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DOBOR
Division of Boating and Ocean Recreation

Department of Land and Natural Resources
State of Hawaii

Wai'anae Baseline Environmental Study

Prepared for:
State of Hawai'i
Department of Land and Natural Resources
Division of Boating and Ocean Recreation

Prepared by:
Tetra Tech, Inc.
737 Bishop Street
Suite 3010
Honolulu, HI 96813

EXECUTIVE SUMMARY

Introduction

The leeward coast of O‘ahu spans a distance of approximately 25 miles (39 km), encompassing the coastal area from Ka‘ena Point, at the most northwestern tip of the island, to Kalaeloa Point, the southwestern tip of the island (Figure ES.1). This coastline is characterized by diverse ocean resources with a range of demands by residents, developers, and visitors alike. The growth of both commercial and recreational ocean uses along coast has increased, resulting in conflicts between ocean users as well as potential adverse effects on marine mammals and other ocean resources. Through Act 6, Special Session Laws of Hawai‘i 2005 (Act 6), the Hawai‘i Department of Land and Natural Resources (DLNR) was mandated to prepare a baseline environmental study of the Wai‘anae coast from Kalaeloa Point to Ka‘ena Point as an informational document to be used to establish rules to manage conflicts in ocean use occurring in the area. This Wai‘anae Baseline Environmental Study, prepared in response to Act 6, describes the status and trends in ocean resource conditions and uses, ocean use issues, and management alternatives to address these issues. The potential environmental, social, and economic effects of these alternative management approaches are analyzed and compared, along with recommendations for implementation.

Ocean Resource Use Issues

Ocean resources, including beaches, coral reefs, fisheries, and special status marine species, including spinner dolphins and humpback whales, provide for both commercial and public uses along the Wai‘anae coast (Figure ES.1). Public ocean uses include swimming, snorkeling, SCUBA diving, fishing, jet skiing, and paddling. Commercial ocean uses include tourism (charter fishing, whale watching, snorkeling, SCUBA diving) and commercial fishing. Commercial ocean tourism off the Wai‘anae coast has grown over the last 10 years. The ongoing expansion of the Ko Olina resort, located on the Wai‘anae coast, and the development of the 600 to 800 slip Hoakalei marina in Ewa Beach will likely accelerate this trend in the near future. This growth has resulted in both beneficial and potential adverse impacts on ocean resources and the local community as well as conflicts between ocean users.

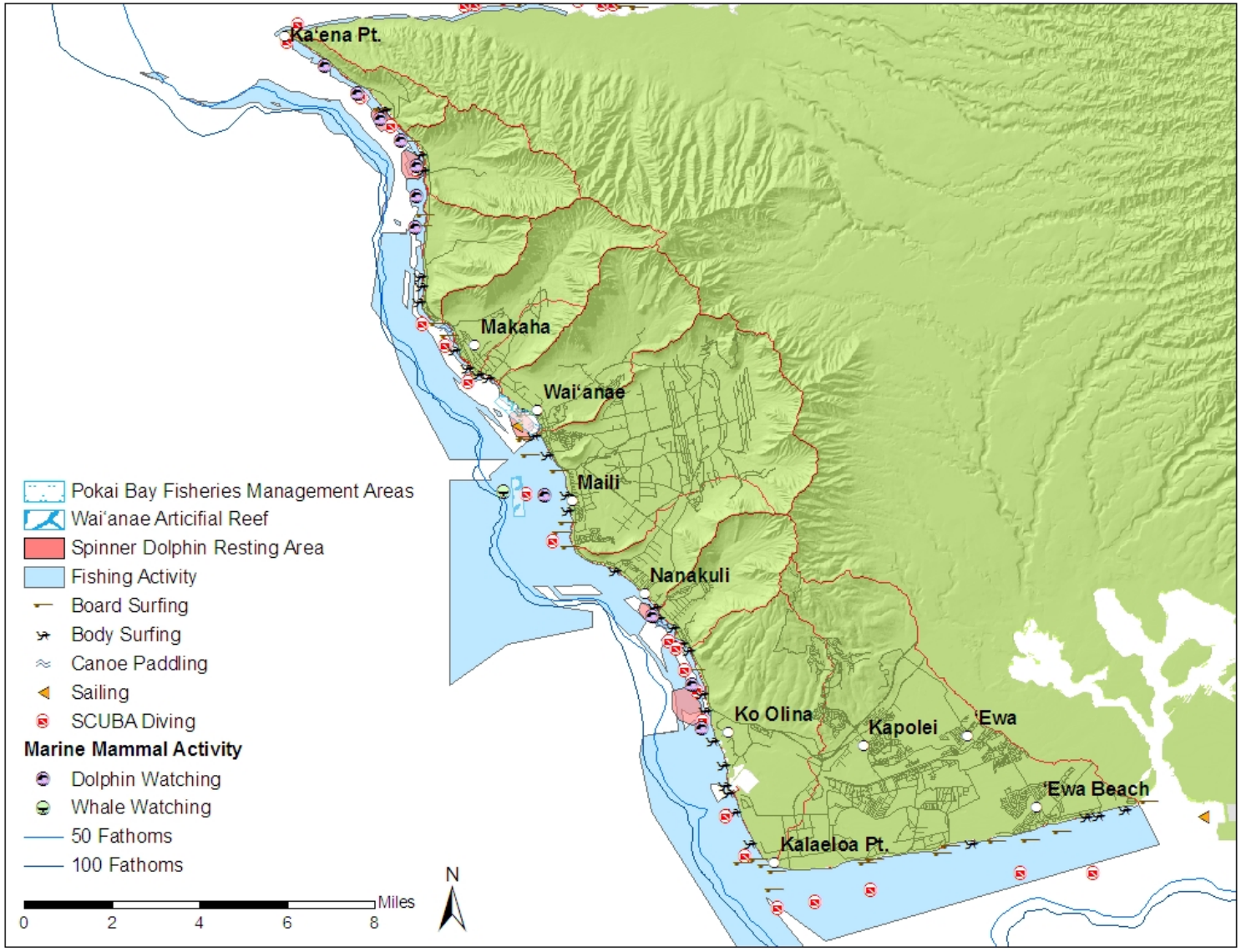

Figure ES. 1 Wai'anae Baseline Study Area and Locations of Key Ocean Uses

Commercial ocean tourism activities, in particular, marine mammal/snorkeling tours, at existing or increasing levels could result in a number of potential adverse impacts on marine mammals, especially, spinner dolphins that come into shallow, sandy bottoms areas along the leeward coast during the daytime to rest after foraging at night. High-speed transit of commercial marine mammal/snorkeling tours through traditional fishing grounds for akule and ‘opelu may be resulting in changes in the distribution and health of fish stocks along the coast. This transit coupled with direct interactions between commercial marine mammal/snorkeling tour boats and akule and ‘opelu fishing boats has resulted in lost income to fishermen. In addition, safety incidents and antagonistic behavior between resource users would be expected to increase. Key ocean use issues that need to be addressed in the area include the following:

- Disturbance and potential individual and population behavioral impacts to protected marine mammals
    - Existing federal guidelines for observing marine mammals not applied by all operators
    - Repeated daily interactions (8 a.m. to 5 p.m.) with spinner dolphins by multiple commercial ocean tour operators minimizing resting time needed by the dolphins
    - Close passage and pursuit of humpback whales (from November to May) by commercial tour operations
    - Absence of mechanisms to limit the number of commercial tour ocean operators
- Unsafe boating conditions created by different ocean users operating in the same area
    - Commercial dolphin watching tours pass too close to deployed gear of akule and ‘opelu fishermen, creating a potentially dangerous wake
    - Commercial SCUBA diving tours operate in surfing areas during high surf conditions when surfers are present
- Loss of traditional akule and ‘opelu fishing areas and livelihood
    - Spawning aggregations and juvenile recruitment in shallow waters disturbed by high-speed transit through fishing grounds by commercial tour operators and other private boats
    - Loss of income when commercial tour operators disrupt fishing activities by operating or transiting too close to fishing boats
- Different requirements for commercial ocean tour boats operating out of state versus private harbors
    - Commercial ocean tour operators are not currently required to obtain a permit to operate in state waters
- Increasing numbers of private thrill craft operating along the coast
- Inadequate management and enforcement capacity along the coast
- Inadequate information and data on ocean use, resource status, and impacts

These key ocean use issues, identified through stakeholder consultations and information and data review and analysis, provide the basis for defining mitigation measures and alternatives for ocean recreation management.

