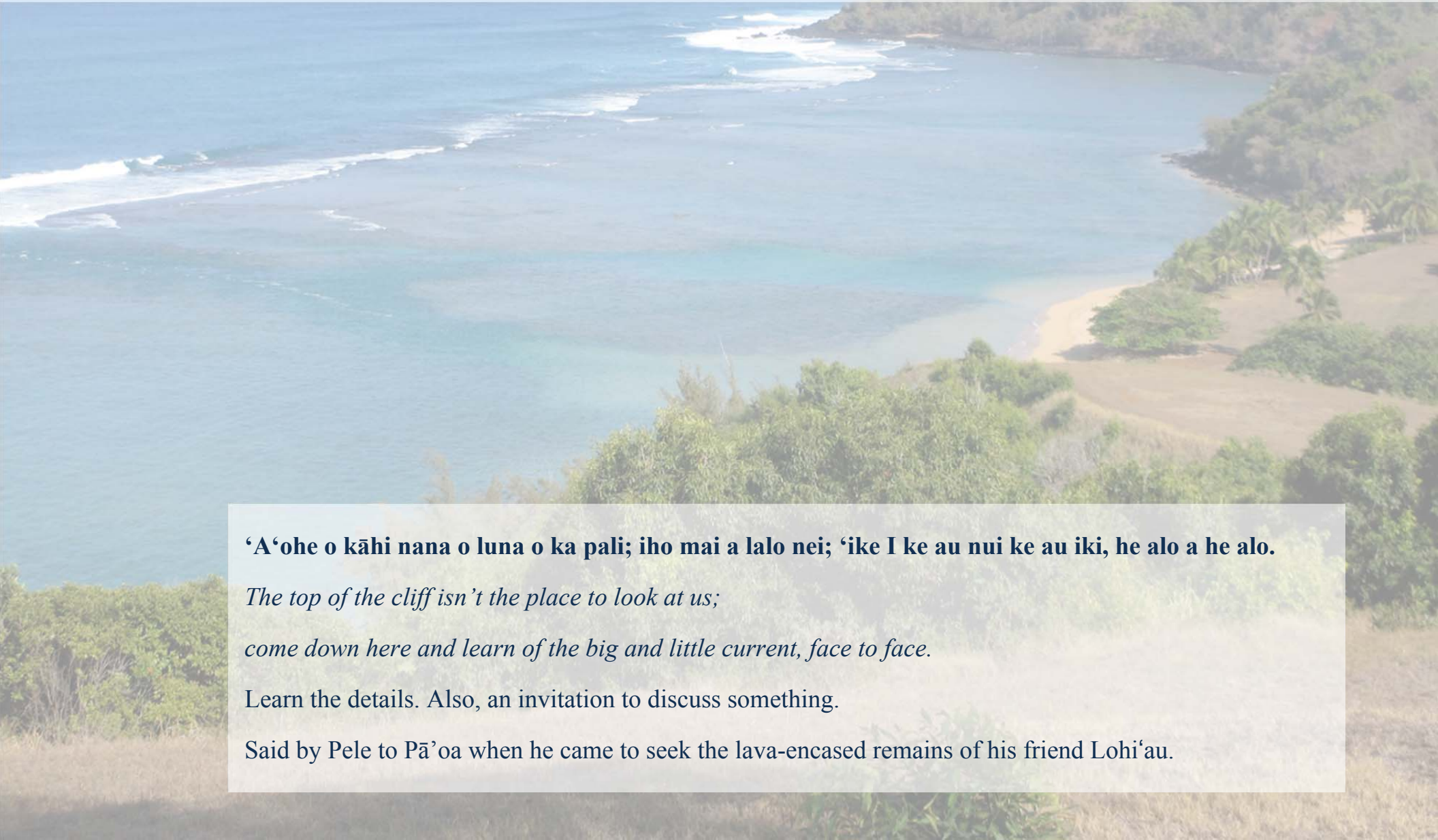
Develop a cooperative relationship with the Ni'ihauan community to increase the protection of priority marine resources on Ni‘ihau and Lehua.

Activity		Output	Outcome
Build Capacity			
SN-2.1.	Develop and disseminate best management practices for both commercial and recreational ocean users that are interested in conducting activities in and around the waters of Ni‘ihau and Lehua.	Best management practices materials developed and disseminated on ocean uses at Ni‘ihau and Lehua.	Wider use of best management practices by ocean users around Ni‘ihau.
Place-Based Planning			
SN-2.2.	Partner with the Ni‘ihau community to develop and implement a framework to assess and prioritize the need for regulatory measures to protect sensitive habitats and species.	Guidance framework document establishing place-based needs for proposing regulatory actions to protect species and/or habitats of concern).	Increased protection for habitats and species.
Build Capacity			
SN-2.3.	Develop a protocol with the Ni‘ihau community, and advised by Hawaiian cultural practitioners, for identifying and protecting sensitive biological and cultural information about Ni‘ihau.	Guidance document establishing sanctuary protocols for safeguarding sensitive Ni‘ihau information.	Set standards for safeguarding sensitive information.
Improve Communication			
SN-2.4.	Collaborate with the residents of Ni'ihau develop and distribute education and outreach materials for the broader public that share the uniqueness of Ni‘ihau in a way that is respectful of and accurately represents the Ni‘ihau community and culture.	Education and outreach materials on Ni‘ihau distributed to the broader public.	Increased public awareness of the uniqueness of Ni‘ihau.
SN-2.5.	Collaborate with the Department of Education and Charter School Commission to develop and distribute education and outreach materials, and deliver targeted outreach.	Education and outreach materials marine resources on Ni‘ihau distributed Ni‘ihau and Kaua‘i.	Increased ocean literacy for children on Ni‘ihau and Kaua‘i.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Operational Foundation	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	SN-1.1: Partner with universities and resource management agencies to identify and characterize locations and distribution of marine habitats, species of concern and cultural resources of Ni‘ihau and Lehua, using local knowledge and modern science.	Within 2 years, a site charecterization has been completed of the location and distribution of marine habitats, species of concern and cultural resources of Ni‘ihau and Lehua.
		SN-2.3. Develop a protocol with the Ni’ihau community, and advised by Hawaiian cultural practitioners, for identifying and protecting sensitive biological and cultural information about Ni‘ihau.	Within 2 years, a guidance document has been developed that establishes protocols for safeguarding sensitive Ni‘ihau information.

10.4.2. Pīla‘a



‘A‘ohe o kāhi nana o luna o ka pali; iho mai a lalo nei; ‘ike I ke au nui ke au iki, he alo a he alo.

The top of the cliff isn’t the place to look at us;

come down here and learn of the big and little current, face to face.

Learn the details. Also, an invitation to discuss something.

Said by Pele to Pā’oa when he came to seek the lava-encased remains of his friend Lohi‘au.

Desired Outcome

A replicable model for applying both traditional Hawaiian and western science-based management practices to restore the health of nearshore ecosystems in the Pīlaʻa ahupuaʻa.

Overview

The Pīlaʻa ahupuaʻa is located on the North Shore of Kauaʻi, east of Kīlauea Point. The marine area contains several small streams, a small estuary, and two coral reefs sheltering inner lagoons that are bisected by a deep channel fronting the stream mouth. The reefs are traditional and customary areas for Hawaiian's to gather a variety of species of reef fish and crustaceans, and in particular from the east reef which is well-known for traditional harvesting of several edible seaweeds.

The Pīlaʻa pilot project aims to restore and maintain these cultural and natural resources while developing a replicable model to apply to other nearshore ecosystems in Hawaiʻi. Combining traditional Hawaiian management practices and western science-informed management practices, the project will implement a restoration and management approach to Pīlaʻa/Piliamoʻo stream, estuary, inner lagoon and fringing reef. The long-term goal of the restoration is returning Pīlaʻa stream to a state that can support optimum reef health and appropriate levels of traditional subsistence utilization of marine resources. Although lagoon restoration is the long-term goal, this initial effort will focus on mitigating impacts resulting from stream alterations, land uses, and changes in riparian vegetative coverage. In addition to being a base for the research, data collection and restoration work, the project site will be used as a field site for students in Hawaiian Studies and other resource management and sustainability-oriented programs at the University of Hawaiʻi at Mānoa Center for Hawaiian Studies and Kauaʻi Community College. Participating students will engage in research and development of traditional and science-based restoration and management approaches, monitoring and evaluation of the recovery of Pīlaʻa stream, estuary, and lagoon, and formulation of a replicable and adaptable management model for combining traditional Hawaiian management practices with western science-informed management for application in other ahupuaʻa.

The *Pīla'a Action Plan* describes a focused sanctuary initiative to restore the nearshore ecosystem in the Pīla'a ahupua'a. The sanctuary plans to work with partners, including the University of Hawaii and Kaua'i Community College, to gather and inventory scientific and cultural information, such as marine and cultural resource assessments, to characterize the current condition of Pīla'a. This information will inform restoration of the coral reef and lagoon habitats. The sanctuary and its partners will then develop and implement a framework for restoration that is consistent with traditional Hawaiian management and science-based resource management. The effectiveness of the restoration process will be evaluated by developing and monitoring indicators and thresholds of change. Using the results of this evaluation, the sanctuary plans to adapt these management practices to other locations within the sanctuary.

Related Goals

Goal 1
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 2
Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 3
Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.

Goal 4
Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Goal 5
Use collaborative and adaptive management approaches to optimize effectiveness.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai'i.

Objective SP-1:

Gather and inventory scientific and cultural information to assist in planning and implementing the restoration for the Pīlaʻa pilot project.

Activity	Output	Outcome
Gather Information		
SP-1.1. Partner with the University of Hawaii and Kauaʻi Community College to research and inventory traditional Hawaiian management practices that are potentially applicable to stream and reef restoration, and long-term management of the Pīlaʻa lagoon system.	Inventory and database of traditional Hawaiian management practices for restoration at Pīlaʻa.	An understanding of traditional Hawaiian resource management practices for Pīlaʻa.
SP-1.2. Partner with the University of Hawaii and Kauaʻi Community College to research and inventory western science-based resource management practices that are potentially applicable to stream and reef restoration, and long-term management of the Pīlaʻa lagoon system.	Inventory and database of western science-based management practices for restoration at Pīlaʻa.	An understanding of western science-based natural resource management practices for Pīlaʻa.
SP-1.3. Work with institutional and agency partners to develop a marine cadastre (spatialized data layers) of different county, state and federal jurisdictional authorities and land owners as is relevant to the Pīlaʻa ahupuaʻa.	Inventory, database and layered spatialized maps of different jurisdictional authorities and land owners in the Pīlaʻa ahupuaʻa.	An understanding of the jurisdictional authorities and land owners in the Pīlaʻa ahupuaʻa.
SP-1.4. Partner with the University of Hawaii and Kauaʻi Community College to characterize the current condition of the Pīlaʻa ahupuaʻa through research of existing information sources, and stream, land and lagoon surveys.	Site characterization of the key components within the Pīlaʻa ahupuaʻa targeted for restoration.	Establishment of target conditions for restoration of Pīlaʻa.

Objective SP-2:

Develop a restoration and learning site planning process framework specifically for Pīlaʻa that integrates traditional Hawaiian and western science-based management approaches.

Activity	Output	Outcome
Place-Based Planning		
SP-2.1. Partner with the University of Hawaii and Kauaʻi Community College to recruit members for a planning and restoration team and a technical advisory team.	Planning and restoration team and technical advisory team.	Buy-in, support and participation by key players in the Pīlaʻa restoration and learning site.
Enhance Management		
SP-2.2. Partner with the University of Hawaii and Kauaʻi Community College to develop and implement the restoration and management goals, processes, and protocols based on traditional and western science-based approaches.	Planned and implemented restoration and management goals, processes and protocols.	Incremental restoration of the Pīlaʻa ahupuaʻa nearshore system.
SP-2.3. Partner with the University of Hawaii and Kauaʻi Community College to measure effectiveness of the Pīlaʻa ahupuaʻa restoration project (both the traditional western management approaches) by developing and monitoring indicators and thresholds of change.	Development of indicators and thresholds and monitoring program designed to measure change.	Monitoring program established to measure effectiveness of management approaches.
Improve Communication		
SP-2.4. Partner with the University of Hawaii and Kauaʻi Community College to develop a communications and documentation team to write a communications plan on the process for the restoration and learning to share with other sites, partners and the media.	Communications plan to document and share progress on the Pīlaʻa pilot project.	Open communication and shared learning about the Pīlaʻa ahupuaʻa pilot project.
Build Capacity		
SP-2.5. Partner with the University of Hawaii and Kauaʻi Community College to evaluate the model and lessons learned from the pilot project to build a replicable model for use in other ahupuaʻa.	Well-documented replicable model and lessons learned from the Pīlaʻa pilot project.	Model made available for application in other ahupuaʻa.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Operational Foundation	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	SP-1.4. Partner with the University of Hawaii and Kauaʻi Community College to characterize the current condition of the Pīlaʻa ahupuaʻa through research of existing information sources, and stream, land and lagoon surveys.	Within 2 years, a site characterization has been completed of the key components within the Pīlaʻa ahupuaʻa targeted for restoration.
		SP-2.2. Partner with the University of Hawaii and Kauaʻi Community College to develop and implement the restoration and management goals, processes, and protocols based on traditional and western science-based approaches.	Within 3 years, a restoration and management plan has been developed, and the first phase of the plan has been implemented for Pīlaʻa.

10.4.3. Southern Maui Nui

Pā ka makani o ka Moaʻe, hele ka lepo o Kahoʻolawe i Māʻalaea.

When the Moaʻe wind blows, the dust of Kahoʻolawe goes towards Māʻalaea.

Desired Outcome

Establish a research area in the southern Maui Nui area to better understand and improve water quality.

Overview

Southern Maui Nui is located between the southeast coast of Lānaʻi and the southwest coast of Maui and includes waters of the Auʻ Au Channel, Kealaikahiki Channel, and the ʻAlalakeiki Channel. Māʻalaea harbor is located on the Maui side of the southern Maui Nui area. Eighteen independent tour operators offer boat-based excursions (approximately 30 boats) out of Māʻalaea boat harbor. Recreational activities that take place in the bay and adjacent areas include snorkeling, diving, whale watching, fishing, and dinner cruises. Māʻalaea boat harbor offers a range of facilities including a U.S. Coast Guard station, shore-based pump-out facility, dry-dock, vessel repair, launch ramp, loading dock, and restrooms. During the public scoping process, community members in the Maui area expressed concerns about the potential adverse effects of vessel discharge in Māʻalaea Bay. Vessel discharge can negatively impact biological resources and presents a potential threat to human health and safety for ocean-users.

Sanctuary management proposed a research area in southern Maui Nui to assess the potential impact of vessel discharge to marine resources. The cornerstone of the research area will be a water quality monitoring program to assess pollution from wastewater. This information will be used to help communities and agencies identify threats and begin to work towards possible solutions to eventually mitigate impact to water quality in the southern Maui Nui area. Additionally, this information can be used to inform best practices for businesses and tour operators that take guests out into the bay for recreational activities. The shore-based pump-out facility in Māʻalaea boat harbor was installed to reduce discharge from vessels operating in the area. A designated research area will complement existing community, county, and state efforts to reduce wastewater discharge in the waters of Maui Island. In the long term, this site can also serve as a pilot to explore the feasibility of establishing other research areas within the sanctuary.

The intent of the *Southern Maui Nui Action Plan* is to improve water quality throughout the area over time. In order to improve water quality, the sanctuary plans to engage water management agencies and local community stakeholders by conducting water quality research and monitoring to assess change and identify impacts to water quality. The results of these assessments will be used to inform specific and targeted management actions including opportunities for alternatives to discharge. The sanctuary also hopes to increase awareness about the potential negative impacts of vessel discharge and other pollutants to encourage best management practices such as the increased use of pump-out stations.

Related Goals

Goal 1	Goal 5	Goal 6
Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.	Use collaborative and adaptive management approaches to optimize effectiveness.	Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai‘i.

Objective SS-1:

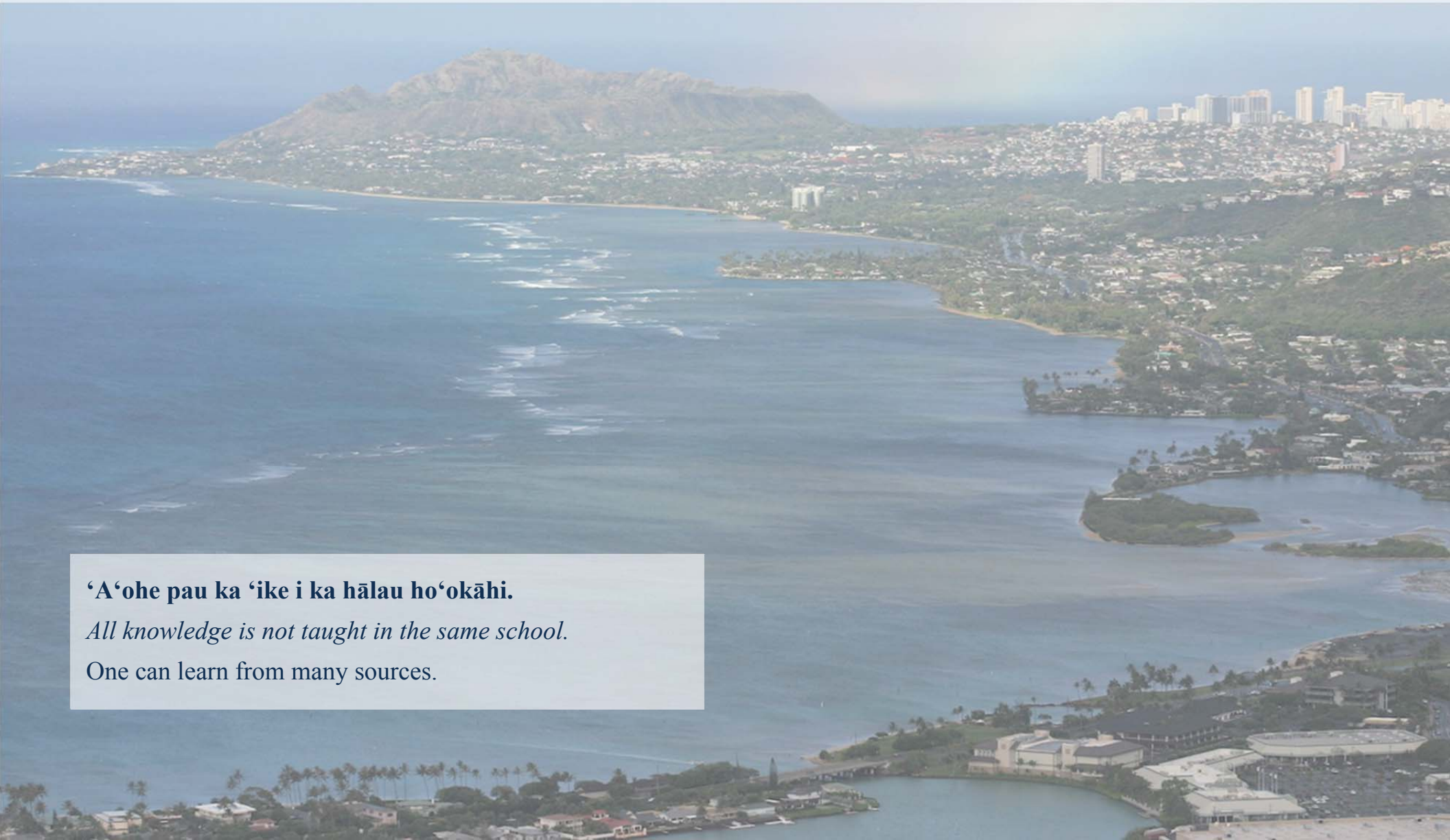
Improve water quality in the sanctuary by reducing wastewater discharge from vessels in the southern Maui Nui.