Public Review and Consultation

Tetra Tech conducted an initial project status meeting in late 2007. Two participatory meetings with the Wai‘anae Neighborhood Board and their Parks and Recreation Committee were held on January 9, 2008, and March 5, 2008. The first meeting was held so that the community could participate in providing issues and concerns that should be addressed in the study. At the second meeting, Tetra Tech provided large maps and community members were urged to provide information on spatial and temporal use of the ocean by activity type. Project status updates were given to the entire Wai‘anae Neighborhood Board on February 14 and April 10.

In addition to these meetings, commercial tour boat operations, representatives from Ko Olina, Wai‘anae akule and ‘opelu fishermen, ocean recreational users, and Wai‘anae community representatives were interviewed. Some of these interviews were at the request of participants at the neighborhood board meetings. Tetra Tech was able to obtain primary data from these key stakeholder groups. These stakeholders shared spatial information about their activities that was critical for developing management alternatives and zoning options. These data were incorporated into a geographic information system database to facilitate analysis of user conflicts and as a tool to discuss management options with stakeholders. The ability to obtain this level of primary data collection was unanticipated and provided a unique opportunity for the Study.

On September 5, 2008, Tetra Tech consulted with relevant government entities including relevant divisions of the DLNR, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Coast Guard (USCG). Agency attendees provided valuable insight into potential legal and statutory issues and barriers relating to various aspects of each of the alternatives.

The scheduling of these meetings and the additional research and analysis resulting from the input we received during three iterations of the draft document extended the time needed to finalize the document. Tetra Tech believes that the additional time invested in stakeholder consultations provided valuable insights in resolving the ocean use conflicts and will improve the acceptability of the management measures and ultimately implementation.

Mitigation Measures

The Wai‘anae coast maintains many distinctive features as an ocean recreational area. Seabirds, sea turtles, and a variety of marine mammals are found along the coast. The northern end of the coast from Kepuhi Point to Ka‘ena Point has abundant wildlife and cultural significance. Community values support the maintenance of a rural landscape and special protection and preservation of Wai‘anae’s coastal resources. In order to preserve these features and guide ocean recreational use in line with community’s vision, improved area management is needed to mitigate current impacts of recreational use and to proactively address future threats. The types of mitigation measures selected should be guided by management goals to preserve these values along the Wai‘anae coast including the following:

- Minimize ecological impacts of ocean resource use and other stressors to the marine ecosystem
- Protect special status marine species
- Ensure traditional nearshore fisheries are sustained to provide livelihood and subsistence
- Preserve rural setting and scenic vistas
- Preserve Native Hawaiian cultural practices in coastal areas
- Provide positive, safe, and ecologically and culturally appropriate recreational experiences for residents and visitors

A combination of regulatory and nonregulatory measures is needed to achieve management goals and mitigate the impacts of ocean use activities now and in the future. These mitigation measures include:

- Restricting the number and type of ocean use activities
- Restricting the location of ocean use activities through zoning
- Increasing enforcement capacity through seaborne patrols
- Establishing an advisory body to address ongoing ocean use issues
- Establishing long-term monitoring studies on ocean recreational use levels and impacts
- Conducting focused research studies on ocean recreational use impacts on marine mammals and other ocean resources to enable adaptive management
- Establishing a regular education and outreach program for the Wai‘anae coast aimed at commercial and public ocean users on a code of conduct and best practices for ocean use

Alternatives Considered

Alternative management regimes to address conflicts in ocean use along the Wai‘anae coast were developed considering the purpose and need described in Section 1.1, using available regulatory and non-regulatory management tools described in Section 7, and examples provided in Act 6. Ocean recreation management alternatives include the status quo, or No Action alternative, and three management alternatives. A comparison of the key provisions of each alternative is provided in Table ES.1 and described below.

Table ES.1 Comparison of Key Provisions of Ocean Recreation Management Alternatives for the Wai‘anae Coast

Provision	No Action Alternative	Alternative 1	Alternative 2	Alternative 3
Maintain Non-Designated ORMA	●	●		
Maintain Gentlemen’s Agreement	●			
Establish Ocean Users Code of Conduct (based on modified Gentlemen’s Agreement)		●		
Designate ORMA based on Ocean User Code of Conduct			●	●
Require all commercial tour vessels to obtain a permit to operate within the ORMA with specific permit conditions on type of services and area of operation			●	●
Establish cap on number permits and capacity of commercial tour operators operating within the ORMA			●	●
Establish Marine Life Conservation District from Kepuhi Point to Ka‘ena Point prohibiting all commercial activities				●

No Action Alternative: Maintain Non-Designated ORMA with Gentlemen's Agreement

Under the No Action alternative, the existing non-designated Ocean Recreation Management Area (ORMA) together with the Gentlemen's Agreement would be used to minimize conflicts in ocean use (Figure ES.2). Ocean recreational activities off the Wai'anae coast would continue with minimal regulation and management. Ocean recreational activities would continue to operate under the rules of a non-designated ORMA (Table ES.2). The non-designated ORMA currently prohibits commercial use of controlled ocean sports (jet ski, wave runner, high-speed boating) and restricts recreational thrill craft to operate in state waters between 500 feet from the shoreline and 2 miles offshore.

The provisions of the existing Gentlemen's Agreement developed by the 2005 task force would remain in place as a non-regulatory management tool for resolving conflicts in ocean use along the Wai'anae coast. Conflicts in ocean use between fishermen and commercial tour operators would be expected to continue as a result of inconsistent application of the provisions of the Gentlemen's Agreement. Conflicts between various ocean users would continue to be resolved on an ad hoc basis without establishment of the Leeward Coast Advisory Ohana.

In 2005, "Act 6 placed a moratorium on the issuance of new commercial vessel permits in state small boat harbors involving ocean-related activities for ocean waters between Kalaeloa Point and Ka'ena Point until the boundaries of a Kalaeloa to Ka'ena ORMA are designated and administrative rules on recreational boating activities and commercial vessel activities are adopted" (DLNR Report to the 24th Legislature 2008 Regular Session). Although this moratorium holds the number of commercial tour operations based out of state harbors to 2005 levels, the number of commercial ocean tour operators continues to increase with increasing tourism and marina development along the leeward coast. Under the No Action alternative, DLNR only regulates the number of permits for vessels using state facilities to launch or dock. Permitting would continue to be used primarily as a revenue-generating mechanism and not as a tool to manage impacts on ocean resources and conflicts between ocean users by limiting the number of permits, incorporating specific permit conditions, and applying and enforcing these permits. Commercial tour operators based in privately owned harbors would continue to be excluded from DLNR requirements to obtain permits to operate in state waters. New entrants would be able to operate their businesses from these harbors.

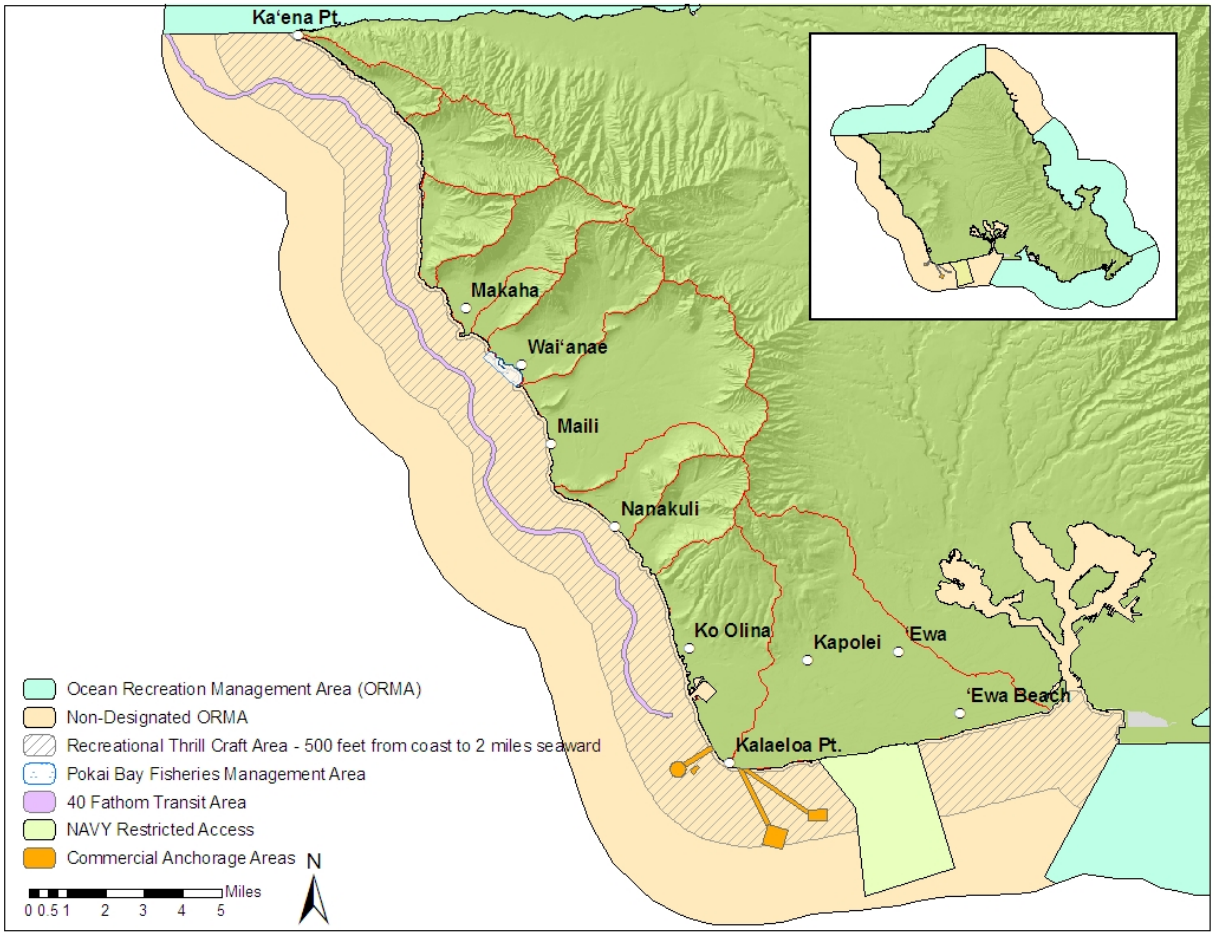

Figure ES.2 Spatial Aspects of the No Action Alternative: Non-designated ORMA and Gentlemen's Agreement

Table ES.2 No Action Alternative: Non-designated ORMA and Gentlemen's Agreement

Non-Designated ORMA
• Non-Designated ORMA currently: o Establishes rules for all other waters (not designated as ORMAs) o Prohibits commercial use of controlled ocean sports o Restricts recreational thrill craft (jet ski, wave runner, and high-speed boating) to operate in state waters from 500 feet from the shoreline to 2 miles offshore
Gentlemen's Agreement
• Applies from Barber's Point to Ka'ena Point (areas 402 and 403) • Operators and researchers must be sensitive while traveling along the coast and work closely with fishing vessels • Normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions • Enter into areas at right angles from offshore to inshore • Works closely on radio channels 78a/68 to minimize conflicts • Work closely with other marine mammal watching vessels on channel 78a • Pass location of dolphin pods to other interested parties • Approach and observe dolphin areas smoothly, quietly, and slowly • Be conscious and watch for swimmers and divers while traveling en route and at site • Work closely with dive vessels • Log activity, amount, direction of travel, type of animal, and daily logs • Pass information along to University of Hawai'i • Communicate with fisherman • Do not pass inside of operating fishing vessel • Convene the Leeward Coast Advisory 'Ohana
Commercial Ocean Operator Permits
• Permit required only for commercial tour boats operating out of Wai'anae Boat Harbor (or launching at ramp), and some permits specify the types of services that can be offered • Commercial tour operators originating out of private harbors are not required to obtain permits from the state • Commercial ocean tour operators allowed to pick up and drop off passengers from beaches and other land-based access points, although usually passengers are loaded and unloaded from Wai'anae Small Boat Harbor and Ko Olina Marina • Commercial Marine License required for commercial fishing
Other Ocean Use Regulations
• Pōka'ī Bay Fishery Management Area (§13-188-36) o Sets gear restrictions for fish, crab, and shrimp for bait
• Pōka'ī Bay Special Ocean Waters (§13-244:33) currently designated two zones: o Zone A: Swimming o Zone B: Canoe paddling

Alternative 1: Maintain Non-Designated ORMA with Ocean Users Code of Conduct (Modified Gentlemen's Agreement) and Additional Management Measures

Under Alternative 1, the existing non-designated ORMA together with an Ocean Use Code of Conduct (modified Gentlemen's Agreement) and additional management measures would be used to minimize ocean use conflicts (Figure ES.3; Table ES.3). Ocean recreation off the Wai'anae coast would continue with additional regulation and management and would continue to operate under the rules of a non-designated ORMA as described in the No Action Alternative. The provisions in the Gentlemen's Agreement would be modified, however, to include additional commercial and recreational ocean users and address management goals related to resource preservation.

Federal guidelines for marine mammal watching would be incorporated into the Gentlemen's Agreement. Protocols would reinforce a hierarchal system where the first vessel governs access to an area. Fishing vessels would be required to fly a flag when fishing and report catch offshore of the leeward coast by smaller quadrants established by DLNR.

Permits would still only be required for commercial ocean tour boats operating out of state harbors, and no new permits would be issued per directive of Act 6. Commercial ocean tour boats operating out of private harbors, including the Ko Olina marina, would remain unpermitted, allowing for new commercial ventures to operate in the area of concern. Permitted ocean tour operators would be required to participate in annual orientation on the Code of Conduct, and unpermitted operators would be encouraged to do as well. Additional resources would be allocated to develop and distribute public education and outreach on Code of Conduct and ocean regulations through the DLNR website and other mechanisms as well as to increase seaborne enforcement presence by the USCG and DLNR's Division of Conservation and Resource Enforcement (DOCARE) along the Wai'anae coast.

The Leeward Coast Advisory 'Ohana would be established by DLNR as a forum to discuss and resolve conflicts in ocean resource use. The harbor masters of the state Wai'anae Boat Harbor and Ko Olina Marina, USCG, and representatives from DLNR's Division of Aquatic Resources (DAR) and Division of Boating and Ocean Recreation (DOBOR) would be included as members of the group. The group would provide recommendations to DAR and DOBOR to penalize and possibly revoke permits of commercial tour operators for noncompliance with the Gentlemen's agreement.