Activity		Output	Outcome
Place-Based Planning			
SS-1.1.	Collaborate with relevant agencies and communities to develop a plan to assess water quality in the southern Maui Nui area to better understand levels and sources of pollutants.	A water quality research plan developed.	Better informed framework for addressing water quality impacts.
Monitor Resources			
SS-1.2.	Coordinate with ocean-based business and citizen science volunteers to conduct long-term monitoring on water quality to assess and understand the impacts of vessel discharge in the southern Maui Nui area.	Long-term water quality data assessing data and trends over time in the southern Maui Nui area.	Improved understanding of the threats to water quality in Mā‘alaea Bay and how the sanctuary will be involved in addressing water quality threats in the southern Maui Nui area.
SS-1.3.	Assess threats to water quality in the southern Maui Nui area.	An inventory of the primary threats to water quality in the southern Maui Nui area.	
SS-1.4.	Determine the role of the sanctuary in addressing threats to water quality in the southern Maui Nui area.	Sanctuary role established.	
Improve Communication			
SS-1.5.	Develop and disseminate outreach materials to both commercial and recreational vessel operators to inform and educate boaters about the need to and feasible options to reduce vessel discharge in the sanctuary.	Informational brochures and maps developed and distributed to boaters in the the southern Maui Nui area.	Improved awareness of alternatives to discharging wastewater and increased use of pump-out stations.
SS-1.6.	Promote the ease and accessibility of the Mā‘alaea Small Boat Harbor vessel pump-out station and the value of using it over direct discharge into sanctuary waters.	Public presentations and outreach materials on the impacts of vessel discharge in the sanctuary and the value of using a pump out station.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Operational Foundation	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	SS-1.1. Collaborate with relevant agencies and communities to develop a plan to assess water quality in the southern Maui Nui area.to better understand levels and sources of pollutants.	Within 1 year, a collaborative and coordinated water quality research plan has been developed for the southern Maui Nui area.
		SS-1.3. Assess threats to water quality in the southern Maui Nui area.	Within 2 years, an inventory has been completed of the primary land and marine-based threats and sources of threats to water quality in the southern Maui Nui area.

10.4.4. Maunalua Bay



‘A‘ohe pau ka ‘ike i ka hālau ho‘okāhi.

All knowledge is not taught in the same school.

One can learn from many sources.

Desired Outcome

A healthy coral reef and sea grass habitats, abundant marine life and high water quality which is achieved by community kuleana caring for this place with future generations in mind.

Overview

Human activities including poorly planned onshore development, high levels of ocean recreation, and overfishing have contributed to the degradation of nearshore habitats in Maunalua Bay. This degradation, in turn, has catalyzed restoration and education efforts to improve the health of marine life in the bay. The sanctuary proposes to work in collaboration with these efforts to better manage resources in this area of the sanctuary.

Maunalua Bay is located on the southeast shore of the island of Oʻahu, between Lēʻahi (Diamond Head) and Koko Head peak. The embayment itself is often delineated as the waters between Kūpikipikiʻō Point (Black Point) near Lēʻahi to Kawaihoa Point at Koko Head (approximately 6.6 square miles). The bay adjoins two ahupuaʻa across seven watersheds, which are largely urban with impervious surfaces. At least four perennial streams and as many as 52 drainages, most of which have been channelized, feed into the bay. The characteristics of the watersheds and drainages facilitate the rapid movement of storm water, sediments, nutrients and other chemicals directly into the ocean. This runoff threatens the numerous nearshore and offshore coral reefs and sand flats within the bay that support a variety of native species, including endemic seagrass and limu. Invasive marine algae flourish in the nutrient-rich waters of Maunalua Bay and smother native coral reef habitat. Efforts are under way to mobilize volunteers to remove invasive habitat and restore near-shore habitats but additional actions are still needed.

Maunalua Bay hosts a variety of recreational ocean activities including boating, fishing, use of personal water crafts, outrigger canoe paddling, surfing, SCUBA diving, and snorkeling. Several human-induced impacts such as sedimentation, increased nutrients and spread of alien species have impacted parts of the bay over the years, which threaten both marine life and ocean recreation. This has brought community, NGO and management agencies together to support restoration and management efforts. These groups have organized restoration efforts, including invasive algae removal and watershed clean up, and education initiatives to teach the community and other ocean users about environmental impacts, responsible practices, and cultural heritage connections in the bay, especially traditional navigation techniques.

The *Maunalua Bay Action Plan* describes activities that the sanctuary proposes to implement alongside the ongoing initiatives to restore native habitat, increase and sustain marine life, and engage communities and businesses in long term sustainable planning in Maunalua Bay. The sanctuary will work with local and federal agencies to address threats from land-based sources of pollution and invasive marine algae in Maunalua Bay. Sanctuary staff will collaborate with resource scientists to explore innovative opportunities to ensure a healthy coral reef ecosystem with a vibrant marine community. The sanctuary will also support ongoing community-based efforts to

monitor and enforce compliance with sanctuary regulations. Community engagement has been critical to the management of Maunalua Bay so the sanctuary will partner with local community organizations to support ongoing efforts to educate residents and encourage marine stewardship. The activities in this action plan will be implemented in collaboration with Malama Maunalua, the Polynesian Voyaging Society, the University of Hawai‘i, Hawai‘i Pacific University, local and national NGOs, and relevant state and federal agencies.

The *Maunalua Bay Action Plan* describes activities that the sanctuary proposes to implement alongside these ongoing initiatives to restore native habitat, increase and sustain marine life, and engage communities and businesses in long term sustainable planning in Maunalua Bay. The sanctuary will work with local agencies to address threats from land-based sources of pollution and invasive marine algae in Maunalua Bay. Sanctuary staff will collaborate with resource scientists to explore innovative opportunities to ensure a healthy coral reef ecosystem with a vibrant marine community. The sanctuary will also support ongoing community-based efforts to monitor and enforce compliance with sanctuary regulations. Community engagement has been critical to the management of Maunalua Bay so the sanctuary will partner with local community organizations to support ongoing efforts to educate residents and encourage marine stewardship. The activities in this action plan will be implemented in collaboration with Malama Maunalua, the Polynesian Voyaging Society, the University of Hawai‘i, local and national NGOs, and relevant state and federal agencies.

Related Goals

Goal 1

Holistically manage biocultural resources in the sanctuary using an ecosystem-based approach to promote the health of the natural and human environment.

Goal 2

Share mutual learning opportunities and build knowledge to enhance understanding and appreciation of biocultural resources in the sanctuary to promote equitable, responsible and sustainable ocean uses.

Goal 3

Inspire local stewardship by engaging communities and stakeholders in cooperative conservation to increase place-based protection of ocean resources.

Goal 4

Perpetuate cultural heritage by integrating cultural perspectives into sanctuary programs and using them to guide future management decisions.

Objective SM-1:

Restore the nearshore environment of Maunalua Bay to sustainable levels of health by addressing threats to both water quality and coral reef habitats.

Activity	Output	Outcome
Resource Protection		
SM-1.1. Support and engage in a community driven process to engage local residents, stakeholders, and community organizations to develop a plan to address key threats to resources in Maunalua Bay.	A marine management plan for Maunalua Bay developed through a community-driven process.	A coordinated planning effort that effectively engages the local community.
SM-1.2. Continue to support volunteer programs to remove invasive alien algae which will promote restoration of native coral reef habitat in the nearshore environment.	Removal of invasive algae and restoration of native coral reef habitat.	Restoration and recovery of coral reef habitats in Maunalua Bay maintained for now and into the future.
SM-1.3. Evaluate and implement innovative management approaches to control future invasive alien algae growth in Maunalua Bay.	Proactive approach to addressing problems of invasive alien algae.	
SM-1.4. Collaborate with scientific experts to measure sediment levels in Maunalua Bay and assess the sources and impacts of sediment at key entry points (e.g., Kuliouou, Wailupe, and Hawaii Kai) into Maunalua Bay.	Scientific measurements and tracking of sources of sediment inputs into Maunalua Bay used to inform management actions.	State and federal water quality standards met through reducing sediment runoff and non-point sources of pollution in Maunalua Bay.
SM-1.5. Support community activities that reduce impacts from runoff discharged into Maunalua Bay (e.g., Pulama Wai) and broaden community awareness.	More effective community activities to reduce harmful discharge into Maunalua Bay.	
SM-1.6. Increase collaborative relationships with relevant city and county, state, and federal agencies to take appropriate actions to reduce sediment and non-point sources of pollution flowing into Maunalua Bay through storm drains.	Partnerships that result in infrastructure improvements that measurably reduce flow of sediment and non-point sources of pollution in Maunalua Bay.	

Activity	Output	Outcome
SM-1.7. Coordinate with relevant city and county, state, and federal agencies to assess, review, and respond to new and emerging threats that impact marine habitats and species in Maunalua Bay.	A more coordinated response to new and emerging threats in Maunalua Bay.	Management approaches are evaluated, assessed and adjusted to ensure historic levels of health are achieved in the nearshore environment of Maunalua Bay.
SM-1.8. Evaluate and assess the need to implement additional regulatory approaches to addressing impacts to water quality and the coral reef ecosystem in Maunalua Bay.	An assessment of the potential value of additional regulatory authorities to address impacts to water quality and the coral reef ecosystem in Maunalua Bay.	

Objective SM-2:

Implement best management practices to ensure a healthier, resilient, more effectively and sustainably managed Maunalua Bay for future generations.

Activity	Output	Outcome
Best Management Practices		
SM-2.1. Collaborate with scientific experts to develop both key indicators and associated monitoring programs that signal specific changes or trends in the condition of the resources and the health of Maunalua Bay.	Key indicators of the health of Maunalua Bay developed and measured as a signal to resource managers on the condition of the resources and appropriate management responses.	Sanctuary management provided with targeted information about changes in Mauanlua Bay so that they may respond in a timely and effective manner.to threats and corresponding impacts.
SM-2.2. Conduct a workshop for kupuna and scientists to develop a coastal resiliency plan for Maunalua Bay that incorporates traditional Hawaiian knowledge and recent scientific information, addresses current threats to the marine environment, and plans for potential future coastal hazards.	A coastal resiliency plan for Maunalua Bay that reduces current and future threats to the marine environment in Maunalua Bay.	
SM-2.3. Support sustainable community efforts to monitor compliance with marine resource regulations to enhance the effectiveness of sanctuary management.	Enhanced compliance with sanctuary regulations through community-based programs and increased agency effectiveness.	More effective management of sanctuary resources achieved through greater compliance.
SM-2.4. Support the development of a web-based reporting system to facilitate community reporting of violations of sanctuary regulations.	A web-based geographic information system (GIS) that facilitates reporting of violations and compliance with regulations.	
SM-2.5. Assess the value of habitat enhancement techniques to restore healthy populations of marine species and habitats.	A comprehensive understanding of the range of options to enhance habitats to inform potential management actions.	Marine life and habitats sustained and enhanced through additional management actions.
SM-2.6. Evaluate and assess the need to implement additional regulatory approaches that ensure a healthier, more resilient, and more effectively and sustainably managed marine environment.	An assessment of the potential value of additional regulatory authorities.	

Objective SM-3:

Use education and outreach as a management tool to engage communities and stakeholders in understanding the value of Maunalua Bay, the effects of their actions on Maunalua Bay, and ultimately understanding the importance of making their behavior consistent with the sustainable use Maunalua Bay.

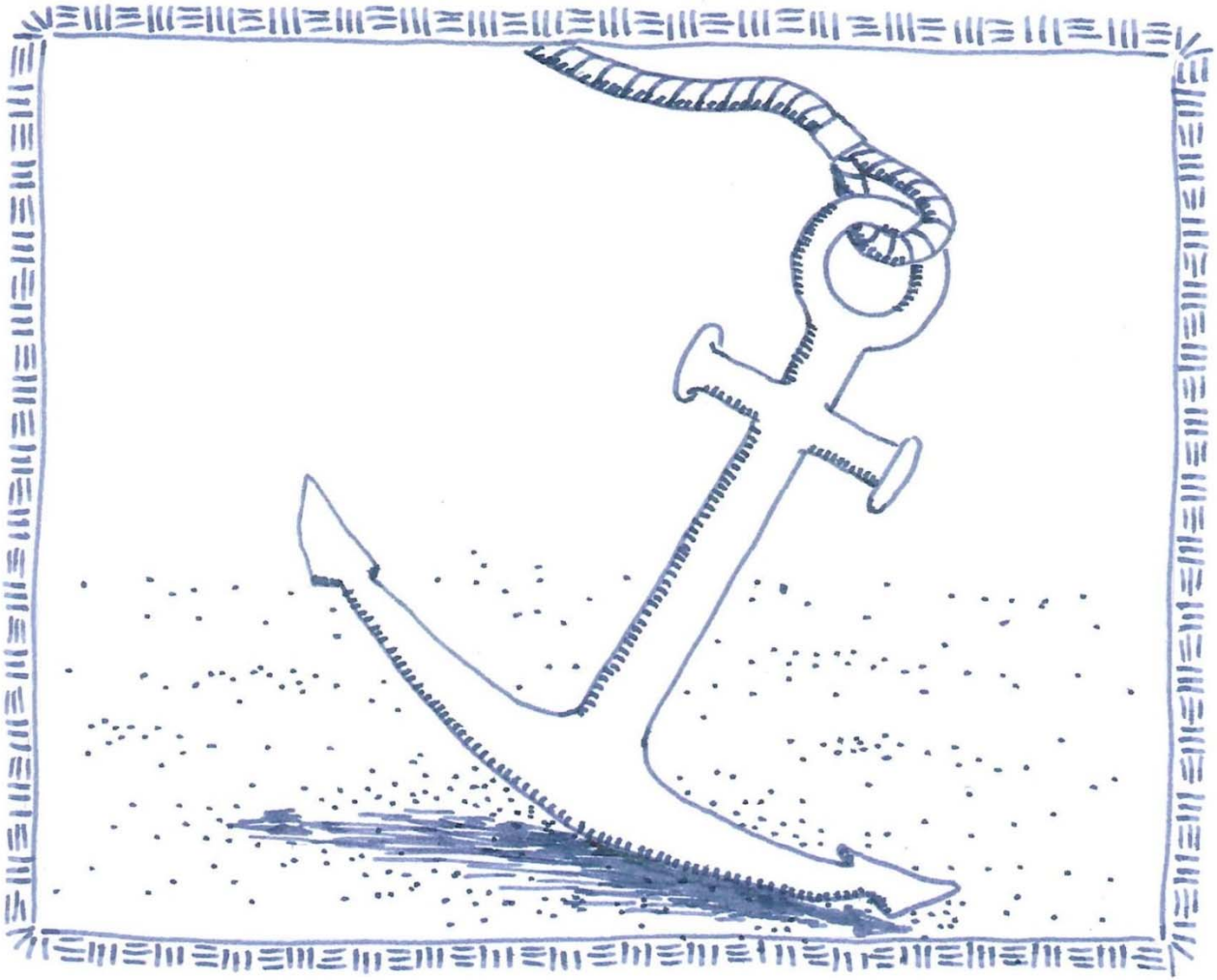
Activity	Output	Outcome
Improve Communications		
SM-3.1. Develop and implement an effective communications campaign about both the value and threats to Maunalua Bay in order to expand and deepen community understanding of, appreciation for, and commitment to engage in activities to sustain, restore, and enhance marine resources in Maunalua Bay.	Outreach approaches and materials developed that are effective at informing and changing behavior.	Enhanced knowledge, understanding of, and appreciation for marine conservation in Maunalua Bay that results in changes in behaviors and builds next generation of stewards
SM-3.2. Provide the public, particularly children, with experiential education opportunities about traditional Hawaiian marine activities, including navigation, pono fishing, and traditional Hawaiian resource management practices.	Enhance knowledge understanding of and appreciation for traditional marine customs in Hawaii and their application to interactions with the marine environment.	
SM-3.3. Work with ocean-based businesses, fishers, and recreational ocean uses that conduct activities within or adjacent to the sanctuary, to understand, develop and embrace the use of best management practices to reduce impacts to marine resources within Maunalua Bay.	Specific and practical best management practices guidelines established and tailored for different ocean user groups.	Long-term sustainable use of Maunalua achieved through engagement with businesses that target ocean users located in proximity to Maunalua Bay.
SM-3.4. Collaborate with local businesses (e.g., Kahala Hotel, Kona Brew, Whole Foods, etc.) to develop communication avenues and messages used to promote to their customers, clients or guests what they can do to engage in sustainable use of the marine environment consistent with sanctuary management goals.	Outreach to a broader audience through collaborations with key businesses to promote sustainable use of Maunalua Bay.	

Activity	Output	Outcome
SM-3.5. Work with Polynesian Voyaging Society and other community and non-profit organizations to establish and implement an education area in Maunalua Bay that will serve as a living marine classroom where hands-on and experiential educational activities are offered that promote sustainable uses and traditional Hawaiian marine resource management concepts.	A specific area within sanctuary waters of Maunalua Bay is set aside and serves the community as a living marine classroom.	Enhanced knowledge, understanding of, and appreciation for marine conservation in Maunalua Bay that results in changes in behaviors and builds next generation of stewards.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Operational Foundation	(1) Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques. (4) Investigate and enhance the understanding of ecosystem processes through continued scientific research, monitoring, and characterization to support ecosystem-based management in sanctuaries and throughout U.S. waters.	SM-1.3. Collaborate with scientific experts to measure sediment levels in Maunalua Bay and assess the sources and impacts of sediment at key entry points (e.g., Kuliouou, Wailupe, and Koko Marina) into Maunalua Bay.	Within 2 years, a sediment levels monitoring program has been established at three entry points into Maunalua Bay.
		SM-2.1. Collaborate with scientific experts to develop both key indicators and associated monitoring programs that signal specific changes or trends in the condition of the resources and the health of Maunalua Bay.	Within 3 years, key indicators of the health of Maunalua Bay have been developed, baseline condition of each resource established, and monitoring program developed to track trends and changes in the health of Maunalua Bay.
		SM-3.3. Work with ocean-based businesses, fishers, and recreational ocean uses that conduct activities within or adjacent to the sanctuary, to understand, develop and embrace the use of best management practices to reduce impacts to marine resources within Maunalua Bay.	Within 4 years, specific and practical best management practices guidelines have been established and tailored for key ocean user groups in Maunalua Bay.

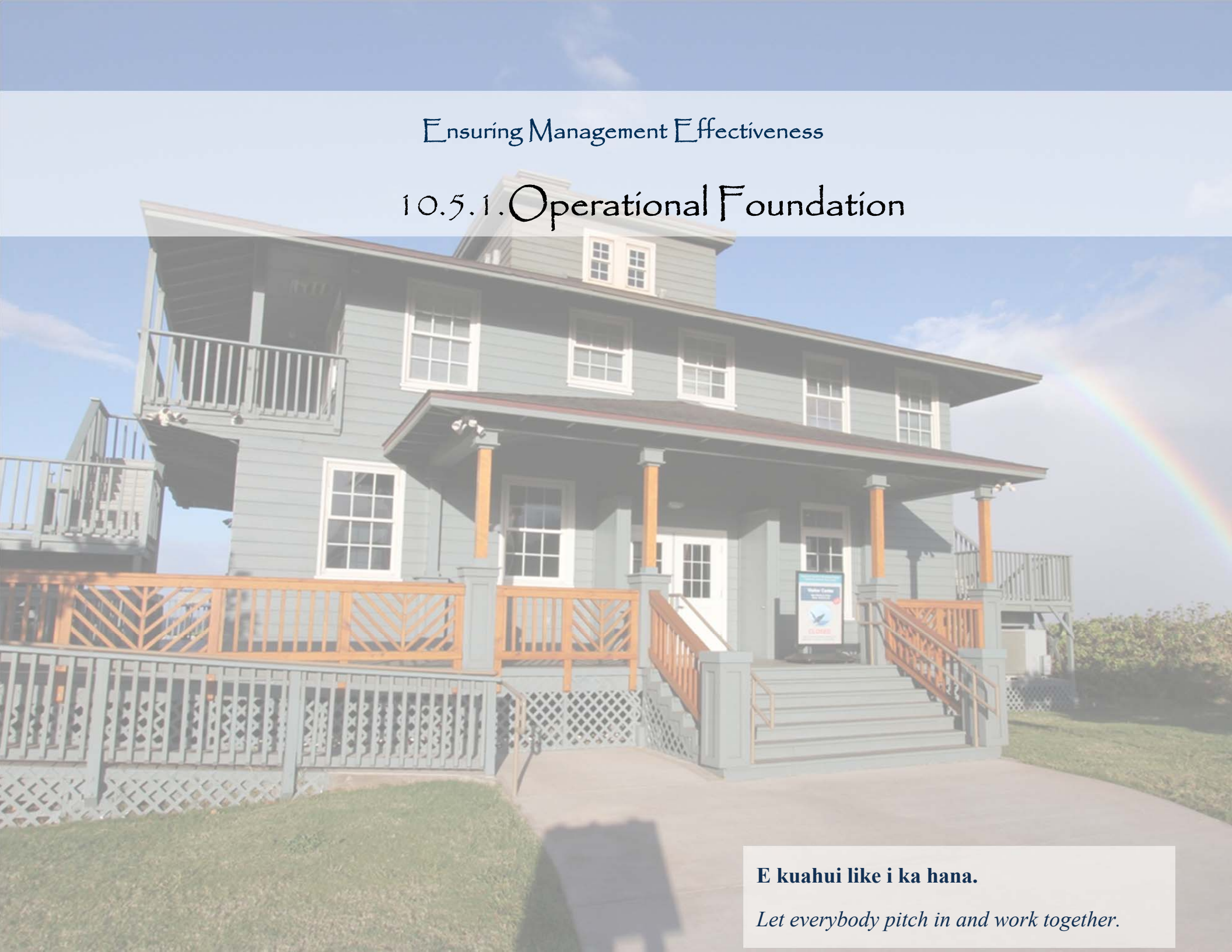
10.5. Ensuring Management Effectiveness



The *Ensuring Management Effectiveness* thematic area describes the means and level of institutional support necessary for sanctuary staff to successfully meet the sanctuary goals and activities detailed in each action plan. This thematic area stands alone from the other sections in this management plan in that it is not necessarily implemented through our program areas (e.g., education and outreach, research and monitoring, policy and planning), but rather functions as a foundation that supports successful resource protection. As a foundational piece or support system for the management plan, the activities outlined below may include partnering, coordinating, collaborating or calling on other entities for support on an as needed basis for purposes such as enforcement, natural resource damage assessment, oil spill response and the like.