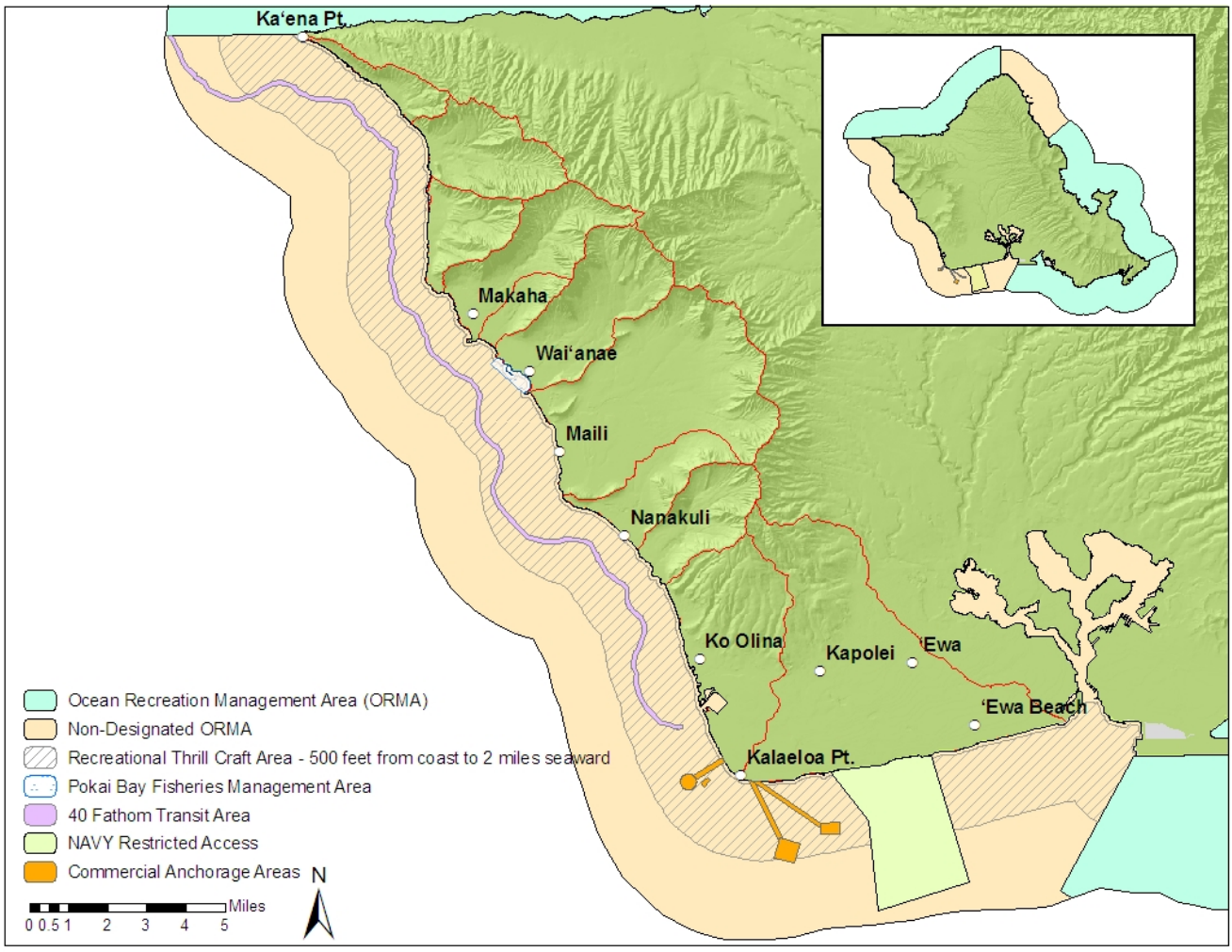

Figure ES.3 Spatial Aspects of Alternative 1: Non-Designated ORMA and Ocean Users Code of Conduct (Spatial Features are the Same as the No Action Alternative)

Table ES.3 Alternative 1 – Maintain Non-Designated ORMA with Ocean Users Code of Conduct and Additional Management Measures

Non-Designated ORMA

• Maintain Non-Designated ORMA as described in the No Action alternative
• Non-Designated ORMA currently:
  o Establishes rules for all other waters (not designated as ORMAs)
  o Prohibits commercial use of controlled ocean sports
  o Restricts recreational thrill craft (jet ski, wave runner, high speed boating) to operate in state waters from 500 feet from the shoreline to 2 miles offshore

Ocean Use Code of Conduct (Modified Gentlemen's Agreement)
Leeward Coast Advisory Ohana
• Establish a chartered advisory body, *Leeward Coast Advisory 'Ohana*, with a coordinator that is funded annually and conducts regular meetings and activities to serve as a mechanism to address potential future conflicts in ocean use and to provide recommendations to DLNR to revoke permits of repeat offenders • Expand recommended membership for the *Advisory 'Ohana* from existing Gentlemen's Agreement to include the harbor masters from Ko Olina Marina and Wai'anae Small Boat Harbor and representatives from the USCG, DAR, DOBOR, and police • Establish and maintain an updated *Commercial Ocean Users Directory for the Leeward Coast* with cellular phone numbers and radio frequencies used by commercial tour and fishing operators • Establish an *Ocean Use Incident Report Form* available on-line at DOBOR's website and in hard copy at the public library, boat harbor, satellite city hall, and police stations to register ocean use conflicts, safety incidents, and non-compliance with regulations and the *Code of Conduct* with the *Advisory 'Ohana* • Establish a process for the Coordinator to review complaint forms, meet with parties affected, and prepare an incident report for review by the *Advisory 'Ohana* • Encourage all commercial tour operators to participate in annual orientation on the *Code of Conduct* • Monitor compliance of ocean users with regulations and the *Code of Conduct* and make recommendations to DLNR to revoke commercial tour operator permits, harbor access, and other mechanisms, such as publishing an annual list of commercial tour operators with good compliance records • Conduct training of Makai Watch Network to monitor and report on violations of regulations and noncompliance with the Code of Conduct to the Advisory 'Ohana using the *Ocean Use Incident Report Form*
Makai Watch Network
• Establish a network of Makai Watch members along the leeward coast trained to monitor and report to the Advisory 'Ohana on potential violations to regulations and noncompliance with the Code of Conduct using the Ocean Use Incident Report Form • Conduct education and outreach activities to inform private recreational users of regulations and the Code of Conduct
Commercial Marine Mammal/Snorkeling Tour Boats

• Fly a dolphin flag
• Implement federal guidelines on marine mammal viewing, including:
  o Stay at least 100 yards from humpback whales
  o Stay at least 50 yards from dolphins
  o Move away cautiously if dolphins show signs of disturbance
  o Always put the engine in neutral when dolphins are near
  o Refrain from swimming with, touching, or feeding wild dolphins
• Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore
• Respect the hierarchy system where first vessel governs access: avoid areas where commercial fishing vessels are operating
• Use *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of fishing activity
• Adopt NOAA's Dolphin SMART Program to promote voluntary compliance
• Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Commercial Fishing Vessels
• Fly fishing flag

- Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore
- Respect hierarchy system where first vessel governs access: avoid areas where commercial marine mammal and snorkeling tours are operating
- Report fish catch by smaller reporting squares (smaller reporting areas would have to be established by DLNR)
- Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Commercial SCUBA Diving Charters

- Fly a dive flag
- Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore
- Use official day moorings
- Do not moor or enter when high surf advisories are in effect for west shores
- Do not alter any permanent moorings
- Do not feed fish
- Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Public Recreational Ocean Users

- Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions and enter into areas at right angles from offshore to inshore
- Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Commercial Ocean Operator Permits

- Permit required only for commercial tour boats operating out of Waiʻanae Boat Harbor (or launching at ramp), and some permits specify the types of services that can be offered
- Commercial tour operators originating out of private harbors are not required to obtain permits from the state
- Commercial ocean tour operators allowed to pick up and drop off passengers from beaches and other land-based access points although usually passengers are loaded and unloaded from Waiʻanae Small Boat Harbor and Ko Olina Marina
- Commercial Marine License required for commercial fishing

Other Management Measures

- Monitor and conduct studies on resource status and impacts of ocean use along the Waiʻanae coast to fill data gaps and improve management decision making
- Increase seaborne enforcement presence by USCG and DOCARE along the Waiʻanae coast
- Establish Makai Watch and train community to assist DOCARE
- Use DLNR website and other mechanisms to conduct regular public education and outreach on *Code of Conduct* and ocean regulations

Alternative 2: Designate ORMA with Cap on Commercial Tour Operator Permits

Under Alternative 2, an ORMA would be designated to manage ocean recreational use to minimize use conflicts (Figure ES.4). The ORMA would formalize through regulations some, but not all, of the provisions of the Code of Conduct described in Alternative 1 (Table ES.4).

The ORMA would extend from Ka‘ena Point to just north of Kalaeloa Point (Figure ES.4). The transit lane described in the Ocean Use Code of Conduct (and Gentlemen’s Agreement) would be formally established within the ORMA boundary. A public recreational thrill craft zone would be established in the ORMA. Commercial thrill craft and other controlled ocean sports would be prohibited by regulation in the ORMA.

Permits would be required for all commercial ocean tour boats operating within the borders of the ORMA, with the number of permits issued based on the existing number and capacity of boats capped as the 2008 baseline by this study. Permits would not be transferable and permit conditions would stipulate the type of services offered. Research and monitoring of the impacts of ocean recreation on marine mammals and other ocean resources would be required to modify the number of permits.

Federal guidelines for marine mammal watching would be incorporated into the Gentlemen’s Agreement. Protocols would reinforce a hierarchal system where the first vessel governs access to an area. Fishing vessels would be required to fly a flag when fishing and report catch offshore of the leeward coast by smaller quadrants established by DLNR.

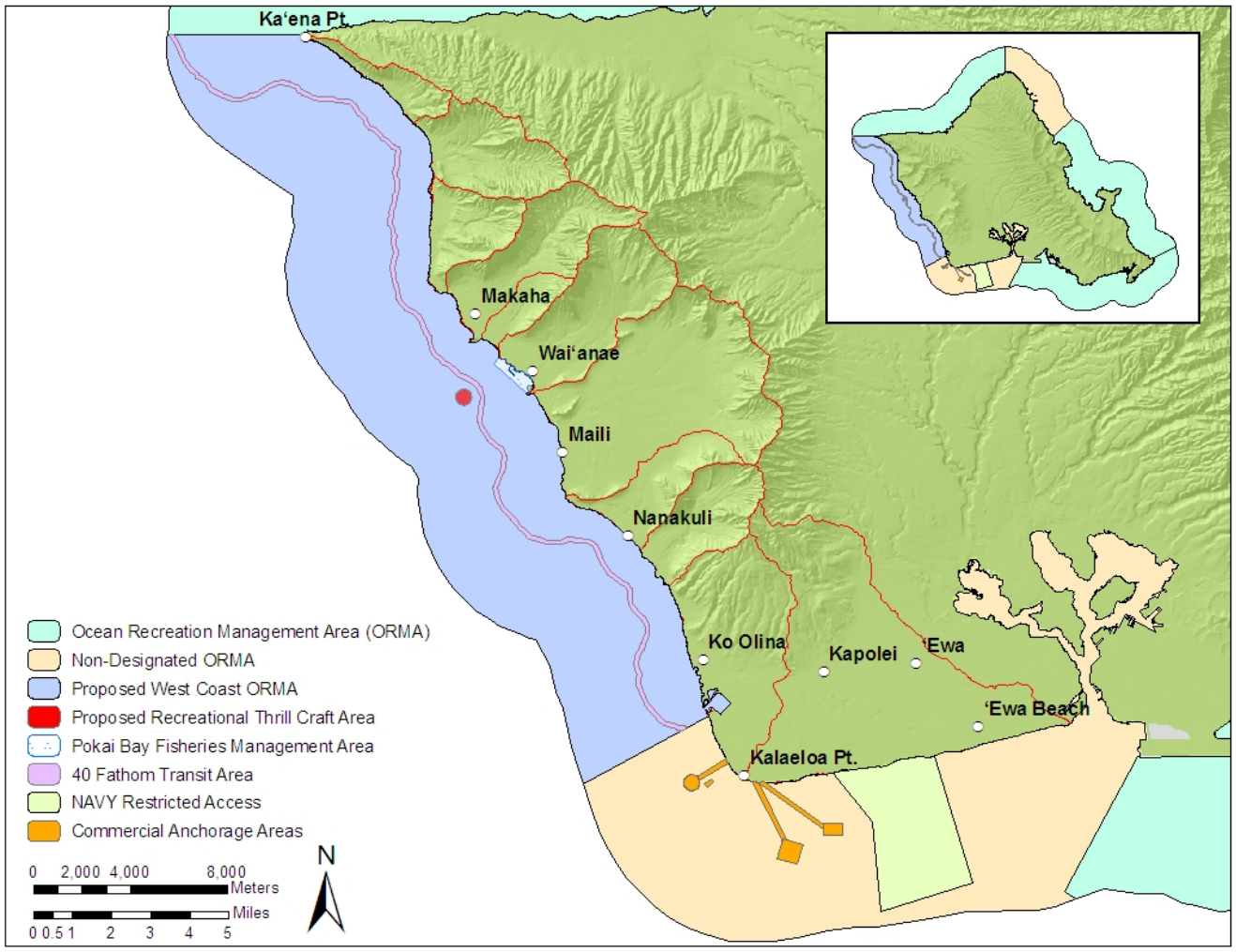

Figure ES.4 Spatial Aspects of the Alternative 2: ORMA and Additional Management Measures

Table ES.4 Alternative 2 – Ocean Recreation Management Area and Additional Management Measures

ORMA
• Establish a recreational thrill craft zone offshore from Waiʻanae Small Boat Harbor • Prohibit all forms of commercial thrill craft with the ORMA • Establish transit zone along 40-fathom depth contour • Access to and from designated operating areas must be the most direct route, and thrill craft operators may not exceed slow-no-wake speed when within 300 feet of the shoreline • Incorporate all provisions of Ocean Users Code of Conduct, such as establishment of a *Leeward Coast Advisory ʻOhana* (except those related to commercial marine mammal watching tours) as rules within the ORMA
Code of Conduct for Public and Commercial Marine Mammal Watching
• Fly a dolphin flag • Implement federal guidelines on marine mammal viewing, including: o Stay at least 100 yards from humpback whales o Stay at least 50 yards from dolphins o Move away cautiously if dolphins show signs of disturbance o Always put the engine in neutral when dolphins are near o Refrain from swimming with, touching, or feeding wild dolphins • Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore • Respect hierarchy system where first vessel governs access: avoid areas where commercial fishing vessels are operating • Use *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of fishing activity • Adopt NOAA's Dolphin SMART Program to promote voluntary compliance • Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*
Commercial Ocean Operator Permits
• Require all commercial tour boats (from private marinas and state harbors) to obtain a permit from DLNR to operate within the waters of the ORMA • Cap the number of commercial ocean tour boat permits (charter fishing, marine mammal and snorkeling, sailing, and SCUBA diving tour boats) operating from the Waiʻanae Boat Harbor and the Ko Olina Marina at baseline study reference levels • Make all permits vessel specific and non-transferable • Establish permit conditions that specify services (for example, charter fishing or marine mammal watching and snorkeling) that operators can provide and incorporate the *Code of Conduct* as permit conditions • Restrict pick up and drop off of passengers to the Waiʻanae Small Boat Harbor and Ko Olina Marina • Allow the number of permits to decrease if vessels are taken out of service and do not issue permits for new vessels until a comprehensive study of impacts of commercial tour operations on spinner dolphins and other marine mammals along the leeward coast has been completed
Other Management Measures
• Monitor and conduct studies on resource status and impacts of ocean use along the Waiʻanae coast to fill data gaps and improve management decision making • Increase seaborne enforcement presence by USCG and DOCARE along the Waiʻanae coast • Establish Makai Watch and train community to assist DOCARE • Use DLNR website and other mechanisms to conduct regular public education and outreach on *Code of Conduct* and ocean regulations

Alternative 3: Designate ORMA and Establish MLCD with Cap on Commercial Tour Operator Permits

Under Alterative 3, multiple place-based management tools would be employed along with additional management measures to regulate ocean use to achieve multiple goals of protecting ocean resources, preserving traditional and cultural uses, and minimizing ocean use conflicts (Figure ES.5, Table ES.5).