The four action plans in the *Ensuring Management Effectiveness* thematic area are, *Operational Foundation* (OF), *Compliance and Enforcement* (CE), *Emergency Preparedness and Damage Assessment* (EP), and *Assessing Progress* (AP). All of these plans detail sanctuary activities to ensure effective management, as well as the health and safety of the marine environment, residents, sanctuary staff and visitors. The *Operational Foundation* action plan describes how effective and well-planned operations, along with appropriate human resources and adequate physical infrastructure will support management of the sanctuary. The *Compliance and Enforcement* action plan describes how the sanctuary will use regulations, guidelines, and best practices to enhance protection of the marine environment within the sanctuary. *Emergency Preparedness and Damage Assessment* outlines plans to protect sanctuary resources from both natural hazards and human-caused incidents or injuries, through coordinated emergency response and damage assessment. The *Assessing Progress* action plan describes a mechanism for performance evaluation to assess progress towards meeting the goals and objectives of this management plan. In 2013, the sanctuary partnered with the *Ocean Tipping Points* project in an effort to incorporate ecological thresholds in the Sanctuary's management, strategy will be integral towards assessing progress and evaluating management effectiveness. The *Ocean Tipping Points* project seeks to understand the drivers and dynamics of past and potential future ecosystem shifts in these environments. The project will establish a robust set of early warning indicators that help provide notice for pending ecosystem shifts, with sufficient time for management responses.

10.5.1. Operational Foundation



E kuahui like i ka hana.

Let everybody pitch in and work together.

Desired Outcome

Effective and well-planned operations, human resources and adequate physical infrastructure to support effective management of the sanctuary.

Overview

Managing the sanctuary requires a strong operational foundation to support management goals throughout the populated Hawaiian Islands. Support of on-site management and day-to-day operations requires that highly trained and experienced staff are recruited and supported to implement the activities described throughout this management plan. In addition, the appropriate physical infrastructure must be in place to support operations. In order to maximize resources, NOAA and the State of Hawaiʻi will continue to coordinate and collaborate, utilizing existing infrastructure within each organization to facilitate effective operations. Successful site operations and programs are achieved through a synergy of personnel and available resources.

The sanctuary has offices and facilities on four islands located in Līhuʻe on Kauaʻi, Honolulu on Oʻahu, Kīhei on Maui, and on Hawaiʻi island. The function of these offices is to provide an effective means to coordinate and communicate with communities, partners and other stakeholders. Adequate staff and infrastructure are critical to successful sanctuary management, providing for research and monitoring, resource protection, and education and outreach programs.

Due to the overlapping goals of NOAA and the State of Hawaiʻi, the sanctuary can benefit from increased sharing of resources such as boating facilities, vehicles, offices and staff support. The sanctuary works with a number of different agencies, offices and organizations to enhance collaborations to address objectives in the management plan. In order to facilitate some of these collaborations, staff from these organizations are co-located in sanctuary offices. This action plan presents activities designed to ensure the required staffing and training, facilities and vessels, and safety and security are in order to support management priorities.

Objective OF-1:

Provide ample administrative and budgetary support to ensure effective management of the sanctuary.

Activity		Output	Outcome
Support Management Implementation			
OF-1.1.	Produce an annual operating plan that reflects all sanctuary programmatic efforts for the fiscal year based on the management plan, the budget and resources provided by NOAA, the State of Hawai‘i, and other sources.	Annual operating plan.	Planned, assessed, documented, and reported implementation of management plan.
OF-1.2.	Oversee financial administration and use contracts, memorandum of agreements (MOA), grants, acquisitions and administrative functions using federal and State of Hawai‘i guidelines, as appropriate to implement the annual operating plan and the management plan.	Contracts, MOA, grants and acquisitions.	
OF-1.3.	Develop and submit reports to the Office of National Marine Sanctuaries headquarters and the State of Hawai‘i as required to assess progress towards implementation of priority programs and meeting the goals and objectives if the management plan.	Progress reports and information submitted to ONMS and State of Hawai‘i.	
OF-1.4.	Identify and pursue external funding opportunities to supplement the budgets provided by NOAA and the State of Hawai‘i, including grants and collaborations with partner agencies and organizations.	Grants and other funding sources applied for and secured.	

Objective OF-2:

Attract, support and retain highly skilled staff to implement the activities of the management plan.

Activity		Output	Outcome
Build Capacity			
OF-2.1.	Develop and implement a staffing plan to support and maintain highly skilled staff to implement and meet the goals and objectives of the management plan.	Staffing plan implemented that reflects the skills and knowledge base needed to effectively implement the management plan.	Sufficient and appropriate human resource capacity for effective management plan implementation.
OF-2.2.	Ensure staff manage contracts and memorandum of agreements (MOA) that fulfill responsibilities and requirements for products, services and staffing for implementation of the management plan.	Staffing contracts and MOAs effectively implemented in a timely and seamless manner.	
OF-2.3.	Maintain a dynamic internship program, including administration, recruiting, mentoring, and evaluation, to engage university students and build local capacity to support sanctuary programs and activities.	Active internship program.	Well-trained and coordinated staff whose skills and knowledge-base remain current and relevant to the needs of effective sanctuary management.
OF-2.4.	Improve training and team-building opportunities for staff, prioritizing those skills and information/knowledge needs that will best support successful implementation of sanctuary initiatives and programs.	Training plan for each staff member and at least one annual staff retreat.	
OF-2.5.	Update facility safety plans to protect staff and visitors and ensure the protection of sanctuary facilities, vessels and vehicles in daily operation and in the event of disasters. Ensure that all staff are aware of current safety procedures.	Annually updated emergency preparedness and safety plan, including regular safety training and drills.	Trained staff compliant with safety and environmental procedures.
OF-2.6.	Incorporate NOAA environmental compliance directives and local, state and federal environmental regulations into all sanctuary operations.	Compliance with environmental regulations complied.	

Objective OF-3:

Assess, evaluate and maintain facilities and vehicles to meet sanctuary standards and support staff needs to successfully implement programmatic activities.

Activity	Output	Outcome
Place-Based Planning		
OF-3.1. Update the *Facilities Master Plan for the Office of National Marine Sanctuaries (ONMS) Pacific Region* to reflect current planning efforts, including current assessments and needs for each of the sanctuary facilities.	Updated master plan.	Updated planning framework for facility needs.
OF-3.2. Continue exploring the development of a discovery center on Kaua‘i to provide offices, meeting space, and expanded facilities for education and outreach.	Opportunities pursued and explored for the development of a discovery center on Kaua‘i.	Opportunities identified for new facilities to support sanctuary operations and outreach.
OF-3.3. Identify facilities on Hawai‘i island to provide office space and expanded facilities for education and outreach.	List of potential facilities on Hawai‘i island.	
OF-3.4. Identify facilities on the North Shore of O‘ahu to provide education and outreach opportunities adjacent to the sanctuary.	List of potential facilities on the North Shore of O‘ahu.	
OF-3.5. Develop a schedule and costs for regular building and grounds maintenance for all facilities, especially the NOAA-owned facilities in Kīhei, Maui. Incorporate this into annual operating plans to address maintenance issues in a timely manner and avoid deferred maintenance that could increase future repair costs.	10-year building and grounds maintenance plan and cost schedule, updated annually	Streamlined process to ensure maintenance of sanctuary facilities and vehicles.

Activity	Output	Outcome
Place-Based Planning		
OF-3.6. Implement the *Kīhei Campus Plan* as outlined by the *Master Plan Update Improvements* (2009) and *Visitor Center Exhibits and Campus Master Plan Concept* (2010).	Professionally installed exhibits in and around the visitor center and completed courtyard, outdoor activity areas and landscaping.	Planning and implementation of improvements at the Kīhei campus fully realized.
OF-3.7. Evaluate the effectiveness of flood preparedness efforts at the Kīhei facility and update the *Masonry Building Facility Survey and Flood Mitigation Investigation* (2011) as needed.	Completed assessment of the status of flood protections.	
OF-3.8. Coordinate with ‘Ao‘ao O Na Loko I‘a O Maui (Maui Fishpond Association) to restore the Hawaiian fishpond which serves as a natural buffer to reduce flooding, erosion, and sedimentation at the Kīhei facilities.	Ongoing restoration of the fishpond.	
OF-3.9. Assess sanctuary facilities biannually to ensure adequate and safe infrastructure for staff and visitors.	Assessment of facility effectiveness.	Adequate facilities for staff and programs.
Best Management Practices		
OF-3.10. Implement green building standards in renovations to increase energy conservation. At the Kīhei facilities, increase on-site electrical production to achieve a positive energy flow to the grid.	Installed technology to increase energy savings (e.g., battery storage, additional photovoltaic, windmills).	Diverse strategies employed to decrease the environmental impacts of sanctuary operations.
OF-3.11. Reevaluate recycling programs at all offices to maximize recycling of all waste materials that are accepted by local recyclers.	Comprehensive recycling program evaluated at all sanctuary facilities.	
OF-3.12. Utilize the National Park Service Climate Leadership in Parks (CLIP) Tool to measure and strategize to reduce the carbon footprint of the sanctuary.	Plan in place for each sanctuary facility to reduce its carbon footprint.	
OF-3.13. Promote alternative transportation opportunities for staff and visitors to sanctuary facilities.	Alternative transportation used by staff and visitors.	
OF-3.14. Grow native plants in the landscape to minimize water usage, provide shading and act as a natural filtration system; communicate its cultural and conservation value to visitors.	Reduced water usage and green landscaping interpretation.	
OF-3.15. Obtain vehicles that are energy efficient and fulfill the requirements for the supported programs.	Energy-efficient vehicles acquired.	

Objective OF-4:

Maintain an on-water presence in the sanctuary to ensure effective and efficient sanctuary research, monitoring, resource protection and education activities.

Activity	Output	Outcome
Support Management Implementation		
OF-4.1. Develop and update vessel operation manuals for each small boat that describe its specific operational procedures and guidelines.	Annually updated vessel operations shared with all vessel operators and crew.	Streamlined process to ensure effective and safe use of small boats in sanctuary activities.
OF-4.2. Maintain regular training and certifications for vessel operators and crewmembers in accordance with the NOAA and Office National Marine Sanctuary (ONMS) Small Boat Program including all safety training.	Updated certifications for all vessel operators and crew.	
OF-4.3. Acquire, maintain, repair and modify small boats in accordance with NOAA and ONMS Small Boat Program guidelines and support the operations, personnel and maintenance (OPM) requirements for each vessel.	Small boats maintained and operational.	
OF-4.4. Develop the infrastructure to adequately support the operation of small boats including maintenance and storage facilities, pier space, and trailers and trucks for towing.	Identified maintenance and storage facilities, pier space, trailers and truck for towing for each boat.	
OF-4.5. Develop and implement procedures and processes to improve the green operation of small boats.	Assessment of all operational procedures to incorporate appropriate green operations.	

Activity	Output	Outcome
Enhance Collaboration		
OF-4.6. Review and update guidance for the use of small boats by partners including an application process, schedule of availability, cost schedule, liability, compatible uses and operational guidelines.	Implemented use policy, formal solicitation process and web-based application to use small boats.	Clear process for partners to use small boats.
OF-4.7. Submit annual ship time requests or acquire the use of other assets to support missions for research, monitoring, mapping and education.	Annual updated list of missions that require ship or aircraft assets.	Increased access to diverse field opportunities to achieve sanctuary goals.
OF-4.8. Coordinate research missions with other supporting entities, such as NOAA Pacific Islands Fisheries Science Center (PIFSC) and academia.	Annual meetings to determine future research missions within the sanctuary.	
OF-4.9. Utilize aircraft and NOAA Unmanned Aircraft Systems (UAS) to support sanctuary missions for research, monitoring, mapping and education.	List of aerial missions updated to support sanctuary programs.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Operational Foundation	(7) Build, maintain, and enhance an operational capability and infrastructure that efficiently and effectively support the attainment of the NMSP's mission and goals.	OF-1.1. Produce an annual operating plan that reflects all sanctuary programmatic efforts for the fiscal year based on the management plan, the budget and resources provided by NOAA, the State of Hawai'i, and other sources.	Every year, the annual operating plan has been updated to reflect the priroties as esyablished in the management plan.
		OF-3.1. Update the Facilities Master Plan for the Office of National Marine Sanctuaries (ONMS) Pacific Region to reflect current planning efforts, including current assessments and needs for each of the sanctuary facilities.	Within 1 year, the *Facilities Master Plan for the Office of National Marine Sanctuaries (ONMS) Pacific Region* has been updated.
		OF-4.3. Acquire, maintain, repair and modify small boats in accordance with NOAA and ONMS Small Boat Program guidelines and support the operations, personnel and maintenance (OPM) requirements for each vessel.	Within 5 years, the small boat requirements for the sanctuary have been reassessed and a plan has been developed to priotitize and fulfill long-term acquisition, maintainence and repair needs for sanctuary vessels.

10.5.2. Compliance and Enforcement

He ‘iki ‘ana ia i ka pono.

It is a recognizing of the right thing.

One has seen the right thing to do and has done it.

Desired Outcome

A high level of compliance achieved through the adherence to sanctuary regulations, guidelines, and best practices resulting in increased protection of the marine environment within the sanctuary.

Overview

Enforcement is a critical component of natural resource management in marine sanctuaries and helps to ensure that the natural and cultural marine resources in Hawai‘i are protected. The sanctuary collaborates with enforcement agencies to enforce sanctuary regulations within sanctuary boundaries. The sanctuary currently works with NOAA’s Office of Law Enforcement (OLE) and NOAA’s General Counsel as the lead offices for enforcement within the sanctuary. The authority for the Hawai‘i Department of Land and Natural Resources Division of Conservation and Resource Enforcement (DOCARE) to enforce federal laws under the National Marine Sanctuaries Act is through the Cooperative Enforcement Agreement and Joint Enforcement Agreement with NOAA. The United States Coast Guard (USCG) also has responsibilities for enforcing sanctuary regulations. In order for there to be better coordination amongst law enforcement agencies responsible for enforcing sanctuary regulations, the *Sanctuary Interagency Law Enforcement Task Force* was formed at the direction of the Office of National Marine Sanctuaries. The task force is made up of the entities that are responsible for enforcing sanctuary regulations in Hawai‘i: NOAA Office of Law Enforcement, NOAA Office of General Counsel, DOCARE, USCG, and sanctuary management.

In addition to law enforcement, the sanctuary promotes voluntary compliance through education programs that encourage responsible marine wildlife viewing, multiple uses of marine resources, and inspired ocean care. This voluntary compliance encourages the public to comply with regulations and guidelines, and practice appropriate behavior to protect marine resources provided they are educated with the proper information. For example, compliance assistance to protect humpback whales promotes behaviors that contribute to boater safety around whales and reduces whale-vessel interactions, while encouraging compliance with the 100-yard humpback whale approach regulation.

The sanctuary office is looking to support community based programs that facilitate community stewardship of marine and coastal resources by supporting education, monitoring and incident reporting in order to achieve better compliance with regulations and promote proper ocean use to protect marine resources. For instance, in Hawai‘i, the Makai Watch program is in place in a number of communities in collaboration with the DLNR Division of Conservation and Resources Enforcement (DOCARE). As of 2014, seven communities have established Makai Watch Programs. At national marine sanctuaries in Florida and California, volunteer based programs called Team OCEAN, short for Ocean Conservation Education Action Network, promote safe and enjoyable use of the marine environment and advocate protection of its natural resources.

Objective CE-1:

Increase coordination and effectiveness of enforcement efforts in order to ensure high levels of compliance with sanctuary regulations and enhance protection of sanctuary resources.

Activity	Output	Outcome
Enhance Collaboration		
CE-1.1. Continue to facilitate the Sanctuary Interagency Law Enforcement Task Force as a coordinating body for enforcement activities related to sanctuary regulations.	Biannual meetings, attended by representatives from various state and federal agencies.	Continued coordination of various agencies to enforce sanctuary regulations and ensure high levels of compliance.
CE-1.2. Develop training opportunities for law enforcement professionals to promote and enhance their understanding of the sanctuary's cultural and natural resources and associated regulations.	Training opportunities for members of the enforcement chain (e.g., officers, prosecutors, and judges).	Well-informed enforcement officials leading to increased enforcement of sanctuary regulations.
CE-1.3. Coordinate with Sanctuary Interagency Law Enforcement Task Force to develop methods to evaluate levels of compliance with regulations, and the effectiveness of its education and outreach efforts.	Assessment of compliance with regulations, and education and outreach efforts.	More effective compliance with regulations.
CE-1.4. Further define sanctuary enforcement protocols within the NOAA-OLE, DOCARE, and ONMS enforcement program.	Updated local protocol for enforcement efforts.	Continued coordination of various entities to more effectively enforce sanctuary regulations and increase compliance.
CE-1.5. Coordinate annually with OLE to update the *Joint Enforcement Agreement* between NOAA and the State of Hawai'i to provide input on enforcement requirements within the sanctuary.	Updated enforcement agreements.	
CE-1.6. Develop and update a memorandum of agreement (MOA) with U.S. Coast Guard to ensure coordinated enforcement efforts.	Updated MOA with USCG.	
CE-1.7. Consider coordinated enforcement and agreements with other federal resource management agencies that have the capabilities to enforce sanctuary regulations.	Consultations with natural resource management and enforcement agencies.	

Objective CE-2:

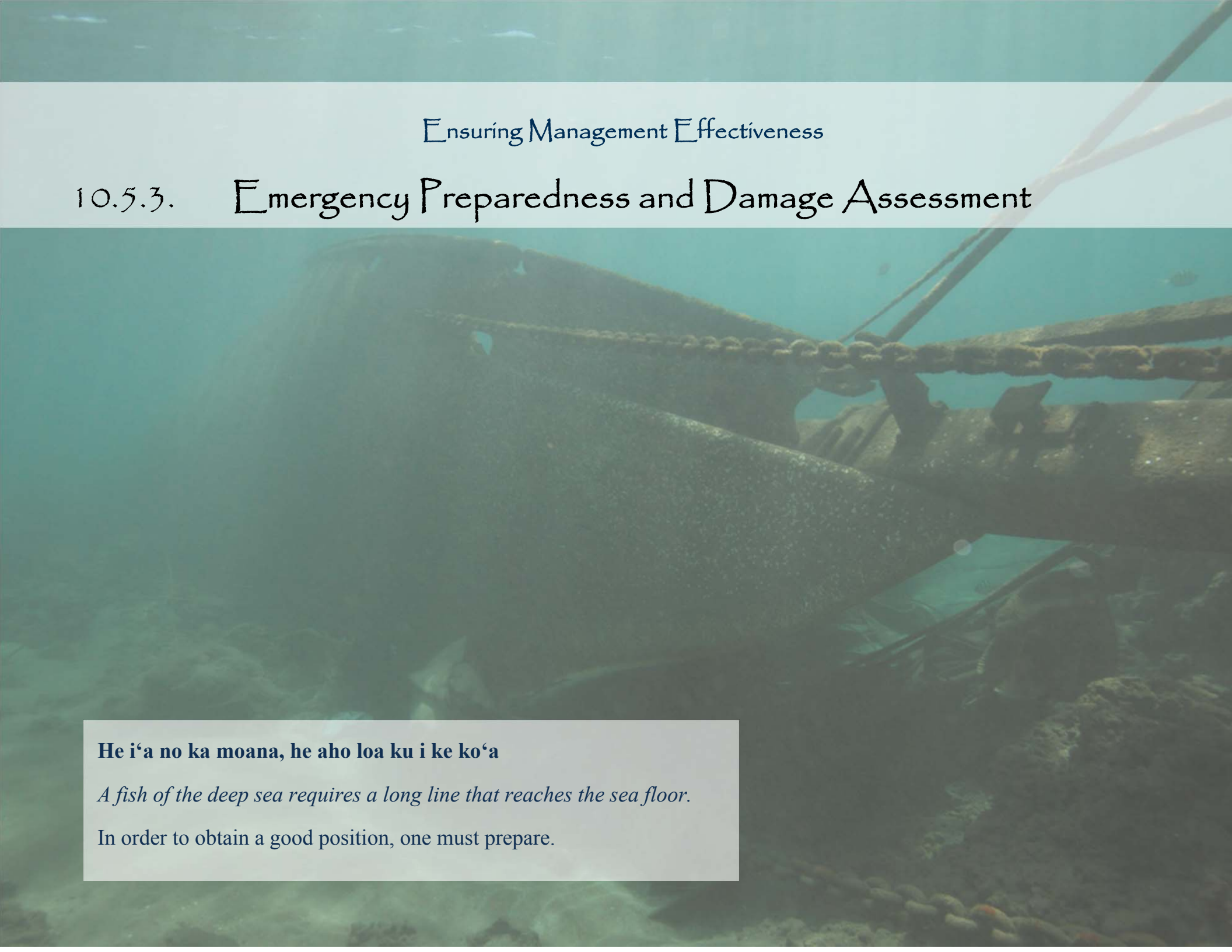
Enhance education and outreach efforts in order to increase public understanding, support and compliance with sanctuary regulations.

Activity		Output	Outcome
Enhance Collaboration			
CE-2.1.	Work with specific user groups that may have impacts on natural and cultural resources within the sanctuary to determine the best means to reach out to their constituencies.	Established communication mechanisms with diverse user groups and constituencies.	Enhanced communication with user groups to enhance voluntary compliance.
Improve Communication			
CE-2.2.	Develop interpretive materials to for sanctuary user groups that promote public awareness and voluntary compliance with sanctuary regulations.	Developed and distributed interpretive materials through various multimedia channels.	Increased public awareness and understanding of impacts on sanctuary resources to enhance voluntary compliance.
CE-2.3.	Continue to assess opportunities for signage describing regulations at access points to the sanctuary, to promote awareness of ocean users of specific resource protection issues and the need for compliance.	Potential signage opportunities identified and prioritized.	
CE-2.4.	Participate in specific ocean related events to educate targeted user groups and encourage voluntary compliance with regulations in order to minimize impacts to natural and cultural resources within the sanctuary.	Sanctuary education materials on regulations and best practices made available at ocean related events (e.g., festivals and conferences).	
Place-Based Planning			
CE-2.5.	Support the development and implementation of community-based marine management programs that aim to strengthen voluntary compliance and improve resources (e.g., Makai Watch Program).	Community place-based planning opportunities identified and supported.	Increased compliance driven by community efforts.
Build Capacity			
CE-2.6.	Coordinate opportunities for volunteers to provide peer-to-peer education and outreach to sanctuary users in high-use or vulnerable areas.	Volunteer-led peer-to-peer outreach and education events.	Increased compliance driven by volunteer efforts.

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Compliance and Enforcement	(5) Facilitate human use in sanctuaries to the extent such uses are compatible with the primary mandate of resource protection, through innovative public participation and interagency cooperative arrangements. (7) Build, maintain, and enhance an operational capability and infrastructure that efficiently and effectively support the attainment of the NMSP's mission and goals.	CE-1.1. Continue to facilitate the Sanctuary Interagency Law Enforcement Task Force as a coordinating body for enforcement activities related to sanctuary regulations.	Twice a year, the Interagency Law Enforcement Task Force has met to assess and evaluate current enforcement needs and responses.
		CE-1.2. Develop training opportunities for law enforcement professionals to promote and enhance their understanding of the sanctuary's cultural and natural resources and associated regulations.	Every year, one training has been offered to law enforcement professionals to familarize them with sanctuary regulations and coordinate on enforcement efforts in the sanctuary.
		CE-2.5. Support the development and implementation of community-based marine management programs that aim to strengthen voluntary compliance and improve resources (e.g., Makai Watch Program).	Within 4 years, community-based programs in two communities have been supported to strengthen voluntary compliance.

10.5.3. Emergency Preparedness and Damage Assessment



He iʻa no ka moana, he aho loa ku i ke koʻa

A fish of the deep sea requires a long line that reaches the sea floor.

In order to obtain a good position, one must prepare.

Desired Outcome

Increased protection of sanctuary resources from both natural hazards and human-caused incidents or injuries, through coordinated emergency response and damage assessment.

Overview

There are a number of natural and human-caused hazards that can result in potentially harmful impacts to marine resources in the sanctuary. Human-caused incidents include vessel groundings, oil and other hazardous material spills and cargo spills, all of which can have significant impacts on the marine environment. Vessel groundings often occur in Hawai‘i due to the high number of vessels used by the shipping and tourism industries, military, and for recreation and fishing. Groundings can directly damage coral reefs and other habitats. Scattered debris and cargo can pose a threat to navigation that may further damage the reef and harm marine life. Groundings may also result in the release of hazardous material into the marine environment, either suddenly upon grounding, when a vessel breaks apart, or over a prolonged period as it leaks from the grounded or sunken vessel. In addition, vessels carrying oil and other products regularly transit through Hawaiian waters, each with the potential to release hazardous materials into the ocean. Hurricanes, large winter storms, high surf, tsunamis, heavy rains, and landslides are all examples of natural disasters that can have severe impacts to land resources as well as potentially severe impacts to marine resources. Runoff from heavy rains can cause severe erosion and sedimentation that could smother already marginalized coral reefs or nursery and spawning habitats. Storms and tsunamis can also flush man-made materials into the ocean increasing marine debris and hazardous materials that may be a threat to marine life, navigation, and human health and safety.

The numerous vessel groundings that occur in waters surrounding Hawai‘i illustrate the need for contingency plans to be prepared for hazardous materials spills and removal of these vessels to prevent further damage. The State of Hawai‘i and U.S. Coast Guard have only specific responsibilities related to grounded vessels and vessel removal can be delayed if owners lack the necessary resources. The sanctuary will partner with other agencies to develop the necessary emergency response capability, including adequate staff capacity to coordinate and conduct natural and cultural resource damage assessments, support litigation if necessary, and oversee restoration and monitoring actions funded by settlements. Emergency preparedness requires attention to not only specific types of hazards but also to increased preparedness for any type of hazard. A sanctuary-specific *All-Hazard Response Plan* will be developed to complement the *Hawai‘i Area Contingency Plan*, developed by the Hawai‘i Area Committee, and will emphasize how the site will work with other federal and state trustees to protect sanctuary resources during an oil spill or other hazardous incidents.

Objective EP-1:

Improve coordinated emergency response to increase readiness for natural hazards and human caused incidents.

Activity		Output	Outcome
Enhance Collaboration			
EP-1.1.	Continue to participate in the Hawai‘i Area Committee and to ensure coordination of sanctuary-specific emergency response planning to natural hazards and human-caused incidents.	Sanctuary input into state emergency planning and response efforts.	Increased coordination in emergency response planning and effectiveness in responding to an incident.
EP-1.2.	Identify and coordinate with other appropriate emergency response experts or agencies to ensure readiness in the case of an emergency response incident.	Effective coordination of response agencies and experts.	
Build Capacity			
EP-1.3.	Identify and assign staff and co-located personnel, in each of the sanctuary offices, to specific responsibilities for resource protection and emergency response.	Resource protection and emergency response responsibilities assigned and evaluated on a regular basis.	Increased staff capacity in emergency response and damage assessment.
EP-1.4.	Acquire and maintain appropriate training and certifications for sanctuary staff for emergency response, including the Incident Command System, Hazardous Waste Operations and Emergency Response (HAZWOPER), Shoreline Cleanup Assessment Technique, Natural Resources Damage Assessment (NRDA), and Aviation Safety.	Emergency response certifications and trainings maintained and kept current.	

Activity		Output	Outcome
Gather Information			
EP-1.5.	Enhance sanctuary website to host key information specific to the sanctuary that can be used to provide up-to-date information to emergency responders.	Web page for sanctuary resource information to be used for emergency response.	Effective use of tools to prepare and respond to emergencies.
EP-1.6.	Coordinate with web-based GIS tools including Pacific Islands Ocean Observing System (PacIOOS) and Environmental Response Management Application (ERMA) to make sanctuary information available including resources at risk, potential high probability threats, maps, coast observation systems, and jurisdictional information.	Sanctuary-specific information available on web-based GIS tools to be used for emergency response planning.	
Enhance Collaboration			
EP-1.7.	Identify gaps in information on key sanctuary resources and develop GIS data that would be useful for emergency responders and resource managers.	Comprehensive GIS data to inform emergency response (e.g., Environmental Sensitivity Index maps, Biogeographic Assessments and updated satellite imagery).	Effective use of data to prepare and respond to emergencies.
EP-1.8.	Develop with partners a sanctuary-specific All-Hazards Response Plan that includes appropriate notifications to various stakeholder groups and preparation response procedures. Practice plan using exercises that include all partners.	*All-Hazards Response Plan.*	Framework to respond to emergencies and hazards.

Objective EP-2:

Prepare for potential impacts from natural hazards and human-use activities to natural and cultural resources within the sanctuary.

Activity		Output	Outcome
Assess Resources			
EP-2.1.	Improve the collection and synthesis of data, so that the distribution and abundance of sensitive species and habitats can inform emergency response and natural resource damage assessment.	Collection and synthesis of data to inform emergency response and damage assessment.	Increased understanding of the spatial distribution of resources and potential threats and hazards used to inform emergency responders about areas of greatest value, sensitivity, and potential exposure to catastrophic events.
EP-2.2.	Identify the potential locations of human-caused threats to sanctuary resources from catastrophic events (e.g., hazardous material spills) using information such as shipping lanes, anchorages, transfer stations, and facility locations.	Place-based information of potential threats integrated into sanctuary emergency planning.	
EP-2.3.	Identify sanctuary and coastal resources that are vulnerable to natural hazards based on existing historical or analytical information (e.g., tsunami inundation, sea-level rise, and flood maps) and create new GIS products to highlight sanctuary resources at risk from natural hazards.	Resource vulnerability to natural hazards integrated into sanctuary emergency planning.	
EP-2.4.	Partner to assess the risk of impacts to marine resources in the sanctuary using the data collected on potential threats from human-caused and natural disasters.	Risk assessment of human and natural hazards for sanctuary emergency planning.	

Objective EP-3:

Participate in the Natural Resource Damage Assessment (NRDA) process with ONMS and the State of Hawai‘i for incidents that injure sanctuary resources.

Activity	Output	Outcome
Enhance Collaboration		
EP-3.1. Work with appropriate NOAA offices, and federal, state and county agencies to assess injury to marine resources in the sanctuary.	Participate in injury assessment of impacted sanctuary resources.	Increased coordination in the assessment of natural resource damage and subsequent restoration efforts.
EP-3.2. Work with the appropriate NOAA offices and the State of Hawai‘i to implement the National Resource Damage Assessment (NRDA) process to identify how to restore, replace, or acquire the equivalent of the injured sanctuary resources.	Incident-specific plans to restore sanctuary resources.	
EP-3.3. Collaborate with partners and stakeholders to develop a monitoring program to assess the effectiveness of restoration efforts.	A monitoring program to assess restoration efforts.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Emergency Preparedness and Damage Assessment	(7) Build, maintain, and enhance an operational capability and infrastructure that efficiently and effectively support the attainment of the ONMS's mission and goals.	EP-1.8. Develop with partners a sanctuary-specific All-Hazards Response Plan that includes appropriate notifications to various stakeholder groups and preparation response procedures.	Within 2 years, an All-Hazards Response Plan has been developed and is updated on an annual basis, and response plans are communicated and coordinated amongst partners to enssure readiness to respond to an incident in or adjacent to the sanctuary.
		EP-2.2. Identify the potential locations of human-caused threats to sanctuary resources from catastrophic events (e.g., hazardous material spills) using information such as shipping lanes, anchorages, transfer stations, and facility locations.	Within 5 years, a risk assessment model has been developed for analyzing the potential areas for incidents that could cause a threat to sanctuary resources from natural and human caused hazards.

Ensuring Management Effectiveness

10.5.4. Assessing Progress

‘A‘ohe pu‘u ki‘eki‘e ke ho‘ā‘o ‘ia e pi‘i.

No cliff is so tall that it cannot be scaled.

No problem is too great when one tries hard to solve it.

Desired Outcome

A performance evaluation framework to continually gauge the sanctuary's progress in meeting its management goals and objectives.

Overview

The action plans in this management plan describe activities that will be undertaken to achieve the management goals and objectives of the sanctuary. Throughout the management plan, specific performance measures have been identified, along with time-bound targets for achieving these management objectives. Management performance metrics are based on *process indicators* that measure the degree to which management activities are being implemented. Often these metrics are not directly connected to the state of the environment, resources, and human communities, but rather are measuring our success at implementing the action plans within this management plan. However, there is also an increased need to identify *impact indicators***,** which measure changes in ecological or social systems that are a result of implementing the action plans in this management plan. Therefore, the sanctuary will use two levels of evaluation, based on both *process indicators* (performance measures or *did we do what we said we would do in our management plan?*) and *impact indicators* (ecological, cultural, and socioeconomic indicators of change or *what did we achieve as a result of implementing the management plan*?). Both types of indicators will be used to measure progress towards achieving the sanctuary's vision, mission, goals and objectives.

In order to understand management effectiveness relative to the condition of natural, cultural, social and economic resources, managers need to identify indicators or reference points that can be used as a proxy for measuring the overall health of the ecosystem (e.g., coral reefs, top predator species). Subsequently, by establishing target levels or thresholds of change for those indicators (e.g., distribution of healthy coral, population size of top predators), and monitoring change in those indicators, sanctuary managers will assess the effectiveness of current management actions, and the corresponding need for adaptive management. This action plan describes the necessary steps to implement an adaptive management approach that is responsive to the evaluation results and allows for adjustments to management activities in order to improve resource protection when trends (indicators) point to a decline in the resource.

The *Assessing Progress Action Plan* describes activities the sanctuary will undertake to assess the implementation of the activities described in the other action plans found throughout this management plan. The sanctuary is proposing to use performance measures to monitor and evaluate how the implementation of activities in the management plan are contributing to achieving the sanctuary's vision, mission, goals and objectives. This information will be tracked and synthesized in annual accomplishment reports and made available to the public. Sanctuary staff will also monitor the impact that sanctuary activities have towards addressing change within ecological, cultural or social systems within the sanctuary. Sanctuary management actions will be informed by these indicators and adapted as necessary to respond to change.

Related Goals

Goal 5
Use collaborative and adaptive management approaches to optimize effectiveness.

Goal 6
Establish best management practices and approaches to demonstrate that lasting, sustainable, and replicable results can be achieved throughout the Hawaiian Islands and applied to settings beyond Hawai'i.

Objective AP-1:

Ensure robust, results-based implementation of the management plan using *process indicators* as a measure of whether management activities are meeting the natural and cultural resource protection objectives and individual activity outcomes as prescribed in the management plan.

Activity		Output	Outcome
Gather Information			
AP-1.1.	Develop a sanctuary advisory council (council) sub-committee to oversee the development and application of a performance measure evaluation framework.	Council sub-committee on performance measures established and performance measure evaluation framework developed.	Evaluation framework in place to continually assess progress towards implementing activities in the management plan.
AP-1.2.	Use *process indicators* (performance measures) as laid out in this management plan to monitor and evaluate how well staff are implementing the activities in the management plan and achieving the specific stated outcomes as described for each activity in each action plan.	Sanctuary performance plan established and implemented, which includes developing monitoring protocols based on already identified indicators; and the process for evaluating, assessing and communicating results.	Information on progress towards achieving management plan activities compiled, responded to, and communicated on a regular and on-going basis.
AP-1.3.	Programmatic staff (e.g., education, research, science) tracks and assesses progress towards achieving performance measures.	Quarterly compilation of performance measure data and assessment towards meeting objectives of management plan.	
Improve Communication			
AP-1.4.	Complete annual *Accomplishment Reports* and *Condition Reports*, as well as other reporting mechanisms in accordance with the Office of National Marine Sanctuaries (ONMS) evaluation standards.	Contributions made to both site-specific evaluation of successful implementation of the management plan, and to a system-wide evaluation.	Management plan evaluation is transparent and effectively communicated to diverse audiences.
AP-1.5.	Ensure that accomplishment updates are available to diverse audiences on a regular basis including Office of National Marine Sanctuaries, State of Hawai‘i Board of Land and Natural Resources, key stakeholders, interest groups and constituents.	Accomplishment updates incorporated into briefing documents, outreach materials, and on the website.	

Objective AP-2:

Advance the application of *impact indicators* to measure the progress of the sanctuary towards addressing change within ecological, cultural or social systems at two sentinel sites within the sanctuary.

Activity	Output	Outcome
Gather Information		
AP-2.1. Identify existing status of key ecological systems within the sanctuary including their spatial distribution, with special attention to transition zones, stressors affecting existing states, and human use activities that can drive those stressors, in partnership with the Ocean Tipping Points project.	A spatial representation of existing biophysical regimes and stressor impacts for two sentinel sites.	Spatial site characterization and assessment helping to establish a baseline and identify key areas that warrant special management attention.
AP-2.2. Identify ranges of acceptable changes (thresholds) for ecosystems in response to human and natural stressors as applied to two identified sentinel sites.	Impact thresholds identified in relation to the condition of biocultural resources and the impacts of stressors for two sentinel sites.	Articulation of acceptable levels (or thresholds of change) in biocultural systems as a standard for triggering adaptive management (a calculated change in management to specific levels of change).
AP-2.3. Identify indicators and reference points that can be used to monitor and evaluate levels of change to ecosystem services in two sentinel sites.	Indicators used to monitor stress levels in relation to levels associated with thresholds (acceptable levels) of change.	

Objective AP-3:

Develop a framework to support adaptive management actions that can be put in place in a timely and effective manner in response to the results of monitoring *impact indicators*.

Activity	Output	Outcome
Gather Information		
AP-3.1. Collaborate with the Ocean Tipping Points project to develop a range of possible calculated management responses that could be incrementally implemented in response to early signs of decline or change and/or if threshold-based targets are exceeded.	Matrices of possible management responses to address the incremental approach towards exceeding threshold-based targets.	Adaptive management framework established, including agreed-upon protocols and processes to respond to change.
AP-3.2. Work with NOAA legal counsel to identify legal mechanisms and/ or policy approaches that could be implemented in a timely manner in response to early signs of decline or change and/or if threshold-based targets are exceeded.	Protocols and processes in place for addressing the need to for implementing adaptive management approaches in a responsive and timely manner.	

Performance Measures

	ONMS Goals	Activities Measured	Performance Measures
Assessing Progress	(7) Build, maintain, and enhance an operational capability and infrastructure that efficiently and effectively support the attainment of the NMSP's mission and goals.	AP-1.2: Programmatic staff (e.g., education, research, science) tracks and assesses progress towards achieving performance measures.	Four times per year, performance measure data has been compiled and assessed.
		AP-2.2: Identify ranges of acceptable changes (thresholds) for ecosystems in response to human and natural stressors as applied to two identified sentinel sites.	Within 2 years, impact thresholds have been identified for two sentinel sites.