A Marine Life Conservation District (MLCD) would be established from Kepuhi Point to Ka‘ena Point to protect the diversity and health of the marine ecosystem (Figure ES.5). All commercial activities would be prohibited within the boundaries of the MLCD. All other provisions would be the same as Alternative 2.

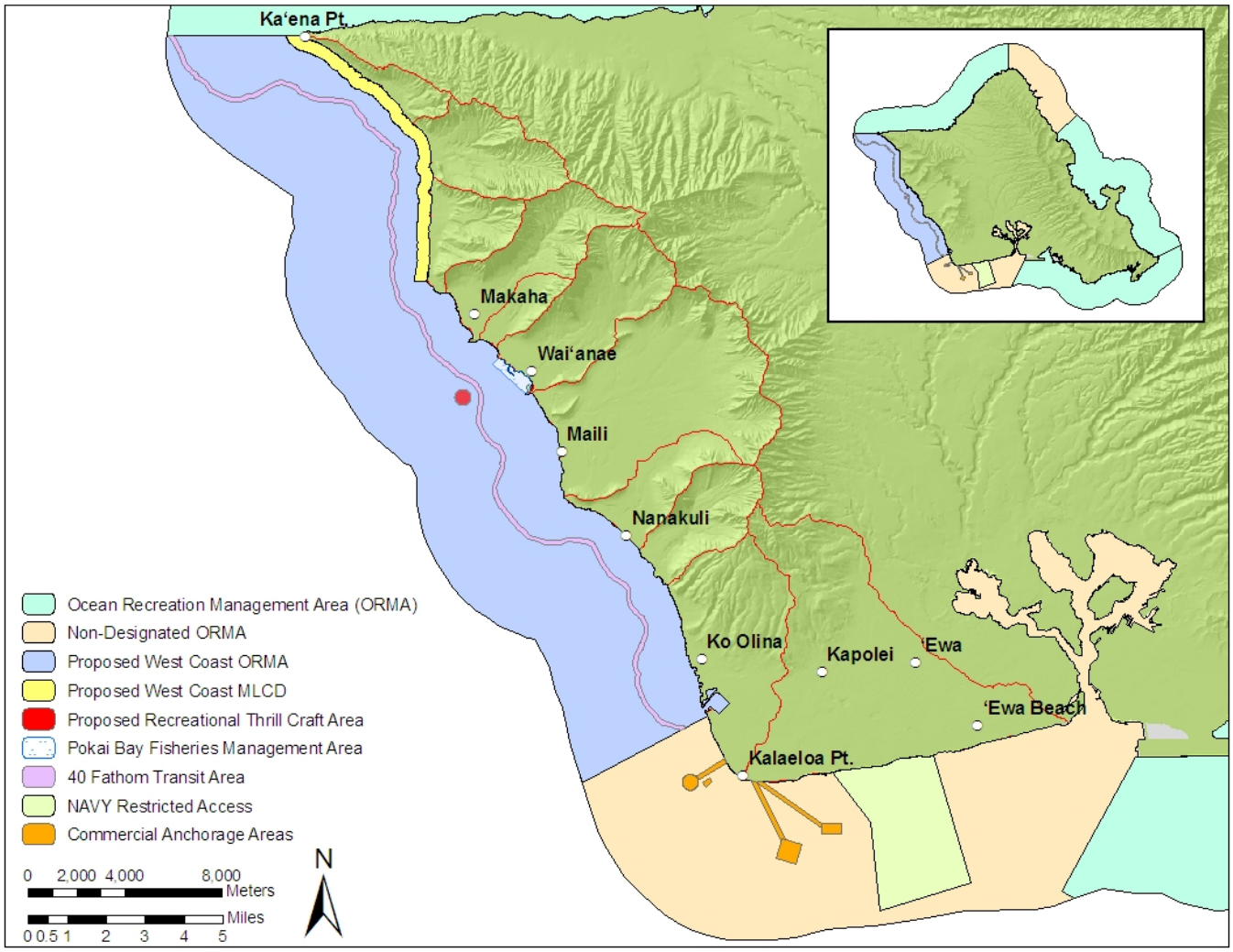

Figure ES.5 Spatial Aspects of Alternative 3: ORMA and MLCD

Table ES.5 Alternative 3 – Ocean Recreation Management Area and Marine Life Conservation District

MLCD
• Establish area from Kepuhi Point to Ka‘ena Point as an MLCD to protect the diversity and health of the marine ecosystem • Prohibit all commercial activity within the MLCD • Allow appropriate recreational activity to occur within the MLCD
ORMA
• Establish a recreational thrill craft zone off shore from Wai‘anae Small Boat Harbor • Prohibit all forms of commercial thrill craft with the ORMA • Establish transit zone along 40-fathom depth contour • Access to and from designated operating areas must be the most direct route, and thrill craft operators may not exceed slow-no-wake speed when within 300 feet of the shoreline • Incorporate all provisions of *Ocean Users Code of Conduct* from Alternative 1 (except those related to commercial marine mammal watching tours) as rules within the ORMA
Code of Conduct for Public and Commercial Marine Mammal Watching
• Fly a dolphin flag • Implement federal guidelines on marine mammal viewing, including: o Stay at least 100 yards from humpback whales o Stay at least 50 yards from dolphins o Move away cautiously if dolphins show signs of disturbance o Always put the engine in neutral when dolphins are near o Refrain from swimming with, touching, or feeding wild dolphins • Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore • Respect hierarchy system where first vessel governs access: avoid areas where commercial fishing vessels are operating • Use *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of fishing activity • Adopt NOAA’s Dolphin SMART Program to promote voluntary compliance • Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*
Commercial Ocean Operator Permits
• Require all commercial tour boats (from private marinas and state harbors) to obtain a permit from DLNR to operate within the waters of the ORMA • Cap the number of commercial ocean tour boat permits (charter fishing, marine mammal/snorkeling, sailing, and SCUBA diving tour boats) operating from the Wai‘anae Boat Harbor and the Ko Olina Marina at baseline study reference levels • Make all permits vessel specific and non-transferable • Establish permit conditions that specify services (such as charter fishing or marine mammal watching and snorkeling) that operators can provide and incorporate the *Code of Conduct* as permit conditions • Restrict pick up and drop off of passengers to the Wai‘anae Small Boat Harbor and Ko Olina Marina • Allow the number of permits to decrease if vessels are taken out of service and do not issue permits for new vessels until a comprehensive study of impacts of commercial tour operations on spinner dolphins and other marine mammals along the leeward coast has been completed
Other Management Measures
• Monitor and conduct studies on resource status and impacts of ocean use along the Wai‘anae coast to fill data gaps and improve management decision making • Increase seaborne enforcement presence by USCG and DOCARE along the Wai‘anae coast • Establish Makai Watch and train community to assist DOCARE • Use DLNR website and other mechanisms to conduct regular public education and outreach on *Code of Conduct* and ocean regulations

Analysis of Effects

The environmental, socioeconomic, management, enforcement, and cost effects of the alternatives are summarized in Table ES.6. Conflicts in ocean use would be expected to continue and increase under the status quo, or No Action alternative along with potential impacts to spinner dolphins and fish stocks. If fully implemented, Alternative 1 could address resource use conflicts; however, DLNR would still not have a mechanism to limit the number of commercial tour boats operating in the area. By designating an ORMA and associated rules under Alternative 2, the number of permits for commercial ocean tour operators would be capped and resource use conflicts could be managed. For this alternative to reduce conflicts and impacts to ocean resources, commercial thrill craft operations would remain prohibited in the waters off the Wai‘anae coast. Under Alternative 3, the establishment of a MLCD in addition to an ORMA would address dual management goals to conserve biodiversity and address resource use conflicts. In the short-term, this alternative could concentrate commercial ocean tours and fishing along other parts of the coast. In the long-term, if commercial users were eventually reduced to 2000 levels, this alternative could provide added protection to ocean resources along the Wai‘anae coast.