11. Appendices

11.1. Appendix A: Protected Species

Common Name	Hawaiian Name	Latin Name	ESA		MMPA	MBTA
			Endangered	Threatened		
Hawaiian monk seal	ʻĪlioholoikauaua	*Neomonachus schauinslandi*	✓		✓	
Blue whale	koholā	*Balaenoptera musculus*	✓		✓	
Fin whale	koholā	*Balaenoptera physalus*	✓		✓	
Humpback whale	koholā kuapiʻo	*Megaptera novaeangliae*	✓		✓	
Sei whale	koholā	*Balaenoptera borealis*	✓		✓	
Right whale	koholā	*Eubalaena japonica*	✓		✓	
Insular false killer whale	koholā	*Pseudorca crassidens*	✓		✓	
Sperm whale	palaoa	*Stenella longirostris*	✓		✓	
Hawksbill turtle	honuʻea	*Eretmochelys imbricata*	✓			
Leatherback turtle	honu	*Dermochelys coriacea*	✓			
Olive Ridley turtle	honu	*Lepidochelys Belolivacea*	✓			
Green sea turtle	honu	*Chelonia mydas*		✓		
Loggerhead Turtle	honu	*Caretta caretta*		✓		
Bryde's whale	koholā	*Balaenoptera edeni*			✓	
Minke whale	koholā	*Balaenoptera acutorostrata*			✓	
Blainsville beaked whale	koholā	*Mesoplodon densirostris*			✓	
Common bottlenose dolphin	naiʻa	*Tursiops truncatus*			✓	
Cuvier's beaked whale	koholā	*Ziphius cavirostris*			✓	
Fraser's dolphin	naiʻa	*Lagenodelphis hosei*)			✓	
Longman's beaked whale	koholā	*Indopacetus pacificus*			✓	
Melon-headed whale	koholā	*Peponocephala electra*			✓	
Pygmy sperm whale	palaoa	*Kogia breviceps*			✓	
Dwarf sperm whale	palaoa	*Kogia sima*			✓	
Risso's dolphin	naiʻa	*Grampus griseus*			✓	
Rough-toothed dolphin	naiʻa	*Steno bredanensis*			✓	
Short-finned pilot whale	naiʻa	*Globicephala macrorhynchus*			✓	
Spinner dolphin	naiʻa	*Stenella longirostris*			✓	
Pantropical spotted dolphin	naiʻa	*Stenella attenuata*			✓	
Pygmy killer whale	koholā	*Feresa attenuata*			✓	
Killer whale	koholā	*Orcinus orcus*			✓	
Striped dolphin	naiʻa	*Stenella coeruleoalba*			✓	
-	ʻAkekeʻe (PE)	*Loxops caeruleirostris*			✓	✓
Hawaiʻi ʻAkepa	ʻĀkepa	*Loxops coccineus coccineus*	✓			✓
Maui ʻAkepa	ʻAkepa	*Loxops coccineus ochraceus*	✓			
-	Greater ʻAkialoa	*Hemignathus ellisianus*	✓			
-	ʻAkiapōlāʻau	*Hemignathus munroi*	✓			

Common Name	Hawaiian Name	Latin Name	ESA		MMPA	MBTA
			Endangered	Threatened		
-	Kaua‘i ‘Akialoa	*Hemignathus procerus*	✓			
Kaua‘i/Baird‘s creeper	‘Akikiki	*Oreomystis bairdi*	✓			
Crested Honeycreeper	‘Ākohekohe	*Palmeria dolei*	✓			✓
Maui/Lāna‘i Creeper	Maui ‘Alauahio	*Paroreomyza montana*				✓
O‘ahu Creeper	O‘ahu ‘Alauahio	*Paroreomyza maculata*	✓			✓
Common ‘Amakihi	Hawai‘i ‘Amakihi	*Hemignathus virens*				✓
-	Kaua‘i ‘Amakihi	*Hemignathus Kaua‘iensis*				✓
-	O‘ahu ‘Amakihi	*Hemignathus flavus*				✓
Lesser ‘Amakihi	‘Anianiau	*Magumma parva*				✓
-	‘Apapane	*Himatione sanguinea*				✓
-	Hawai‘i Creeper	*Oreomystis mana*	✓			✓
-	Laysan Finch	*Telespiza cantans*	✓			✓
-	Nihoa Finch	*Telespiza ultima*	✓			✓
-	‘I‘iwi	*Vestiaria coccinea*				✓
Moloka‘i Creeper	Kākāwahie	*Paroreomyza flammea*	✓			✓
- (Nihoa Reed-warbler)	Nihoa Millerbird	*Acrocephalus familiaris kingi*	✓		✓	✓
-	Maui Nukupu‘u	*Hemignathus lucidus affinus*	✓			✓
-	Kaua‘i Nukupu‘u	*Hemignathus lucidus hanapepe*	✓			
-	‘Ō‘ū	*Psittirostra psittacea*	✓			✓
-	Palila	*Loxioides bailleui*	✓			✓
Maui Parrotbill		*Pseudonestor xanthophyrs*	✓			✓
Black-faced Honeycreeper	Po‘ouli	*Melamprosops phaeosoma*	✓			✓
Chinese Goshawk or Chinese Sparrowhawk	Gray Frog-Hawk	*Accipiter soloensis*				
-	Stejneger’s Petrel	*Pterodroma longirostris*				
-	Greater Crested Tern	*Thalasseus bergii*				
Hawaiian Stilt	Ae‘o	*Himantopus mexicanus knudseni*	✓			
Laysan Duck		*Anas laysanensis*	✓			
Hawaiian Duck	Koloa Maoli	*Anas wyviliana*	✓			
Hawaiian Goose	nēnē	*Branta sandvicensis*	✓			
Hawaiian Hawk	‘Io	*Buteo solitarius*	✓			
-	O‘ahu ‘Elepaio	*Chasiempus sandwichensis ibidis*	✓			
Hawaiian Crow	‘Alalā	*Corvus Hawaiiensis*	✓			
Hawaiian Coot	‘Alae ke‘oke‘o	*Fulica alai*	✓			
Hawaiian gallinule	‘Alae ‘ula	*Gallinula chloropus sandvicensis*	✓			
Kaua‘i ‘ō‘ō	‘ō‘ō ‘ā‘ā	*Moho braccatus*	✓			
Moloka‘i Thrush	Oloma‘o	*Myadesxes Lāna‘iensis ruxha*	✓			
Large Kaua‘i Thrush	Kāma‘o	*Myadestes myadestinus*	✓			
Small Kaua‘i Thrush	Puaiohi	*Myadestes palmeri*	✓			
Short-tailed Albatross	-	*Phoebastria albatrus*	✓			
Dark-rumped/Hawaiian Petrel	‘Ua‘u	*Pterodroma phaeopygia sandwichensis*	✓			
Newell’s Shearwater	-	*Puffinus auricularis*		✓		

11.2. Appendix B: Military Activities

Military Activities

The following Department of Defense (DoD) activities and other federal agency activities supporting DoD activities or supported by DoD, occur within or adjacent to the Hawaiian Islands Humpback Whale National Marine Sanctuary. These classes of activities near Hawai‘i are conducted by all the DoD components of the United States, and during combined training and operations, by military units from cooperating foreign nations or the State of Hawai‘i Department of Defense/National Guard.

Near-Shore Activities[1]	Open Ocean Activities [1]
Surface Activities	
• Pierside testing and maintenance. • Dry dock activities at Pearl Harbor. • Harbor movements by ships, submarines, boats and auxiliary craft. • Anchoring and mooring to a buoy or pier. • Engineering, navigation, seamanship and general readiness-related activities. • Transit between harbors and operating areas (OPAREAS). • Salvage and towing activities. • Anti-submarine warfare (ASW) activities include but are not limited to use of: o Mobile and stationary targets o Active / passive sonar o Towed arrays and towed counter-measure devices o Air- and surface-launched sonobuoys, dye markers, smoke floats and sensors o Air, surface and subsurface launch of countermeasure devices o Air, surface and subsurface launch of torpedoes. o Evasive maneuvers • Amphibious warfare activities include but are not limited to: o Ship ballasting o Landing craft and small craft activities (operating in displacement and non-displacement modes) including beaching o Aircraft activities o Ship-to-shore logistics	• Transit between harbors and operating areas (OPAREAS). • Engineering, navigation, seamanship and general readiness-related activities. • Salvage and towing activities. • Anti-submarine warfare (ASW) activities include but are not limited to use of: o Mobile and stationary targets o Active / passive sonar o Towed arrays and towed counter-measure devices o Air- and surface-launched sonobuoys, dye markers, smoke floats and sensors o Air, surface and subsurface launch of countermeasure devices o Air, surface and subsurface launch of torpedoes. o Evasive maneuvers • Amphibious warfare activities include but are not limited to: o Ship ballasting o Landing craft and small craft activities (operating in displacement and non-displacement modes) o Aircraft activities • Anti-surface warfare and naval surface fire support activities include but are not limited to: o Mobile and fixed targets including environmentally remediated hulks o Missiles, rockets, guns, small arms, kinetic energy weapon (e.g., railgun) tests and countermeasure devices stationed at sea and ashore o Evasive maneuvers

Near-Shore Activities[1]	Open Ocean Activities [1]
Surface Activities	
• Anti-surface warfare and naval surface fire support activities include but are not limited to: o Mobile and fixed targets o Missiles, rockets, guns, small arms, kinetic & directed energy weapon (e.g., railgun) tests and countermeasure devices conducted at sea and ashore o Evasive maneuvers • Expeditionary warfare activities against ships and small boats. • Expeditionary warfare activities involving swimmers and small boats. • Explosive ordnance disposal (EOD) activities (use of explosives for demolition). • Mine warfare and mine countermeasure (MCM) activities include but are not limited to use of: o Mine shapes o Mine detection using active hull and towed sonar o Lasers and electromagnetic systems o Marine mammal systems o Mine sweeping and mine neutralization vehicle o Explosives for demolition. • Equipment and personnel drops from rotary and fixed-wing aircraft. • Surveys from ships and associated small craft using towed and hull-mounted sensors/sonar. • Surveys conducted by low-flying rotary and fixed-wing aircraft.	• Air and missile defense activities include but are not limited to use of: o Airborne targets both sub/supersonic o Missiles, guns, and countermeasure devices o Evasive maneuvers o Launch of target missiles from mobile platforms o Launch of Interceptor missiles from Navy ships o Ship-based radar and tracking activities • Replenishment activities to vessels underway (transfer of supplies and fuel via connected wire and/or transfer of supplies by low-flying rotary aircraft). • Surveys from ships and associated small craft using towed and hull-mounted sensors/sonar • Explosive ordnance disposal (EOD) activities (use of explosives for demolition). • Equipment and personnel drops from rotary and fixed-wing aircraft

[1]Activities may involve the use of unmanned vehicles.

Near-Shore Activities	Open Ocean Activities
Sub-Surface Activities	
• Transit to and from ports and OPAREAs. • Engineering, navigation, seamanship and general warfare-related activities. • Post maintenance shallow water dives. • ASW and anti-ship activities include but are not limited to use of: o Mobile and stationary targets o Active and passive sonar o Towed arrays o Torpedoes and countermeasures o Evasive maneuvers o Flares • Mine warfare activities (submarines traverse a field of bottom and moored non-explosive practice mines using sonar). • Mine warfare and mine counter-measure (MCM) activities include but are not limited to use of: o Mine shapes o Active hull and towed sonar o Lasers and electromagnetic systems o Marine mammal systems o Mine sweeping and mine neutralization vehicles o Launch of inert mines • ASW target service for ships and aircraft. • Expeditionary warfare activities involving swimmers operating from submerged submarines. • Unmanned underwater vehicle activities	• Transit at a variety of depths. • Engineering, navigation, seamanship and general warfare-related activities. • Deep-water dives and surfacing. • ASW and anti-submarine/ship warfare activities include but are not limited to use of: o Mobile and stationary targets o Active and passive sonar o Towed arrays o Torpedoes and countermeasures o Evasive maneuvers o Flares • Unmanned underwater vehicle activities.

Near-Shore Activities	Open Ocean Activities
Air Activities	
• Landings and take-offs by aircraft, target drones and unmanned vehicles from shore. • Landings, take-offs and training flights from ships. • Training flights and transfers of personnel and equipment by aircraft. • Low-flying tactical aircraft flights (single and multi-ship, day, night unaided and night vision goggles) often involving terrain following and Nap Of the Earth (NOE) flight over or near the island and shorelines, as well as flight in published FAA transition zone below controlled airspace and flight traffic patterns over water. • Air assaults by aircraft from amphibious ships including low level. • Anti-submarine aircraft activities include but are not limited to the use of: o Mobile and stationary targets o Sonobuoys o Smoke floats o Torpedoes o Dipping sonars • Bombing, missile and/or gunnery firing activities by aircraft using surface target, Ka‘ula Islet or a land-based range. • Insertion/extraction of personnel from aircraft into/out of the water. • Unmanned aerial system activities.	• Landings, take-offs and flights from ships. • Air combat maneuvering. • Live missile firings by aircraft versus targets. • Live bombing, gunnery and missile firings versus surface targets. • Training flights and transfers of personnel and equipment by aircraft. • Low-flying tactical aircraft (single and multi-ship day, night unaided and night vision goggles) over-flights between island operating areas. • Air to air warfare activities involving the actual firing of guns and missiles at target craft and the launch of countermeasures and flares. • Air assaults, including low-level, by aircraft from amphibious ships. • Anti-submarine aircraft activities include but are not limited to use of: o Mobile and stationary targets o Sonobuoys o Smoke floats o Torpedoes o Dipping sonars • Aircraft conducting mine warfare detection and clearance activities with towed systems. • Unmanned aerial system activities. • Insertion/extraction of personnel from aircraft into/out of the water. • Missile Defense Test Activities o Launch of airborne target missiles o Intercept of target missiles with associated booster separation and drop and intercept debris o Reservation of temporary airspace during test activities o Radar and missile tracking activities from aircraft

Military Training Activities by Location

Department of Defense military training and test activities and other federal agency activities supporting DoD activities or supported by DoD occur throughout the Hawaiian Islands Humpback Whale National Marine Sanctuary. The following highlights of some the many capabilities mentioned previously. In Penguin Bank, submarines conduct post-overhaul shallow-water dives and high-speed maneuvers. The area is also used for shallow-water anti-submarine warfare (ASW) training and tests. The waters adjacent to Maui, Molokaʻi, and Lānaʻi are important training areas for Navy ships homeported in Pearl Harbor. The channel between Maui, Lānaʻi and Molokaʻi is extensively used for the biennial RIMPAC exercise as a mine counter measure (M)CM exercise area as well as for shallow-water ASW. Port visits are frequently conducted in Hilo, Hawaiʻi and Lahaina, Maui. Salvage ship and diving training are also frequently conducted in the area. The U.S. Naval facility Pacific Missile Range Facility (PMRF)/Barking Sands is located on western side of Kauaʻi. Although it is not located directly adjacent to the sanctuary, active sonar is used frequently; target drones are launched from PMRF through coastal airspace and helicopter operations are also conducted frequently in the nearshore area. A range of vessel and aircraft activities occur on and around Oʻahu out of Joint Base Pearl Harbor-Hickam, Bellows Air Force Station, Marine Corps Base Hawaii (Kaneohe Bay), and Camp Smith Training Facility. Training and testing activities also occur within the sanctuary adjacent to Hawaii Island. Army and USMC helicopter operations regularly occur over the island in support of the Pohakuloa Training Area (PTA) located in the center of the Island. Navy and Army landing craft frequently on/offload supplies and equipment at Kawaihae Bay in support of military training at PTA. The Kingfisher Underwater Training Area off the southeast coast of Niʻihau between the water depths of 200-350 ft. in flat areas without coral cover. Kingfisher is a simulated underwater minefield used for training with active sonar. Although military activities may occur anywhere within the Hawaii Range Complex, the following table summarizes the primary military activities that overlap specific areas of the sanctuary and were previously identified in the activity tables preceding this section.

Military Activities by Location	
Military Activity	**Description**
Penguin Bank	
Submarines Post-Overhaul Shallow-Water Dives and High-speed Maneuvers	All submarines completing any major repair work are required to conduct initial submerged testing in shallow water. It is necessary to conduct initial testing close to shipyard facilities in case an unscheduled return to port is required for repairs. Penguin Bank is the only shallow water in the Hawaii Range Complex suitable for these required tests.
Shallow-Water ASW Activities	Exercises, of 2-5 days duration, involving surface ships and submarines using active sonar transmissions, sonobuoys, smoke floats, expendable sensors and submarine-launched inert (non-explosive) torpedoes. Activities are conducted in Penguin Bank because of the unique characteristics of the shallow water.
Submarine Mine Warfare Training	Submarines practice deploying inert mine shapes, which are later recovered by small craft.
Maui Nui Area (Maui, Molokaʻi, and Lānaʻi)	
Shallow Water ASW Activities	Activities take place inside 100-fathom isobaths surrounding Maui, Molokaʻi, Kahoʻolawe, and Lānaʻi. These include use of active sonar transmissions, sonobuoys, smoke floats, expendable bathythermographs and inert training torpedoes.
MCM Activities	Activities include the use of bottom and moored inert mines, active sonar, towed mine sweeping device, and surface ships.
Flight Activities	Flight activities occur around the Hawaiian Islands for day, night, unaided, and night vision goggles (NVG) training. Flights are conducted within FAA prescribed altitudes/airspeeds at day/night for transit between islands.
Submarine Mine Warfare Training	Submarines practice deploying inert mine shapes on the ocean floor, which are later recovered by small craft.
Hawaiian Area Tracking System (HATS)	HATS is located southeast of Lānaʻi to provide a passive acoustic range for shallow water tracking of non-explosive torpedoes.
Kahoʻolawe Shallow Water Minefield	Simulated underwater minefield where active sonar systems are used to detect, locate, and classify mineshapes. It is installed west of the Kahoʻolawe coast. Naval vessels navigate in and around the area.
Kauaʻi	
Aircraft Operations	Aircraft deploy inert weapons, including mines and missiles against submarines and mobile targets. Other exercise material may also be discharged including non-retrievable smoke markers and sonobuoys which may emit active sonar, and retrievable torpedoes.
Amphibious Exercises	Amphibious exercises involving landing craft, LCAC and AMTRACs are conducted on the beaches at and throughout PMRF.
Area R-3101 Exercises	R-3101 is a fully instrumented range that extends 3 nm seaward from the western coast of Kauaʻi. The area is used for missile and gun live firing and aerial target launch and recovery
Submarine Torpedo Activities	Submarines conduct torpedo firing activities using retrievable torpedoes. Submarines traverse through a field of bottom and moored mines, using active sonar to detect and avoid mines. Non-retrievable bathythermographs or other sensors or weapons may be expended.
Missile Defense Testing	Target and Interceptor launches from PMRF with intercepts, booster drop and intercept debris dispersion over open ocean areas.

O‘ahu	
Pearl Harbor	Activities within and near Pearl Harbor include transit operations, anchoring, ammunition on/off loads, maintenance, dry-docking, Civilian Port Defense exercises, and pier side activities, which could include high frequency sonar.
Marine Corps Training Area Bellows	USMC and Naval forces use beaches and adjacent waters for amphibious training including landing craft, LCAC, AAV, submarines, associated support craft, small boat landings, and low level helicopter overflights.
MCB Hawaii Kaneohe Bay	Helicopters and fixed wing aircraft overfly coastal waters at low level on approach and takeoff; small boats operate in the harbor. USMC and Naval forces conduct amphibious landings involving one or more amphibious vessel, and any associated watercraft and aircraft.
Area A-311	Army helicopters conduct day/night low level training flights to, in, around, and from tactical training area in O‘ahu A-311. Adverse weather often requires aircraft to divert low level (200-500 ft.) seaward of the north shore.
Ni‘ihau	
Kingfisher Underwater Training Area	An underwater minefield where active sonar systems and/or Navy marine mammals are used to detect, locate, and classify mineshapes. It is installed 2 miles off Ni ‘ihau coast in water depths of 200 to 350 feet in flat areas without coral cover. Naval vessels navigate in and around the area.
Ka‘ula Islet	
Strike Warfare	Exercise involves aircraft delivery of inert or non-explosive ordnance against land targets on a portion of the islet, in day or night conditions.

11.3. Appendix C: Proposed Sanctuary Regulations

The following regulations are proposed under Alternatives 1-4 in the DEIS. Regulations in light blue are the current sanctuary-wide humpback whale regulations.

Regulations		Alternative			
	Description	1	2	3	4
Approach	Approaching, or causing a vessel or other object to approach, within the Sanctuary, by any means, within 100 yards of any humpback whale except as authorized under the Marine Mammal Protection Act (MMPA), as amended, and the Endangered Species Act (ESA), as amended.	✓			
	(i) Approaching in the Sanctuary, by any means, including by interception (e.g. by placing a vessel or person in the path of an oncoming humpback whale so that the whale surfaces within 100 yards (91.4m) of the vessel or person), within 100 yards (91.4 m) of any humpback whale; (ii) Causing a vessel or other object to approach within 100 yards (91.4 m) of a humpback whale; (iii) Disrupting the normal behavior or prior activity of a whale by any other act or omission. A disruption of normal behavior may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities, attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movement; or the abandonment of a previously frequented area; (iv) Exceptions: This paragraph (1) does not apply to any approach authorized by the National Marine Fisheries Service through a permit issued under 50 C.F.R. Part 222, subpart C, General Permit Procedures or through a similar authorization;		✓	✓	✓
Overflight	Operating an aircraft above the Sanctuary within 1,000 feet of any humpback whale except when in any designated flight corridor for takeoff or landing from an airport or runway or as authorized under the MMPA and the ESA.	✓	✓	✓	✓
Take & Possess	Taking any humpback whale in the Sanctuary except as authorized under the MMPA and ESA.	✓			
	Possessing within the Sanctuary (regardless of where taken) any living or dead humpback whale or part thereof taken in violation of the MMPA or the ESA.	✓			
	Taking or possessing any humpback whales within the Sanctuary except as authorized by the Marine Mammal Protection Act (MMPA), or the Endangered Species Act (ESA);		✓	✓	*
	Taking or possessing any marine mammal, sea turtle, seabird, Endangered Species Act-listed species or Hawai‘i Revised Statutes chapter 195D listed species, within or above the Special Sanctuary Management Areas (Penguin Bank, Maui Nui Area), except as authorized by the Marine Mammal Protection Act (MMPA); the Endangered Species Act (ESA); the Migratory Bird Treaty Act (MBTA); the Magnuson Stevens Fishery Conservation and Management Act; or Hawai‘i State Law.		✓		

Regulations		Alternative			
	Description	1	2	3	4
	Taking or possessing any marine mammal, sea turtle, seabird, Endangered Species Act-listed species or Hawai'i Revised Statutes chapter 195D listed species, within or above the Special Sanctuary Management Areas ((Penguin Bank, Maui Nui Area, and Maunalua Bay), except as authorized by the Marine Mammal Protection Act (MMPA); the Endangered Species Act (ESA); the Migratory Bird Treaty Act (MBTA); the Magnuson Stevens Fishery Conservation and Management Act; or Hawai'i State Law.			✓	
	Taking or possessing any marine mammal, sea turtle, seabird, Endangered Species Act-listed species or Hawai'i Revised Statutes chapter 195D listed species, within or above the Sanctuary, except as authorized by the Marine Mammal Protection Act (MMPA); the Endangered Species Act (ESA); the Migratory Bird Treaty Act (MBTA); the Magnuson Stevens Fishery Conservation and Management Act; or Hawai'i State Law.				✓
Discharge	Discharging or depositing any material or other matter in the Sanctuary; altering the seabed of the Sanctuary, or discharging or depositing any material or other matter outside of the sanctuary if the discharge or deposit subsequently enters and injures a humpback whale or humpback whale habitat; provided that: such activity requires a Federal or State permit, license, lease, or other authorization, and is conducted: - without such permit, license, lease, or other authorization; or - not in compliance with the terms or conditions of such permit, license, lease, or other authorization.	✓			
	Discharging or depositing any material or other matter in the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area), except: (i) Fish, fish parts, chumming materials or bait used in or resulting from lawful fishing activities within the Sanctuary, provided that such discharge or deposit is during the conduct of lawful fishing activities within the Sanctuary; (ii) Biodegradable effluents incidental to vessel use and generated by Type I and II marine sanitation devices approved in accordance with section 312 of the Federal Water Pollution Control Act33 U.S.C. 1322; (iii) Water generated by routine vessel operations (e.g., cooling water, deck wash down, and gray water as defined by section 312 of the Federal Water Pollution Control Act33 U.S.C. 1322) excluding oily wastes from bilge pumping; (iv) Engine exhaust; or (v) Discharge of biodegradable materials for traditional ceremonies associated with culturally important customs and usage (e.g. the discharge of leis, paper lanterns).		✓		
	Discharging or depositing any material or other matter in the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area and Maunalua Bay), except: (i) Fish, fish parts, chumming materials or bait used in or resulting from lawful fishing activities within the Sanctuary, provided that such discharge or deposit is during the conduct of lawful fishing activities within the Sanctuary; (ii) Biodegradable effluents incidental to vessel use and generated by Type I and II marine sanitation devices approved in accordance with section 312 of the Federal Water Pollution Control Act33 U.S.C. 1322; (iii) Water generated by routine vessel operations (e.g., cooling water, deck wash down, and gray water as defined by section 312 of the Federal Water Pollution Control Act33 U.S.C. 1322) excluding oily wastes from bilge pumping; (iv) Engine exhaust; or			✓	

Regulations		Alternative			
	Description	1	2	3	4
	(v) Discharge of biodegradable materials for traditional ceremonies associated with culturally important customs and usage (e.g. the discharge of leis, paper lanterns).				
	Discharging or depositing any material or other matter in the Sanctuary, except: (i) Fish, fish parts, chumming materials or bait used in or resulting from lawful fishing activities within the Sanctuary, provided that such discharge or deposit is during the conduct of lawful fishing activities within the Sanctuary; (ii) Biodegradable effluents incidental to vessel use and generated by Type I and II marine sanitation devices approved in accordance with section 312 of the Federal Water Pollution Control Act33 U.S.C. 1322; (iii) Water generated by routine vessel operations (e.g., cooling water, deck wash down, and gray water as defined by section 312 of the Federal Water Pollution Control Act33 U.S.C. 1322) excluding oily wastes from bilge pumping; (iv) Engine exhaust; or (v) Discharge of biodegradable materials for traditional ceremonies associated with culturally important customs and usage (e.g. the discharge of leis, paper lanterns).				✓
Enter & Injure	Discharging or depositing any material or other matter in the Sanctuary; altering the seabed of the Sanctuary, or discharging or depositing any material or other matter outside of the sanctuary if the discharge or deposit subsequently enters and injures a humpback whale or humpback whale habitat; provided that: such activity requires a Federal or State permit, license, lease, or other authorization, and is conducted: - without such permit, license, lease, or other authorization; or - not in compliance with the terms or conditions of such permit, license, lease, or other authorization.	✓			
	Discharging or depositing any material or other matter outside of the Special Sanctuary Management Areas if the discharge or deposit subsequently enters and injures a sanctuary resource within the Special Sanctuary Management Areas (Penguin Bank and Maui Nui Area).		✓		
	Discharging or depositing any material or other matter outside of the Special Sanctuary Management Areas if the discharge or deposit subsequently enters and injures a sanctuary resource within the Special Sanctuary Management Areas (Penguin Bank, Maui Nui Area, and Maunalua Bay).			✓	
	Discharging or depositing any material or other matter outside of the Special Sanctuary Management Areas if the discharge or deposit subsequently enters and injures a sanctuary resource within the Sanctuary.				✓
Altering Submerged Lands	Discharging or depositing any material or other matter in the Sanctuary; altering the seabed of the Sanctuary, or discharging or depositing any material or other matter outside of the sanctuary if the discharge or deposit subsequently enters and injures a humpback whale or humpback whale habitat; provided that: such activity requires a Federal or State permit, license, lease, or other authorization, and is conducted: - without such permit, license, lease, or other authorization; or - not in compliance with the terms or conditions of such permit, license, lease, or other authorization.	✓			

Regulations		Alternative			
	Description	1	2	3	4
Altering Submerged Lands	Dredging, drilling into, or otherwise altering in any way the submerged lands (including natural bottom formations, live rock and coral) within the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area), except: (i) To anchor a vessel on sandy bottom or substrate other than live rock or coral; (ii) Routine maintenance of docks, seawalls, breakwaters, jetties, or piers authorized by any valid lease, permit, license, approval, or other authorization issued by any Federal, State, or local authority of competent jurisdiction; (iii) Installation and maintenance of navigational aids by, or pursuant to valid authorization by, any Federal, State, or local authority of competent jurisdiction; (iv) Activities associated with conducting harbor maintenance in accordance with a federal or state permit issued prior to [date final rule is effective], including dredging of entrance channels during the time period of one year from the [final rule effective date]; (v) Aquaculture activities authorized under a permit issued by the State of Hawai'i Department of Land and Natural Resources, the State of Hawai'i Department of Health, the U.S. Army Corps of Engineers, or the National Marine Fisheries Service pursuant to applicable regulations under the appropriate fisheries management plan. (vi) Lawful fishing activities authorized under a permit issued by the State of Hawai'i or the National Marine Fisheries Service pursuant to applicable regulations under the appropriate fisheries management plan.		✓		
	Dredging, drilling into, or otherwise altering in any way the submerged lands (including natural bottom formations, live rock and coral) within the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area, and Maunalua Bay), except: (i) To anchor a vessel on sandy bottom or substrate other than live rock or coral; (ii) Routine maintenance of docks, seawalls, breakwaters, jetties, or piers authorized by any valid lease, permit, license, approval, or other authorization issued by any Federal, State, or local authority of competent jurisdiction; (iii) Installation and maintenance of navigational aids by, or pursuant to valid authorization by, any Federal, State, or local authority of competent jurisdiction; (iv) Activities associated with conducting harbor maintenance in accordance with a federal or state permit issued prior to [date final rule is effective], including dredging of entrance channels during the time period of one year from the [final rule effective date]; (v) Aquaculture activities authorized under a permit issued by the State of Hawai'i Department of Land and Natural Resources, the State of Hawai'i Department of Health, the U.S. Army Corps of Engineers, or the National Marine Fisheries Service pursuant to applicable regulations under the appropriate fisheries management plan. (vi) Lawful fishing activities authorized under a permit issued by the State of Hawai'i or the National Marine Fisheries Service pursuant to applicable regulations under the appropriate fisheries management plan.			✓	
	Dredging, drilling into, or otherwise altering in any way the submerged lands (including natural bottom formations, live rock and coral) within the Sanctuary, except: (i) To anchor a vessel on sandy bottom or substrate other than live rock or coral;				✓

Regulations		Alternative			
	Description	1	2	3	4
	(ii) Routine maintenance of docks, seawalls, breakwaters, jetties, or piers authorized by any valid lease, permit, license, approval, or other authorization issued by any Federal, State, or local authority of competent jurisdiction; (iii) Installation and maintenance of navigational aids by, or pursuant to valid authorization by, any Federal, State, or local authority of competent jurisdiction; (iv) Activities associated with conducting harbor maintenance in accordance with a federal or state permit issued prior to [date final rule is effective], including dredging of entrance channels during the time period of one year from the [final rule effective date]; (v) Aquaculture activities authorized under a permit issued by the State of Hawai'i Department of Land and Natural Resources, the State of Hawai'i Department of Health, the U.S. Army Corps of Engineers, or the National Marine Fisheries Service pursuant to applicable regulations under the appropriate fisheries management plan. (vi) Lawful fishing activities authorized under a permit issued by the State of Hawai'i or the National Marine Fisheries Service pursuant to applicable regulations under the appropriate fisheries management plan.				
Explosives	Possessing or using explosives within the Special Sanctuary Management Areas, except for valid law enforcement purposes (Penguin Bank and Maui Nui area).		✓		
	Possessing or using explosives within the Special Sanctuary Management Areas, except for valid law enforcement purposes (Penguin Bank, Maui Nui area, and Maunalua Bay).			✓	
	Possessing or using explosives within the Sanctuary, except for valid law enforcement purposes				✓
Introduced Species	Introducing or otherwise releasing from within or into the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area) an introduced species, except species cultivated by aquaculture activities in state or federal waters pursuant to a valid lease, permit, license or other authorization issued by the State of Hawai'i Department of Natural Resources, or the National Marine Fisheries Service in effect on the effective date of the final regulation.		✓		
	Introducing or otherwise releasing from within or into the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area, and Maunalua Bay) an introduced species, except species cultivated by aquaculture activities in state or federal waters pursuant to a valid lease, permit, license or other authorization issued by the State of Hawai'i Department of Natural Resources, or the National Marine Fisheries Service in effect on the effective date of the final regulation.			✓	
	Introducing or otherwise releasing from within or into the Sanctuary an introduced species, except species cultivated by aquaculture activities in state or federal waters pursuant to a valid lease, permit, license or other authorization issued by the State of Hawai'i Department of Natural Resources, or the National Marine Fisheries Service in effect on the effective date of the final regulation.				✓
Historical & Cultural	Removing, damaging, or tampering with any historical or cultural resource within the Sanctuary.		✓	✓	✓

Regulations		Alternative			
	Description	1	2	3	4
Signage	Marking, defacing, or damaging in any way, or displacing or removing or tampering with any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to the Sanctuary including boundary markers related to the Special Sanctuary Management Areas (Penguin Bank and Maui Nui area).		✓		
	Marking, defacing, or damaging in any way, or displacing or removing or tampering with any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to the Sanctuary including boundary markers related to the Special Sanctuary Management Areas (Penguin Bank, Maui Nui area, and Maunalua Bay).			✓	
	Marking, defacing, or damaging in any way, or displacing or removing or tampering with any signs, notices, or placards, whether temporary or permanent, or with any monuments, stakes, posts, or other boundary markers related to the Sanctuary including boundary markers related to the Sanctuary.				✓
Enforcement	Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of either of the Acts or any regulations issued under either of the Acts.	✓	✓	✓	✓

* Intent implied by prohibition against taking or possessing any marine mammal

11.4. Appendix D: Other Regulatory Authorities

Proposed Sanctuary Regulation	Existing State Regulations	Existing Federal Regulations
Prohibit take and possess		
The sanctuary proposes a prohibition against taking or possessing any marine mammal, sea turtle, seabird, ESA-listed species or Hawai'i Revised Statutes chapter 195D listed species, within or above the sanctuary. Sanctuary management is not proposing to issue any of it's own permits, however the regulation makes exception to any take or possess action that is authorized by the MMPA, the ESA, the MBTA, the Magnuson Stevens Fishery Conservation and Management Act, or Hawai'i State Law.	The State of Hawai'i Wildlife Law prohibits the catch, possess, injure, kill, destroy, sell, offer for sale, or transport of indigenous wildlife and introduced wild birds. The law also prohibits the take, possess, process, sell, offer for sale, or transport of any endangered and threatened species of wildlife (HAR §13-124). These regulations do not apply to authorized employees of the department, or enforcement agents and inspectors of the department of agriculture and USFWS. The State may also issue permits for scientific or educational purposes including cultural activities, or for activities that will enhance the survival of the wildlife species.	Under the ESA prohibited acts, it unlawful to take, possess, sell, deliver, carry, transport, or ship, any endangered species of fish or wildlife (16 U.S.C. § 1538). Under the MMPA prohibition Section 102, it is unlawful to take or possess any marine mammal in waters or on lands within the United States except as permitted for scientific research, public display, photography for educational or commercial purposes, or enhancing the survival or recovery of a species of stock. Exceptions are made for marine mammals taken incidentally in the course of commercial fishing operations (16 U.S.C. § 1372). NOAA Fisheries federal regulations prohibit the take, import, or export of any threatened or endangered species (50 C.F.R. § 216.1-11). The MBTA prohibits the killing or taking of migratory birds. USFWS is responsible for implementing this federal prohibition, which protects seabirds, their eggs, and their nests. However, NOAA Fisheries also has statutory authority and responsibilities to reduce the effects of fisheries bycatch and manage seabird habitat within the U.S. Exclusive Economic Zone (Rivera et al. 2009).
Prohibit discharge and enter and injure		
The sanctuary proposes a prohibition against discharging or depositing any material or matter into the sanctuary, or adjacent to the sanctuary if that discharge subsequently enters the sanctuary and injures a sanctuary resource. Sanctuary management may issue permits for research, education, and management. The types of activities to which these regulations may	The State of Hawai'i Administrative Rules Title 11 regulate water quality in state waters, including the establishment of water quality standards for various localities in compliance with the Clean Water Act and are implemented by the State of Hawai'i Department of Health (HAR § 11). The State of Hawai'i prohibits any person from allowing of any pollutant (including biological materials, soil, sludge, chemical, and agricultural waste)	The Clean Water Act prohibits the unauthorized discharge of pollutants into U.S. waters in an effort to restore and maintain water quality and is implemented by the Environmental Protection Agency (EPA; 33 U.S.C. § 1251-1387). The Ocean Dumping Act prohibits or limits the dumping into the ocean waters of any material which would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems or economic potentialities and is also implemented by the EPA. The Rivers and Harbors Act regulates construction and prohibits the discharge of any refuse matter of any kind into navigable waters of the U.S. and is implemented by the U.S. Army Corps of Engineers. The Oil Pollution Act requires vessel owners to demonstrate evidence of financial

Proposed Sanctuary Regulation	Existing State Regulations	Existing Federal Regulations
apply include, but are not limited to, dumping of dredge, untreated vessel sewage and marine debris. It would also apply to land-based sedimentation and pollution discharge into sanctuary waters. These regulations will not apply to fish, fish parts, chumming materials or bait used in or resulting from fishing in the sanctuary, biodegradable effluents incidental to vessel use, water generated by routine vessel operations, engine exhaust, and discharge for ceremonial purposes.	to enter any state waters without a permit (HRS § 342D-50). Additionally, the State of Hawai‘i prohibits littering or polluting water within a small boat harbor (HAR § 13-232) and requires all vessels on state waters and having a marine sanitation device to comply with 33 C.F.R. § 159 (HAR § 13-243-2).	responsibility for oil spills and requires tank vessels operating in the waters of the U.S. to be equipped with a double hull and is implemented by the Coast Guard. The Marine Plastic Pollution Research and Control Act prohibits the discharge of any plastic materials and regulates the discharge of other materials and is implemented by the EPA and NOAA. The Marine Debris Research, Prevention and Reduction Act is an effort to identify, assess, reduce and prevent marine debris and is implemented by NOAA.
Prohibit altering submerged lands		
The sanctuary proposes a prohibition against dredging, drilling into, or otherwise altering in any way submerged lands. Submerged lands include bottom formations, live rock and coral. This regulation will not apply to anchoring a vessel on sandy bottom or substrate, routine maintenance, ecological maintenance, or navigation. In addition, sanctuary management would recognize any aquaculture activities authorized under a permit issued by appropriate authorities. Sanctuary management would also issue permits for research, education, and management and submarine cables.	The State of Hawai‘i prohibits intentional or negligent large-scale damage to stony coral and live rock, such as by vessel groundings, introduction of sediments, biological contaminants, and other pollutants. It also prohibits the take, break, or damage any stony coral or live rock. It is also unlawful to sell stony coral or live rock (HAR § 13-95 Amended). Hawai‘i Water Quality Standards define activities that are permissible in specific marine bottom ecosystems categorized as Class I, in which activities are restricted to passive human uses without intervention or alteration, allowing the perpetuation and preservation of the marine bottom in a most natural state, and Class II, in which activities are restricted to uses compatible with the protection and	NOAA Fisheries prohibits any person from taking any stony coral, or to break or damage any stony coral with a crowbar, chisel, hammer, or any other implement. All precious corals beds in the populated Hawaiian Islands are designated as Essential Fish Habitat (EFH) by NOAA Fisheries and federal consultations are required for activities that may affect precious corals. Specific EFH, with extremely important ecological functions or areas that are especially vulnerable to human-induced degradation, are further defined by NOAA Fisheries and WesPac as Habitats of Particular Concern (HAPC). NMFS issues permits for harvesting precious corals for designated “Established Beds” in federal waters outside of 3 nautical miles. WesPac has also banned bottom trawling in the 1.5 square miles of exclusive economic zone around the U.S.-Affiliated Pacific Islands in 1983. Any entity (public or private) trying to establish an artificial reef or fish aggregation devices (FAD) in Hawai‘i must get a permit from the U.S. Army Corp of Engineers. In addition to state authorities, the U.S. Army regulates the construction of aquaculture facilities.