Table ES.6 Summary of Effects of Alternatives Compared to the No Action Alternative

Impact Category	No Action	Alternative 1	Alternative 2	Alternative 3
Environmental	• Potential impacts to ocean resources from unchecked commercial ocean tourism growth and high speed traffic in shallow waters • Reduces disturbance to marine life by prohibiting recreational thrill craft within 500 feet of shoreline and commercial thrill craft	• Potential to minimize impacts on ocean resources if Code of Conduct fully implemented and collaboration with NOAA for adoption of the Dolphin Smart Program should improve dolphin tour practices • Reduces disturbance to marine life by prohibiting recreational thrill craft within 500 feet of shoreline and commercial thrill craft throughout the area	• Potential to minimize impacts on ocean resources by limiting commercial growth to 2008 level • Potential to reduce disturbance to marine life by prohibiting commercial thrill craft and limiting recreation thrill craft to a specific zone • Enforceable regulations and additional surveillance should limit detrimental practices	• Potential to minimize impacts on ocean resources by limiting commercial growth to 2008 level • Potential beneficial effects on ocean resources through the establishment of an MLCD and prohibiting all commercial activities • Potential impacts on ocean resources if MLCD transfers some commercial operations to more crowded areas
Socioeconomic	• Non-designated ORMA is the wish of Wai‘anae residents, prohibits commercial thrill craft • Unchecked commercial tourism could degrade community’s sense of place • Continued user conflicts, including some not covered by Gentlemen’s Agreement • Permits not required of all commercial ocean operators • Resource stress may impact fishing and other commercial operations	• Retain non-designated ORMA status, including prohibition on commercial thrill craft • Unchecked commercial tourism issue remains • Permits not required of all commercial ocean operators • Resource stress may impact fishing and other commercial operations • Voluntary annual orientation on Code of Conduct could reduce user conflicts	• Permit requirements and regulations could impact small businesses • Potential conflict between commercial operators and Makai Watch/Advisory Ohana regarding revoking permits • Limit on commercial operators could benefit existing permit holders • ORMA opens door for commercial activities not wanted by Wai‘anae residents • Restricts certain uses through zoning	• Permit issues same as Alternative 2 • ORMA issues same as Alternative 2 • Prohibits commercial activities in MLCD • MLCD could lead to increased conflicts outside its boundaries • Recreational users benefit from MLCD
Management	• Simplest regime • No mechanism to address growth at Ko Olina & Hoakalei • Some key players not involved in Gentlemen’s Agreement (USCG, harbor masters, Ko Olina personnel) • Does not effectively manage	• Active advisory council can address emerging issues • Need to develop protocols of advisory council • Includes role for key players • NOAA increases involvement in dolphin	• Need to develop new permit system, including legal and just method of permit issuance and revocation • New thrill craft zone, transit corridor, no-wake zone, and other spatial tools will require continuous public education, but could limit user conflicts	• Zoning issues same as Alt 2 • Need to develop management goals for MLCD • MLCD creation requires public process

Impact Category	No Action	Alternative 1	Alternative 2	Alternative 3
	user conflicts	issues • New fishing reporting grids • Ocean incident report untested	• Easier management by restricting pick-up and drop-off of passengers to harbors	
Enforcement	• No additional enforcement	• Additional sea (CG, DOBOR) and land (Makai Watch) enforcement presence	• Codifying Code of Conduct into permits and ORMA regulations clarifies response from CG and DOBOR • No shoreside pick-up and drop-off eases monitoring • ORMA zoning increases responsibilities	• New regulations provide same benefit as Alternative 2 • Additional zone to enforce
Cost	• Lowest cost	• New costs for Advisory Ohana, impact studies, enforcement, directory, incident report and orientation training	• Same cost as for Alternative 1 • Additional cost to manage ORMA and permitting system	• Same cost as for Alternative 2 • Additional cost to monitor MLCD

Unresolved Issues

A number of ocean use issues remain unresolved by the management regimes described in the alternatives considered. These issues are as follows:

- Research studies and monitoring the impacts of ocean use activities on marine mammals, especially spinner dolphins, along the Wai‘anae coast are insufficient to estimate disturbance levels and the number of commercial tour operators that would minimize disturbance to spinner dolphin and other marine mammals.
- The status of the akule and ‘opelu fisheries are not fully characterized. Although long term catch data exists, rigorous analyses of these data have not been undertaken. In addition, the large reporting grids for fish catch provide no information on the impacts of commercial ocean tourism on the status and distribution of fish along the leeward coast. Smaller reporting grids are needed to decipher changes in these fisheries and fishery-independent studies are needed to evaluate the status of the fisheries.
- Commercial ocean recreational activities conducted from county beach parks could become a major source of additional activity that is not addressed by this study. Land-based commercial ocean recreational activities, such as surf schools, kayaking tours, snorkeling, and kayaking equipment rental do not exist along the Wai‘anae coast but could become prominent in the future. These land-based commercial activities are resulting in conflicts with public recreational use in many beach parks throughout the state.
- Management of ocean resources and ocean use conflicts require a comprehensive approach that considers sea- and land-based stressors. The development and implementation of comprehensive plan is needed for the Wai‘anae coast that incorporates place-based, culture-based, and community-based strategies and activities as an integral part of the Wai‘anae Sustainable Communities initiative.
- With the development of Hoakalei and the expansion of Ko Olina, commercial and recreational thrill craft use will remain an issue. This report did not include in its alternatives a zone for either commercial or recreational thrill craft use along the southern coast. This omission was conscious, as the Ko Olina resort management indicated that they were not considering offering or promoting thrill craft use from the facility, as it did not conform to their ocean use philosophy. Nevertheless, others may feel differently, and the only currently proposed thrill craft use location (from Alternatives 2 and 3) is prohibitively far from Hoakalei.

Compatibility with Land Use Plans and Policies

Ocean recreation management alternatives 1 to 3 are generally compatible with land use plans and policies. The proposed cap on the number of permits allowed for commercial tour operators in the

area is compatible with Wai‘anae boat harbor and Ko Olina Marina operational plans. Commercial tours currently operating out of other harbor facilities or proposed new marinas would not be eligible to apply for permits to operate along the leeward coast. Alternative 3 proposes additional limitations on commercial activity in waters between Kepuhi Point and Ka‘ena Point in line with the goals of the Wai‘anae Sustainable Communities Plan to prohibit all commercial land-based activity in this area of the coast.

Recommendations

Using the existing regulatory rules and tools, establishment of an ORMA as described in Alternative 2 would provide an enforceable management regime to limit the number of commercial ocean tour operations and minimize conflicts in ocean use. The ORMA would require the following zoning and regulatory characteristics to effectively address resource use conflicts and community concerns:

- Establishment and sustained funding for a Leeward Coast Advisory ‘Ohana with capacity to recommend revocation of permits to DLNR
- Prohibition of all commercial thrill craft in ORMA
- Establishment of a recreational thrill craft zone seaward of transit corridor
- Establishment of a transit corridor at the 40 fathom depth contour

Existing regulations need to be clarified to allow DLNR to require commercial ocean tour operators state-wide to obtain a permit to operate in state waters. Because DOBOR regulates ocean users through access to state waters (entry and exit at state harbors and boat ramps), it does not regulate commercial ocean tourism from private harbors. With the ongoing development of private harbors, the state currently has no regulatory tool to limit the number of commercial ocean tourism activities. All commercial ocean tour operators, regardless of point of origin, should be required to obtain a permit to operate in state waters. DOBOR is currently working on amendments to its regulations, which may address this issue and expand the permitting structure to include private marinas and harbors. This permit should include conditions that can be used as a basis for permit revocation. Permits conditions should specify:

- Type of activity
- Location of activity
- Vessel size and capacity
- Requirements that all permit holders and associated vessel operators must attend annual Code of Conduct training (permit fees could cover training costs)

With this permit system, DLNR would have a mechanisms to limit number of permits issued and cap number of permits operating along leeward O‘ahu to baseline study levels.