Proposed Sanctuary Regulation	Existing State Regulations	Existing Federal Regulations
	propagation of fish, shellfish, and wildlife, and with recreation. In addition to the U.S. Army, the Hawai'i Office of Conservation and Coastal Lands and the Hawai'i Office of Environmental Quality Control regulate the construction of aquaculture facilities.	
Prohibit explosives		
The sanctuary proposes a prohibition against possessing or using explosives within the sanctuary. Explosives used for valid law enforcement purposes would not be prohibited under this regulation. Sanctuary management will not issue any additional permits for this regulation.	The State of Hawai'i restricts the use of firearms and spears in the marine environment and altogether prohibits the use of explosives in catching fish. The State of Hawai'i also prohibited the use of firearms to catch, attempt to catch or kill fish, crustaceans, mollusks, turtle, or marine mammals with the exception of sharks and gaffed tuna and billfish. Explosives, electro-fishing devices, and noxious chemicals are both unlawful to use in fishing and unlawful to possess in the vicinity of fishing activities (HAR § 13-75, HRS § 188-23).	
Prohibit introduced species		
The sanctuary proposes a prohibition against introducing or otherwise releasing an introduced species into the sanctuary. The regulation will not apply to species cultivated by mariculture activities in state waters pursuant to a valid lease, permit, license or other authorization issued by DLNR or NOAA Fisheries in effect on the effective date of the final regulation.	The State of Hawai'i prohibits the introduction or spread of species within state waters including HAR § 4-76 (Non-Indigenous Aquatic Species) including discharge of ballast water and has permitting requirements. The State of Hawai'i Department of Agriculture issues permits when mariculture ventures include non-indigenous species.	Executive Order 13112, which established the National Invasive Species Council, directs federal agencies to: Identify actions that may affect the status of invasive species; (1) Use relevant programs and authorities to prevent the introduction of invasive species; (2) Detect, respond to and control populations of invasive species; (3) Monitor invasive species populations accurately and reliably; (4) Provide for restoration of native species and habitat conditions; (5) Conduct research; promote public education; and (6) Not authorize or fund actions that may promote introduction of species

Proposed Sanctuary Regulation	Existing State Regulations	Existing Federal Regulations
Sanctuary management will not issue any of it's own permits for introduced species.		in consultation with the Invasive Species Council. NOAA Fisheries issues permits when mariculture ventures include non-indigenous species

11.5. Appendix E: Class I and Class II Marine Bottom Ecosystems

Marine Bottom Ecosystems		
Marine Bottom Type	**Class I**	**Class II**
Sand Beaches	Northwestern Hawaiian Islands	Populated Hawaiian Islands
Lava Rock Shoreline	All lava rock shorelines in preserves, reserves, sanctuaries, and refuges established by the Department of Land and Natural Resources under chapter 195 or chapter 190, HRS, or similar reserves for the protection of marine life established under chapter 190, HRS, as amended; or in refuges or sanctuaries established by USFWS or NOAA Fisheries.	All lava rock shorelines not in Class I.
Solution benches	All solution benches in preserves, reserves, sanctuaries, and refuges established by DLNR under chapter 195 or chapter 190, HRS, or similar reserves for the protection of marine life established under chapter 190, HRS, as amended; or in refuges or sanctuaries established by the USFWS or NOAA Fisheries.	**Maui:** Kīhei, Papaʻula Point **Kauaʻi:** Near Hanapēpē Salt Ponds, Miloliʻi, Nuʻalolo, Mākaha, Māhāʻulepu, Kūhiō Beach Park (Kukuiʻula) **Oʻahu:** Diamond Head, Mānana Island, Makapuʻu, Lāʻie, Kahuku, Mokulēʻia, Mākua, Mākaha, Maile, Lualualei, Barbers Point.
Marine Pools & Protected Coves	**Hawai'i:** Hōnaunau, Kiholo All marine pools and protected coves in preserves, reserves, sanctuaries, and refuges established by DLNR under chapter 195 or chapter 190, HRS, or similar reserves for the protection of marine life established under chapter 190, HRS, as amended; or in refuges or sanctuaries established by the USFWS or NOAA Fisheries.	**Hawai'i:** Kalpana, Pohaulpa, Kapalaoa, Kapoho King's Landing (Pāpaʻi), Hilo, Leileiwi Point, Wailua Bay **Maui:** Hāna, Keʻanae, Napulu, Puʻu Ōlaʻi to Cape Hanamanioa, Kīpahulu **Molokaʻi:** Cape Hālawa, Kalaupapa, South Coast **O'ahu:** Diamond Head, Halona Blowhole to Makapuʻu, Mokulēʻia, Kaʻena Point, Mākua, Punaluʻu **Kauaʻi**: Keālia, Māhāʻulepu, Hanamāʻulu, Poʻipū, Puolo Point

11.6. Appendix F: List of Agencies and Organizations Receiving Copies of the DEIS

Aha Moku Advisory Council
National Park Service
National Sea Grant College
NOAA Fisheries Pacific Islands Regional Office
NOAA National Centers for Coastal Ocean Science
NOAA Office of Law Enforcement
NOAA Office of Marine and Aviation Operations
NOAA Office of Ocean and Coastal Resource Management
NOAA Office of Response and Restoration
NOAA Pacific Islands Fisheries Science Center
State of Hawai‘i – Coastal Zone Management Program
State of Hawai‘i – Department of Business, Economic Development & Tourism - Energy Office
State of Hawai‘i – Department of Health
State of Hawai‘i – Department of Land and Natural Resources
State of Hawai‘i – Department of Transportation
State of Hawai‘i – Office of Conservation and Coastal Lands
State of Hawai‘i – Office of Hawaiian Affairs
State of Hawai‘i – Office of Planning
United States Coast Guard
United States Department of Defense
United States Environmental Protection Agency
United States Fish and Wildlife Service
University of Hawai‘i
Western Pacific Fisheries Management Council

11.7. Appendix G: Acronyms

AIS	Aquatic Invasive Species
AP	Assessing Progress
BFRA	Bottomfish Restricted Fishing Area
BMP	Best Management Practices
BPI	Black Pearl Inc.
BV	Ecosystem Benefits and Values
CBSFA	Community-based subsistence fishing area
CCP	Comprehensive Conservation Plan
CDUA	Conservation District Use Application
CE	Compliance and Enforcement
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species
CLIP	National Park Service Climate Leadership in Parks
COTS	Crown of Thorns Starfish
CP	Community Partnerships
CRED	Coral Reef Ecosystem Division
CT	Evolving Cultural Traditions
CWA	Clean Water Act
DBEDT	Department of Business, Economic Development and Tourism
DEIS	Draft Environmental Impact Statement
DLNR	Department of Land and National Resources
DMP	Draft Management Plan
DOBOR	Department of Boating and Ocean Recreation
DOCARE	Division of Conservation and Resource Enforcement
DOH	Department of Health
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
ENSO	El Niño Southern Oscillation
EO	Executive Order
EP	Emergency Preparedness and Damage Assessment
EPA	Environmental Protection Agency
ER	Understanding and Managing Specis and Habitats
ERMA	Environmental Response Management Application
FAD	Fish Aggregation Device
FR	Federal Register
FRN	Federal Register Notice
GDP	Gross Domestic Product
GIS	Geographic Information System
HADS	Heritage Awareness Diving seminars
HAPC	Habitats of Particular Concern
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCH	Hexachlorocyclohexane

HECO	Hawaiian Electricity Company
HINMSA	Hawaiian Islands National Marine Sanctuary Act
HLCC	Hawaiian Lee Counter Current
HRS	Hawaiʻi Revised Statutes
HTA	Hawaiʻi Tourism Authority
MAST	Maritime Archaeology Survey Techniques
MBTA	Migratory Bird Treaty Act
MCBI	Marine Conservation Biology Institute
MH	Maritime Heritage
MLCD	Marine Life Conservation District
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOP	Marine Option Program
MPR	Management Plan Review
MPRSA	Marine Protection, Research and Sanctuaries Act
NAS	Nautical Archeology Society
NEC	North Equatorial Current
NEEH	NextEra Energy Hawaiʻi
NEPA	National Environmental Policy Act
NGO	Nongovernmental Organization
NHPA	National Historic Preservation Act
NHRC	North Hawaiian Ridge Current
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuary Act
NMSAS	National Marine Sanctuary of American Samoa
NMSP	National Marine Sanctuary Program
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPC	North Pacific Central Water Mass
NRDA	Natural Resource Damage Assessment
NRHP	National Register of Historic Places
NWHI	Northwestern Hawaiian Islands
NWR	National Wildlife Refuge
OAT	Ocean Awareness Training
OCEAN	Ocean Conservation Education Action Network
OCS	Outer Continental Shelf
OF	Operational Foundation
OL	Ocean Literacy
OLE	NOAA Office of Law Enforcement
ONMS	Office of National Marine Sanctuaries
OPM	Operations, Personnel and Maintenance
OPR	Office of Protected Resources
ORMA	Ocean Recreation Management Area
OTEC	Ocean Thermal Energy Conversion
OWS	Oscillating Water Column
PacIOOS	Pacific Integrated Ocean Observing System

PDO	Pacific Decadal Oscillation
PIBHMC	Pacific Islands Benthic Habitat Mapping Center
PIFSC	Pacific Island Fisheries Science Center
PIR	Pacific Islands Region
PMNM	Papahānaumokuākea Marine National Monument
POP	Persistent Organic Pollutant
PUC	Public Utilities Commission
RC	Resilience to a Changing Climate
RFP	Request for Proposal
RHA	Rivers and Harbors Act
ROD	Record of Decision
ROI	Region of Interest
ROV	Remotely Operated Vehicle
RUST	Resources and Undersea Threats
SCUBA	Self-Contained Underwater Breathing Apparatus
SHIELDS	Sanctuaries Hazardous Incident Emergency Logistics Database System
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
SU	Sustainable Use
TOAD	Tethered Optical Assessment Device
U.S.C.	United States Code
UAS	Unmanned Aircraft Systems
USACE	US Army Corp of Engineers
USCG	United States Coast Guard
USFWS	US Fish and Wildlife Service
USWEX	Undersea War Exercise
WesPac	Western Pacific Regional Fishery Management Council
WQ	Water Quality Protection
WTP	Willingness to Pay

11.8. Appendix H: Hawaiian Terms Glossary

ae‘o	Hawaiian stilt
‘ahi	white spotted surgeonfish
‘ahi	yellowfin or bigeye tuna
āholehole	Hawaiian flagtail
ahupua‘a	land division usually extending from mountain to sea
‘ai	food
‘āina	land
‘alae ke‘oke‘o	Hawaiian coot
‘alae‘ula	Hawaiian moorhen
‘ala‘ihi	spotfin squirrelfish
ali‘i	chief
aloha ‘āina	love of the land and sea
a‘o aku	to teach
a‘o mai	to learn
‘āpe‘ape‘a	Hawaiian hoary bat
‘aumakua	deified ancestor
‘auwai	taro irrigation ditch
ehu	squirrelfish snapper
‘ewalu	eight
hāhālua	manta ray
hailepo	spotter eagle ray
hāpu‘upu‘u	Hawaiian sea bass
he‘e	octopus
heiau	shrine or place of worship
hīnālea lau-wili	saddle wrasse
hinana	juvenile goby
hi‘uwai	water purification festivity
honu	turtle
honu ‘ea	hawksbill turtle
ho‘ohawai‘i	to act as an Hawaiian
ho‘okaulike	to balance
hope	after
hukilau	seine fishing
hula	Hawaiian dance
‘īlioholoikauaua	Hawaiian monk seal
imu	underground oven
kāhala	amberjack
kai	sea
kala	unicornfish
kalekale	Von Siebold’s snapper (Hawaiian snapper)
Kanaka ‘Ōiwi	Native Hawaiian person
kapu kai	ceremonial sea bath for purification
kapu	sacred
kilo i‘a	fish sighting spot

koʻa	coral, fishing grounds or shrine built of coral and stone
koaʻe	longtail snapper (also tropicbirds, particularly the white-tailed variety)
koholā kuapiʻo	humpback whale
kohola	or reef flat
koholā	Humpbacked whale
koloa maoli	Hawaiian duck
kuleana	responsibility
kumulipo	origin, Hawaiian creation chant
kupuna	ancestor
Laka	goddess of hula
laulima	many hands, cooperation
lehi	silverjaw snapper (also lehe)
lei	necklace of flowers, leaves, shells and more
leina	jumping off point
leina-a-ka-uhane	place from which spirits leap into ancestral land
lele	cliff jumping spot
limu	algae, underwater plant
loʻi	irrigated terrace for taro or rice
loko iʻa	fishpond
mahimahi	dolphinfish
makai	ocean
makawalu	eight eyes, numerous
makukana	thornback cowfish
mālama	to take care of
mamo	Hawaiian sergeant
manini	convict tang
manō kihikihi	scalloped hammerhead shark
manō lālākea	oceanic white tip reef shark
manō	shark
mauka	inland
moʻo	reptile, water spirit
moi	Pacific threadfin
moku	district encompassing ahupuaʻa
moʻokūʻauhau	genealogy
mua	before
muliwai	brackish pond
naʻenaʻe	orange band surgeonfish
naiʻa	dolphin
nēnē	Hawaiian goose
nenue	rudderfish, or chub
ʻohana	family
oʻi liuwiʻuwi	fantail filefish
ʻōlelo Hawaiʻi	Hawaiian language
ʻōmaka	belted wrasse
ʻōmilu	bluefin trevally
onaga	red snapper
ono	wahoo

‘o‘opu ‘akupa	*Eleotris sandwicensis*
‘o‘opu alamo‘o	*Lentipes concolor*
‘o‘opu nākea	*Awaous Guamensis*
‘o‘opu naniha	*Stenogobius hawaiiensis*
‘o‘opu nōpili	*Sicyopterus stimpsoni*
‘ōpakapaka	pink snapper
‘opihi	limpet
‘opihi alinalina	yellowfoot limpet
pāku‘iku‘i	achilles tang
palani	eyestripe surgeonfish
palaoa	sperm whales
pāpa‘i kualoa	Kona crab
Pele	volcano goddess
pipipi	nerite snail
po kane	night marcher
pu‘uōla‘i	crowned toby
puhi	eel
puna kea	rice coral
pupu	small shelter
pūpū	marine or land shell
pu‘uhonua	place of refuge
roi	peacock grouper
ta‘ape	blueline snapper
toau	blacktail snapper
uhu	parrotfish
‘ukīkiki	Bringham’s snapper
uku	snapper
ula	spiny lobster
ula-pāpapa	slipper lobster
ulua	crevally
umeiki	stone fish trap
wā	time
wahi pana	legendary place
weke	*Mullidae*
weke ‘ula	goatfish

11.9. Appendix I: Definitions

Acts means the Hawaiian Islands National Marine Sanctuary Act (HINMSA; sections 2301-2307 of Pub. L. 102-587), and the National Marine Sanctuaries Act (NMSA; also known as Title III of the Marine Protection, Research, and Sanctuaries Act (MPRSA), as amended, 16 U.S.C. 1431 et seq.).

Adverse Impact means an impact that independently or cumulatively damages, diminishes, degrades, impairs, destroys, or otherwise harms.

Alteration of the seabed means drilling into, dredging, or otherwise altering a natural physical characteristic of the seabed of the Sanctuary; or constructing, placing, or abandoning any structure, material, or other matter on the seabed of the Sanctuary.

Biocultural Resources means biological resources that also have cultural value. In Hawaiian culture, all biological resources are perceived to have cultural value so this refers to all resources found within the sanctuary. The United Nations Development Program (UNDP) has coined the term "biocultural" to describe the "fundamental link between local language, ecological knowledge, cultural practices and biodiversity" (Maffi and Woodley, 2010).

Civil Action means actions arising under the National Marine Sanctuaries Act or under authorities supporting state claims within the sanctuary, including civil penalties recovered under section 307, and amounts recovered under section 312, of the National Marine Sanctuaries Act.

Coral means but is not limited to species of the Phylum Cnidaria, including all species in the: Class Anthozoa, Subclass Hexacorallia, Order Scleractinia (stony corals); Class Anthozoa, Subclass Hexacorallia, Order Antipatharia (black corals); Class Anthozoa, Subclass Hexacorallia, Order Zoantharia, Family Parazoanthidae (gold coral); Class Anthozoa, Subclass Octocorallia, Order Alcyonacea (soft corals, bamboo coral, pink coral); Class Anthozoa, Subclass Octocorallia, Order Gorgonacea (gorgoneans); Class Anthozoa, Subclass Octocorallia, Order Pennatulacea (sea pens); Class Hydrozoa, Subclass Hydroidolina, Order Anthoathecata, Suborder Filifera, Family Stylasteridae (stylasterids).

Coral Reef means the hard bottoms, deep-water banks, patch reefs, and outer bank reefs.

Ecosystem means a community of living organisms (e.g., plants, animals and microbes) in conjunction with the nonliving components of their environment (e.g., air, water and mineral soil), interacting as a system.

Ecosystem-based Management means an environmental management approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation (Christensen et al. 1996, McLeod et al. 2005).

Emergency Regulations means any temporary regulation, including prohibitions necessary to prevent or minimize the destruction of, loss of, or injury to a sanctuary resource.

Governor means the Governor of the State of Hawai‘i, or designee.

Habitat means those ecological or environmental areas inhabited by one or more living species.

Introduced Species means any species (including, but not limited to, any of its biological matter capable of propagation) that is non-native to the ecosystems of the Sanctuary; or any organism into which altered genetic matter, or genetic matter from another species, has been transferred in order that the host organism acquires the genetic traits of the transferred genes.

Live Rock means any Coral, basalt rock, or other natural structure with any living organisms growing in or on the Coral, basalt rock, or structure.

Management Plan means the final management plan and regulations for the Hawaiian Islands National Marine Sanctuary - *Nā Kai ‘Ewalu*.

Military Activities means those military activities conducted by or under the auspices of the Department of Defense and any combined military activities carried out by the Department of Defense and the military forces of a foreign nation.

Native Hawaiian Practice means cultural activities conducted for the purposes of perpetuating traditional knowledge, caring for and protecting the environment and strengthening cultural and spiritual connections to the Hawaiian Islands that have demonstrable benefits to the Native Hawaiian community. This may include, but is not limited to, the non-commercial use of sanctuary resources for direct personal consumption while in the sanctuary.

Protected Species means an animal or plant population that is declining in the wild, and is protected under federal or state statutes or regulations. The decline could be as a result of human or other causes. They are also widely known as endangered and threatened species.

Sanctuary means the Hawaiian Islands National Marine Sanctuary - *Nā Kai ‘Ewalu*.

Sanctuary Focus Areas means specific locations within the sanctuary with place-based management approaches developed to improve the overall health of the marine environment (i.e., Ni‘ihau, Pīla‘a, and Maunalua).

Special Sanctuary Management Areas means discrete, biologically and/or culturally important areas that help sustain critical marine species and habitats.

Sanctuary Resource means any living or non-living resource of a national marine sanctuary that contributes to the conservation, recreational, ecological, historical, research, educational, or aesthetic value of the sanctuary, including, but not limited to, the substratum of the area of the sanctuary, other submerged features and the surrounding submerged lands, carbonate rock, corals and other bottom formations, coralline algae and other marine plants and algae, marine invertebrates, phytoplankton, zooplankton, fish, seabirds, sea turtles and other marine reptiles, marine mammals, and historical and cultural resources.

Secretary means the Secretary of Commerce.

Shoreline means the upper reaches of the wash of the waves, other than storm or seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves.

State means the State of Hawai‘i.

Take or Taking a humpback whale or protected species means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or injure a humpback whale, or to attempt to engage in any such conduct. The term includes, but is not limited to, any of the following activities: collecting any dead or injured humpback whale, or any part thereof; restraining or detaining any humpback whale, or any part thereof, no matter how temporarily; tagging any humpback whale; operating a vessel or aircraft or doing any other act that results in the disturbing or molesting of any humpback whale.

Vessel means a watercraft of any description, including, but not limited to, motorized and non-motorized watercraft, personal watercraft, airboats, and float planes while maneuvering on the water, capable of being used as a means of transportation in/on the waters of the sanctuary.

11.10. Appendix J: Index

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11.11. Appendix K: Summary of Proposed Changes to the Sanctuary Terms of Designation

Section 304(a)(4) of the National Marine Sanctuaries Act (NMSA) requires that the terms of designation include the geographic area included within the sanctuary; the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational, or aesthetic value; and the types of activities that will be subject to regulation by the Secretary of Commerce to protect these characteristics.

Pursuant to the NMSA and the HINMSA, the terms of designation of the sanctuary shall be modified pursuant to Sections 303 and 304 of the NMSA and Sections 2305 and 2306 of the HINMSA.

With this proposed rule, NOAA is proposing changes to the HIHWNMS terms of designation, which were previously published in the Federal Register on March 28, 1997 (62 FR 14799). The changes would:

1. Modify the introduction to change the name of the sanctuary to the Hawaiian Islands National Marine Sanctuary - Nā Kai ‘Ewalu, and re-characterize the purpose of the sanctuary as ecosystem-based (rather than single species).
2. Modify Article I. Effect of Designation to change the name of the sanctuary to the Hawaiian Islands National Marine Sanctuary - Nā Kai ‘Ewalu.
3. Modify Article II. Description of the Area to update the boundary description with the new areas NOAA proposes adding to the sanctuary and remove the outdated text pertaining to Kahoolawe Island.
4. Modify Article III. Characteristics of the Area to update information on the abundance of humpback whales found near the Hawaiian Islands.

5. Modify Article IV. Scope of Regulations to update the activities regulated to include the activities covered by the proposed regulations.
6. Modify Article V to update the reference to the NMSA.

The revised terms of designation are proposed to read as follows (new text in bold and deleted text in brackets and italics):

DESIGNATION OF THE HAWAIIAN ISLANDS [HUMPBACK WHALE] NATIONAL MARINE SANCTUARY **– NĀ KAI 'EWALU**

On November 4, 1992, President Bush signed into law the Hawaiian Islands National Marine Sanctuary Act (HINMSA or Act; Subtitle C of the Oceans Act of 1992, Pub. L. 102–587) which designated the Hawaiian Islands Humpback Whale National Marine Sanctuary [(HIHWNMS or Sanctuary)]**, now called the Hawaiian Islands National Marine Sanctuary - Nā Kai 'Ewalu (Sanctuary)**. The purposes of the Sanctuary are to:

(1) protect **and conserve the marine ecosystem of the Hawaiian islands including** humpback whales**, marine turtles and other protected species,** [and their] Sanctuary habitat**, and historic and cultural resources and values**;

(2) educate and interpret for the public the **value [**relationship] of [humpback whales to] the **natural, historic and cultural value of the** Hawaiian Islands marine environment; **and**

(3) manage human uses of the Sanctuary consistent with the designation and Title III of the Marine Protection, Research and Sanctuaries Act, as amended (MPRSA; also cited as the National Marine Sanctuaries Act or NMSA), 16 U.S.C. § 1431 et seq. [; and

(4) provide for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary.]

ARTICLE I. EFFECT OF DESIGNATION

Section 2306 of the HINMSA requires the Secretary to develop and issue a comprehensive management plan and implementing regulations to achieve the policy and purposes of the Act, consistent with the procedures of sections 303 and 304 of the NMSA. Section 304 of the NMSA authorizes the issuance of such regulations as are necessary and reasonable to implement the designation, including managing and protecting the conservation, recreational, ecological, historical, research, educational and aesthetic resources and qualities of the Hawaiian Islands Humpback Whale National Marine Sanctuary**, now called the Hawaiian Islands National Marine Sanctuary - Nā Kai ‘Ewalu**. Section 1 of Article IV of this Designation Document lists activities subject to regulation which are those activities that may be regulated on the effective date of the regulations, or at some later date in order to implement the Sanctuary designation.

ARTICLE II. DESCRIPTION OF THE AREA

The HINMSA identified a Sanctuary boundary but authorized the Secretary to modify the boundary as necessary to fulfill the purposes of the designation. The Sanctuary boundary was modified by the Secretary to encompass the submerged lands and waters off the coast of the Hawaiian Islands extending seaward from the shoreline, cutting across the mouths of rivers and streams,—

(1) O‘ahu: The sanctuary boundary on the southern shore of O‘ahu is defined by the coordinates provided in table A1 and the following textual description. The boundary begins ENE of Makapuu Point roughly 3.4 nautical miles offshore at Point 1. It approximates the 100-fathom (182.8 meter) isobath line extending first clockwise to the SE, then to the SW, and finally to the west to Point 68 in numerical order. From Point 68 the

boundary extends NE towards Point 69 and the Kapahulu Groin. From Point 69 the boundary extends towards Point 70 until it intersects the shoreline. From this intersection the boundary then follows the shoreline eastward around Diamondhead Crater and Maunalua Bay until it intersects the line segment between Point 71 and Point 72 at the western entrance to the Hawaii Kai Marina. From this intersection the boundary moves towards Point 72 across the entrance to the marina until it intersects the shoreline again. The boundary then follows the shoreline eastward until it intersects the line segment between Point 73 and Point 74 at the eastern entrance to the Hawaii Kai Marina. From this intersection the boundary moves towards Point 74 across the entrance to the marina until it intersects the shoreline again. The boundary then follows the shoreline south around Koko Head and then northward around Pai‘olu‘olu Point, into Hanauma Bay and then back out and around Palea Point. The boundary then continues to follow the shoreline to the NE until it intersects the line between Point 75 and Point 76 at Makapuu Point. From this intersection the boundary extends seaward to the NE to Point 76. The sanctuary boundary on the North Shore of O‘ahu is defined by the coordinates provided in table A2 and the following textual description. The boundary extends from Point 1, located roughly 3.5 nautical miles NW of Ali‘i Beach Park in Hale‘iwa, approximating the 100-fathom (182.8 meter) isobath line first to the NE and then to the SE to Point 60 in mumerical order roughly 2.7 nautical miles NE of Māhie Point. The eastern edge of the sanctuary extends SW from Point 60 towards Point 61 at Māhie Point (aka Makahonu Point) until it intersects the shoreline. From this intersection the boundary follows the shoreline to the NW around Kahuku Point and then to the SW until it intersects the line segment between Point 62 and Point 63 at the eastern breakwater protecting Haleiwa Harbor. From this intersection the boundary extends towards Point 63 and the western breakwater until it

intersects the shoreline again. From this intersection the boundary follows the shoreline to the SW until it intersects the line segment between Point 64 and Point 65 near Ali‘i Beach Park. From this intersection the sanctuary boundary extends seaward to the NW to Point 65.

(2) Hawai‘i: The sanctuary boundary of Hawai‘i Island is defined by the coordinates provided in table A3 and the following textual description. The boundary begins offshore roughly 0.5 nautical miles west of Keāhole Point at Point 1, and approximates the 100-fathom (182.8 meter) isobath line as it extends northward to Point 102 in numerical order. The northeastern edge of the sanctuary boundary extends from Point 102 south towards Point 103 on the tip of ‘Upolu point until it intersects the shoreline. From this intersection, the boundary extends west and then south along the shoreline until it intersects the line segment between Point 104 and Point 105 to the north of Kawaihae Harbor. Kawaihae Harbor is excluded from the sanctuary so the boundary extends across the mouth of the harbor from this intersection towards Point 105 on the outer breakwater of Kawaihae Harbor until it intersects the shoreline. From this intersection the boundary continues south along the shoreline until it intersects the line segment between Point 106 and Point 107 at the westernmost tip of Hawai‘i Island (Keahole Point), west of the southern end of Kona Airport. From this intersection, the boundary extends seaward approximately 0.5 nautical miles west to Point 107.

(3) Ni‘ihau: The sanctuary boundary around the island of Ni‘ihau (including Lehua Island) is defined by the coordinates provided in table A4 and the following textual description. The landward boundary of Ni‘ihau and Lehua is the shoreline. The seaward boundary of

Ni‘ihau and Lehua is approximately three nautical miles from the shoreline and extends around the islands from Points 1 to 61 in numerical order.

(4) Kaua‘i: The sanctuary boundary off the north coast of Kaua‘i is defined by the coordinates in table A5 and the following textual description. The boundary begins offshore nearly 3.8 nautical miles WNW of Ka’īlio Point at Point 1 and approximates the 100-fathom (182.8 meters) isobath line as it extends eastward in numerical order to Point 59, approximately 1.5 nautical miles NE of Kepuhi point at roughly the Pila‘a/Waipake ahupua‘a boundary. The eastern edge of the sanctuary boundary then extends SW from Point 59 towards Point 60 on Kepuhi Point until it intersects the shoreline. From this intersection the sanctuary boundary extends westward along the shoreline of the north coast of Kaua‘i, and then continues to follow the shoreline as it extends southward along the eastern shore of Hanalei Bay until it intersects the line segment between Point 61 and Point 62 at approximately the mouth of the Hanalei River. From this intersection the boundary extends towards Point 62 until it intersects the shoreline again. From this intersection the boundary continues to follow the shoreline south around Hanalei Bay and then westward around Ka’ilio Point until it intersects the line between Point 63 and Point 64 at approximately the boundary of the Ha‘ena/Hanakāpi‘ai ahupua‘a NE of Hanakāpi‘ai beach. From this intersection, the boundary extends seaward to the WNW to Point 64.

(5) Maui Nui: The sanctuary boundary in Maui Nui between the islands of Moloka‘i, Lana’i, and Maui is defined by the coordinates in table A6 and the following textual description. The boundary begins roughly 3.5 nautical miles west of ‘Īlio Point off the northwest tip of Moloka‘i at Point 1. The boundary approximates the 100-fathom (182.8

meter) isobath line to the west and south around Penguin Bank and then back to the north and east following the coordinates in numerical order across Kalohi Channel to Point 202 to the NE of Kaena on Lanaʻi. The boundary then continues to approximate the 100-fathom (182.8 meter) isobath line south continuing to the west of Lana'i and then SE crossing the Kealaikahiki Channel and continuing between Kahoʻolawe and Molokini to the SE to Point 347 in numerical order roughly 2.2 nautical miles SW of Hanamanioa Lighthouse on the southern shore of Maui. The boundary then continues NE towards Point 348 until it intersects the shoreline near the Hanamanioa Lighthouse. At this intersection the boundary follows the shoreline northward to Māʻalaea Bay until it intersects the line segment between Point 349 and Point 350 at the eastern breakwater of the entrance to Māʻalaea Harbor. From this intersection the boundary continues toward Point 350 until it intersects the shoreline at the western breakwater of Māʻalaea Harbor. From this intersection the boundary continues to follow the shoreline SW around McGregor and Papawai Points and then to the NW until it intersects the line between Point 351 and Point 352 at the outer breakwater entrance to Lahaina Small Boat Harbor. From this intersection the boundary continues towards Point 352 until it intersects the shoreline again. From this intersection the boundary then continues to follow the shoreline northward until it intersects the line between Point 353 and Point 354 at Lipoa Point on the NW tip of Maui. From this intersection the boundary continues to the NNW across the Pailolo Channel through Point 354 and Point 355 to the intersection of the line segment between Point 356 and Point 357 and the shoreline at Cape Halawa on the NE tip of Molokai. From this intersection the boundary continues to follow the shoreline to the SW and then westward until it intersects the line segment between Point 358 and Point 359 east of Kaunakakai Pier. From this intersection the boundary then continues offshore through

Point 359 and Point 360 and towards Point 361 to the west of Kaunakakai Pier until it intersects the shoreline. From this intersection the boundary continues to follow the shoreline westward until it intersects the line segment between Point 362 and Point 363 near the entrance to Lono Harbor. From this intersection the boundary continues towards Point 363 until it intersects the shoreline again. From this intersection the boundary continues to follow the shoreline westward around Laau Point, and then it continues NNE until it reaches the intersection of the shoreline with the line segment between Point 364 and Point 365 at ʻĪlio Point on the NW tip of Molokaʻi. From this intersection the boundary continues seaward to Point 366 west of ʻĪlio Point. The landward sanctuary boundary around the island of Lana'i is the shoreline. The boundary follows the western shoreline of the island south from Keanapapa Point until it intersects the line between Point 367 and Point 368 at the breakwater north of Kaumalapau Harbor. The boundary extends towards Point 368 south of the harbor mouth, excluding Kaumalapau Harbor from the sanctaury, until it intersects the shoreline again. From this intersection the boundary continues to follow the shoreline south around Palaoa Point and then east until it intersects the line between Point 369 and Point 370 at the SE breakwater of Manele Small Boat Harbor. From this intersection the boundary extends across the mouth of the harbor towards Point 370 until it intersects the shoreline again at the NE breakwater, excluding Manele Small Boat Harbor from the sanctuary. From this intersection the boundary continues to follow the shoreline of Lana'i to the east around Kikoa Point and then to the NW to Keanapapa Point.

[(1) To the 100-fathom (183 meter) isobath adjoining the islands of Maui, Molokai and Lanai, including Penguin Bank, but excluding the area within three nautical miles of the upper

reaches of the wash of the waves on the shore of Kahoolawe Island;

(2) To the deep water area of Pailolo Channel from Cape Halawa, Molokai, to Nakalele Point, Maui, and southward;

(3) To the 100-fathom (183 meter) isobath around the island of Hawaii;

(4) To the 100-fathom (183 meter) isobath from Kailiu Point eastward to Makahuena Point, Kauai; and

(5) To the 100-fathom (183 meter) isobath from Puaena Point eastward to Mahie Point, and from the Ala Wai Canal eastward to Makapuu Point, Oahu.

Excluded from the Sanctuary boundary are the following commercial ports and small boat harbors:

Hawaii (Big Island)

Hilo Harbor Honokohau Boat Harbor

Kawaihae Boat Harbor & Small Boat Basin

Keauhou Bay

Oahu

Ala Wai Small Boat Basin

Kauai

Hanamaulu Bay

Nawiliwili Harbor

Lanai

Kaumalapau Harbor

Manele Harbor

Maui

Kahului Harbor

Lahaina Boat Harbor

Maalaea Boat Harbor

Molokai

Hale o Lono Harbor

Kaunakakai Harbor

As specified at sections 2305(b) of the HINMSA, on January 1, 1996, the area of the marine environment within 3 nautical miles of the upper reaches of the wash of the waves on the shore of Kahoolawe Island was to become part of the Sanctuary, unless during the 3 month period immediately preceding January 1, 1996, the Secretary certified in writing to Congress that the area was not suitable for inclusion in the Sanctuary. The Secretary made such a certification in December 1995. As such, the waters surrounding Kahoolawe are not included in the Sanctuary. The HINMSA was amended in 1996 to allow the Kahoolawe Island Reserve Commission

(KIRC) to request inclusion of the marine waters three miles from Kahoolawe in the Sanctuary. Upon receiving a request from the KIRC, should NOAA determine that Kahoolawe waters may be suitable for inclusion in the Sanctuary, NOAA will prepare a supplemental environmental impact statement, management plan, and implementing regulations for that inclusion. This process will include the opportunity for public comment. Further, the Governor would have the opportunity to certify his or her objection to the inclusion, or any term of that inclusion, and if this occurs, the inclusion or term will not take effect.]

ARTICLE III. CHARACTERISTICS OF THE AREA THAT GIVE IT PARTICULAR VALUE

The Hawaiian Islands comprise an archipelago which consist of eight major islands and 124 minor islands, with a total land area of **6,471** [6,423] square miles, and a general coastline of 750 miles. The central North Pacific stock of endangered humpback whales, the largest of the three North Pacific stocks, estimated to be at approximately **50**[10]% of its pre-whaling abundance, uses the waters around the main Hawaiian Islands for reproductive activities including breeding, calving and nursing. The warm, calm waters around the main Hawaiian Islands provide protective environments required for such activities. Of the known wintering and summering areas in the North Pacific used by humpback whales, the waters around the main Hawaiian Islands maintain the largest seasonally-resident population; approximately **12,000 to 16,000** [2,000 to 3,000] humpback whales use these waters. The proximity to shore helps support an active commercial whalewatch industry, which is supported annually by millions of visitors who either directly or indirectly enjoy the Sanctuary waters. In sections 2302 (1) and (4) of the HINMSA, Congressional findings state that “many of the diverse marine resources and ecosystems within the Western Pacific region are of national significance,” and “the marine environment adjacent to and between the Hawaiian Islands is a diverse and unique subtropical

marine ecosystem." In addition, Congress found that the Sanctuary could be expanded to include other marine resources of national significance. The waters around the Hawaiian Islands contain 24 other species of cetaceans, the highly endangered Hawaiian monk seal, three species of sea turtles and many other marine species endemic to this environment. Coastal Hawaiian waters also support spectacular coral reef ecosystems which provide local people with an abundant source of fish and are a popular dive destination for visitors worldwide. These waters also contain a number of cultural/historical resources, including those reflecting native Hawaiian traditions and uses.

ARTICLE IV. SCOPE OF REGULATIONS

Section 1. Activities Subject to Regulation.

In order to implement the Sanctuary designation, the following activities **may be regulated** [are subject to regulation] to the extent necessary [and reasonable] to ensure the protection and management of the characteristics and values of the Sanctuary described above [; primarily the protection and management of humpback whales and their Sanctuary habitat. Regulation may include governing the method, location, and times of conducting the activity, and prohibition of the activity, after public notice and an opportunity to comment. If a type of activity is not listed it may not be regulated, except on an emergency basis, unless Section 1 of Article IV is amended by the procedures outlined in section 304(a) of the NMSA. Such activities are]:

a. Taking or otherwise damaging natural resources;

[a. Approaching, or causing another vessel or object to approach, by any means a humpback whale in the Sanctuary;]

b. [Flying over a humpback whale in the Sanctuary in any type of aircraft except as necessary for takeoff or landing from an airport or runway;

c.] Discharging or depositing **any substance; [**, from within or from beyond the boundary of the Sanctuary, any material or other matter into, or that enters or could enter the Sanctuary, without, or not in compliance with, the terms or conditions of a required, valid Federal or State permit, license, lease or other authorization;]

c. Disturbing the benthic community;

d. Removing or otherwise harming cultural or historical resources;

e. Operating a vessel;

f. Moving, removing, or tampering with any sign or other Sanctuary property;

g. Introducing or otherwise releasing an introduced species.

[d. Drilling into, dredging or otherwise altering the seabed of the Sanctuary; or constructing, placing or abandoning any structure, material or other matter on the seabed of the Sanctuary without, or not in compliance with, the terms or conditions of a required, valid Federal or State permit, license, lease or other authorization;

e. Taking, removing, moving, catching, collecting, harvesting, feeding, injuring, destroying or causing the loss of, or attempting to take, remove, move, catch, collect, harvest, feed, injure, destroy or cause the loss of any humpback whale or humpback whale habitat;

f. Possessing within the Sanctuary a humpback whale or part thereof regardless of where taken, removed, moved, caught, collected or harvested; and

g. Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the HINMSA or NMSA or any regulation or permit issued under the HINMSA or NMSA.]

Section 2. Emergencies.

Where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource or quality; or minimize the imminent risk of such destruction, loss or injury, any activity, including those not listed in Section 1 of this Article, is subject to immediate temporary regulation, including prohibition. If such a situation arises, the Director of NOAA's Office of **National Marine Sanctuaries** [Ocean and Coastal Resource Management] or his or her designee shall seek to notify and consult to the extent practicable with any relevant Federal agency and the Governor of the State of [Hawaii] **Hawai'i**.

ARTICLE V. EFFECT ON LEASES, PERMITS, LICENSES, AND RIGHTS

Pursuant to section 304(c)(1) of the NMSA, 16 U.S.C. §1434(c)(1), no valid lease, permit, license, approval or other authorization issued by any Federal, State, or local authority of competent jurisdiction, or any right of subsistence use or access, may be terminated by the Secretary of Commerce, or his or her designee, as a result of this designation, or as a result of any Sanctuary regulation, if such authorization or right was in existence on the effective date of Sanctuary designation (November 4, 1992).

ARTICLE VI. ALTERATION OF THIS DESIGNATION

The terms of designation, as defined under section 304**(a)** of the NMSA, may be modified only by the procedures outlined in section 304**(a) of the NMSA**, including public hearings, consultation with interested Federal, State, and county agencies, review by the appropriate Congressional committees, and review and non-objection by the Governor of the State of [Hawaii] **Hawai'i**, and approval by the Secretary of Commerce, or his or her designee.

HAWAIIAN ISLANDS [HUMPBACK WHALE] NATIONAL MARINE SANCTUARY **– NĀ KAI ‘EWALU** BOUNDARY COORDINATES

Appendix A to subpart Q, part 922, 15 CFR sets forth the precise boundary coordinates for the Sanctuary.

11.12. Appendix L: Photo Credits

Cover: Jason Waltman
3.1 HIHWNMS
3.2 HIHWNMS
3.3 HIHWNMS
7.1.1.1 Paul Wong
7.1.1.3 Fiona Langenberger
7.1.2.1 Seale/HIHWNMS/NOAA Fisheries MMHSRP Permit #14682
7.1.2.2 Ben Richards
7.1.2.3 Ed Lyman
7.1.2.4 Ed Lyman
7.1.2.5 Fiona Langenberger
7.1.2.6 Paul Wong
7.1.3 Jonathan Martinez
7.1.4.1 Jonathan Martinez
7.1.4.3 Ed Lyman
7.1.4.5 Lyman/HIHWNMS/NOAA Fisheries MMHSRP Permit #932-1905
7.1.4.6 Barbara Billand
7.1.4.7 HIHWNMS
7.1.4.8 Ed Lyman
7.1.4.10 Carey Morishige
7.1.4.11 Paul Wong
7.2.2.2 Fiona Langenbergerm Fiona Langenberger, Polynesian Voyaging Society
7.2.2.3 Jeff Kuwabara
7.2.3.1 Paul Wong
7.2.3.2 NOAA
7.2.3.3 Paul Wong, Paul Wong
7.4.1 Paul Wong, Ed Lyman
8.1 Norman Wang
8.1.1.1 Ray Boland
8.1.1.2 Derek Wang, Patrick Doyle, Andre Seale
8.2.1.2 Fiona Langenberger
8.2.2.2 Fiona Langenberger
8.3.1.2 Fiona Langenberger
8.4.1.1 Jean Souza
8.4.2.2 Emily Gaskin
8.5.2.1 Fiona Langenberger
8.6.1.1 Fiona Langenberger
8.6.2.2 Emily Gasking
8.6.4 Jonathan Martinez
8.8.1.1 Ed Lyman
8.8.2.2 Seale/HIHWNMS/NOAA Fisheries MMHSRP Permit #14682
9.2.1 Hawaii Undersea Research Lab, Tamara Paltin
9.2.2 Paul Wong
9.3.3.1 Derek Want

0	Fiona Langenberger
10.1	Alison Andrews
10.1.1	Ed Lyman
10.1.2	Fiona Langenberger
10.1.3	Fiona Langenberger
10.2	Alison Andrews
10.2.1	Fiona Langenberger
10.2.2	Hans VanTilburg
10.3	Alison Andrews
10.3.1	Jean Souza
10.3.2	Bo Petty
10.3.3	Jean Souza
10.4	Alison Andrews
10.4.1	Greg McFall
10.4.3	Fiona Langenberger
10.4.4	Paul Wong
10.5	Alison Andrews
10.5.1	Ed Lyman
10.5.2	HIHWNMS
10.5.3	Ed Lyman
10.5.4	Donna Loudon

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