Regardless of the alternative selected, the state should provide funding and other necessary resources to establish and maintain an Advisory Ohana with the following characteristics

- Includes representation from USCG, NOAA, state and private harbor masters, and police and DLNR, in addition to members from the community and individual user groups
- Provides a means to report violations, review reports, and provide formal recommendations on course of action to the DLNR
- Focuses on education and outreach for specific audiences

The state should continue to work with NOAA to develop a Hawai‘i Dolphin Smart program that can be adopted along the leeward coast of Oahu. The state should request NOAA’s assistance in conducting site-specific studies on the impacts of ocean tourism and recreation on mammals along the Wai‘anae coast. In future, changes in the federal Marine Mammal Protection Act may provide the opportunity for the state to directly manage marine mammals in state waters.

CONTENTS

ATTACHMENT Large Scale Map of the Wai‘anae Coast Showing Location of Commercial and Public Ocean Uses

FIGURES

TABLES

ACRONYMS

BRFA	Bottomfish Restricted Fishing Area
CRAMP	Coral Reef Assessment and Monitoring Program
DAR	Division of Aquatic Resources
DLNR	Department of Land and Natural Resources
DOBOR	Division of Boating and Ocean Recreation
DOCARE	Division of Conservation and Resource Enforcement
FAD	Fish Aggregating Device
IPCC	Intergovernmental Panel on Climate Change
MHI	Main Hawaiian Islands
MLCD	Marine Life Conservation District
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWHI	Northwestern Hawaiian Islands
ORMA	Ocean Recreation Management Area
UME	Unusual Mortality Event
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

The leeward coast of O'ahu spans a distance of approximately 25 miles (39 km), encompassing the coastal area from Ka'ena Point, at the most northwestern tip of the island, to Kalaeloa Point, the southwestern tip of the island. This coastline is characterized by diverse ocean resources with a range of demands by residents, developers, and visitors alike. The growth of both commercial and recreational ocean uses along coast has increased, resulting in conflicts between ocean users as well as potential adverse effects on marine mammals and other ocean resources. Through Act 6, Special Session Laws of Hawai'i 2005 (Act 6), the Hawai'i Department of Land and Natural Resources (DLNR) was mandated to prepare a baseline environmental study of the Wai'anae coast from Kalaeloa Point to Ka'ena Point as an informational document to be used to establish rules to manage conflicts in ocean use occurring in the area. This Wai'anae Baseline Environmental Study, prepared in response to Act 6, describes the status and trends in ocean resource conditions and uses, ocean use issues, and management alternatives to address these issues. The potential environmental, social, and economic effects of these alternative management approaches are analyzed and compared, along with recommendations for implementation.

1.1 Purpose and Need for Managing Ocean Recreational Use along the Wai'anae Coast

Future population and economic growth is expected to increase the demands on Hawaii's ocean and coastal resources. This growth is characterized by increased urbanization, tourism, and recreational and commercial ocean use, resulting in both direct and indirect impacts on the health of coastal and ocean resources. In addition to these local demands, global climate change poses additional threats to Hawaii's coastal and ocean resources, already compromised by land-based pollution, invasive marine species, and recreational overuse. Although economic growth is vital to Hawai'i, it must be properly managed to preserve natural resources and to reduce conflicts among resource users.

The Wai'anae coast is experiencing increasing demands on its ocean and coastal resources. Increasing commercial and recreational ocean uses are creating conflicts and potential impacts on natural resources. In particular, commercial ocean tourism along the coast has doubled over the last 10 years in the absence of increased management. Ocean recreation use issues along the Wai'anae coast need to be addressed through a comprehensive management regime that includes regulatory and nonregulatory measures to achieve a set of management goals. Although the legal mandate for establishing an ocean recreational use management regime off Wai'anae is based in Act 6, responsibility for managing ocean use must be shared among government and nongovernmental entities as well as the public.

Hawaii's coral reefs attract visitors from around the world and provide the economic foundation for more than 1,000 ocean tourism companies, with annual gross revenues estimated at $700 million per year (Clark and Gulko 1999). More than 80 percent of Hawaii's tourists participate in ocean recreation, generating almost $364 million each year in added value (Cesar and van Beukering 2004). Hawaii's tourism industry is a mature market that must continue to develop new destinations and products to retain and grow revenues (Hillel 2006). New visitor destinations and activities that will continue to grow in the future include coastal-dependent resort development and ecotourism alternatives designed to explore Hawaii's most sensitive and unique natural resources. As new tourism activities are developed, they must ensure long-term ecosystem health to benefit local residents and the economy.

Conflicts in ocean resource use are increasing as commercial recreational uses compete with public recreational uses and access to beaches and ocean areas. Resource allocation issues, user conflicts, and stress on the marine ecosystem will become more prevalent without proactive management and unless significant and appropriate areas are set aside for conservation and public access.

The characteristics of ocean use issues along the Wai'anae coast are both unique and similar to other areas of the State. These ocean use issues, identified through stakeholder consultations and information and data review and analysis, are listed in Table 1.1 and provide the basis for defining management alternatives and recommendations to improve ocean recreation use management.

Table 1.1 Ocean Resource Use Issues along the Wai'anae Coast

Ocean Resource Use Issues Identified through Stakeholder Consultations
• Disturbance to, and potential individual and population behavioral impacts on, protected marine mammals o Existing federal guidelines for observing marine mammals that are not followed by all operators o Repeated daily interactions (8 a.m. to 5 p.m.) with spinner dolphins by multiple commercial ocean tour operators, reducing resting time needed by the dolphins o Close passage and pursuit of humpback whales (from November to May) by commercial tour operations o Absence of mechanisms to limit the number of commercial tour ocean operators
• Unsafe boating conditions created by different ocean users operating in the same area o Commercial dolphin watching tours pass too close to to akule and 'opelu fishermen with gear in the water o Commercial SCUBA diving tours operate in surfing areas during high surf conditions when surfers are present
• Loss of traditional akule and 'opelu fishing areas and livelihood o Spawning aggregations and juvenile recruitment in shallow waters disturbed by high-speed transit through fishing grounds by commercial tour operators and other private boats o Loss of income when commercial tour operators disrupt fishing activities by operating too close to fishing boats
• Different requirements for commercial ocean tour operators operating out of state versus private harbors o Commercial ocean tour operators operating from private harbors are not required to obtain a permit o Permit addresses ocean access (entry and exit) but not the location or nature of activity
• Other ocean use issues include: o Increasing numbers of private thrill craft operating along the coast o Inadequate management and enforcement capacity o Absence of long-term monitoring of ocean use and resource status

1.2 Objectives and Scope of Study

The Hawai‘i State Legislature, through Act 6, documented its concern that the growing population of west O‘ahu and the visitor industry are affecting traditional uses of the area and are having cumulative economic, environmental, social, and cultural effects on many communities along the coast. Increased usage of beach parks and state boating facilities to accommodate commercial ocean recreation activities between Kalaeloa and Ka‘ena Point were cited as contributing to adverse effects on traditional commercial fishing and well as public ocean recreational uses. The objectives of this study are to:

- Characterize commercial and recreational ocean uses and areas of conflict along the Wai‘anae coast
- Develop and analyze alternatives that mitigate existing and potential future ocean use conflicts and preserve ocean resources
- Serve as an informational document for the Department of Land and Natural Resources (DLNR) in preparing rules to better manage ocean resources and uses in the area

The overall study area encompasses the leeward coast of O‘ahu from Ka‘ena Point to Kalaeloa Point (Figure 1.1); however, geographic coverage is focused on the Wai‘anae coast. A focused geographic coverage on the Wai‘anae Coast, from Ka‘ena Point to Kahe Point, is employed to provide as much detail as possible in characterizing the ocean resources and use conflicts that are the subject of Act 6. A broader geographic coverage, from Ka‘ena Point to Kalaeloa Point, is employed to characterize the larger environmental, social, and cultural issues and trends affecting ocean resource status and conflicts along the Wai‘anae coast.

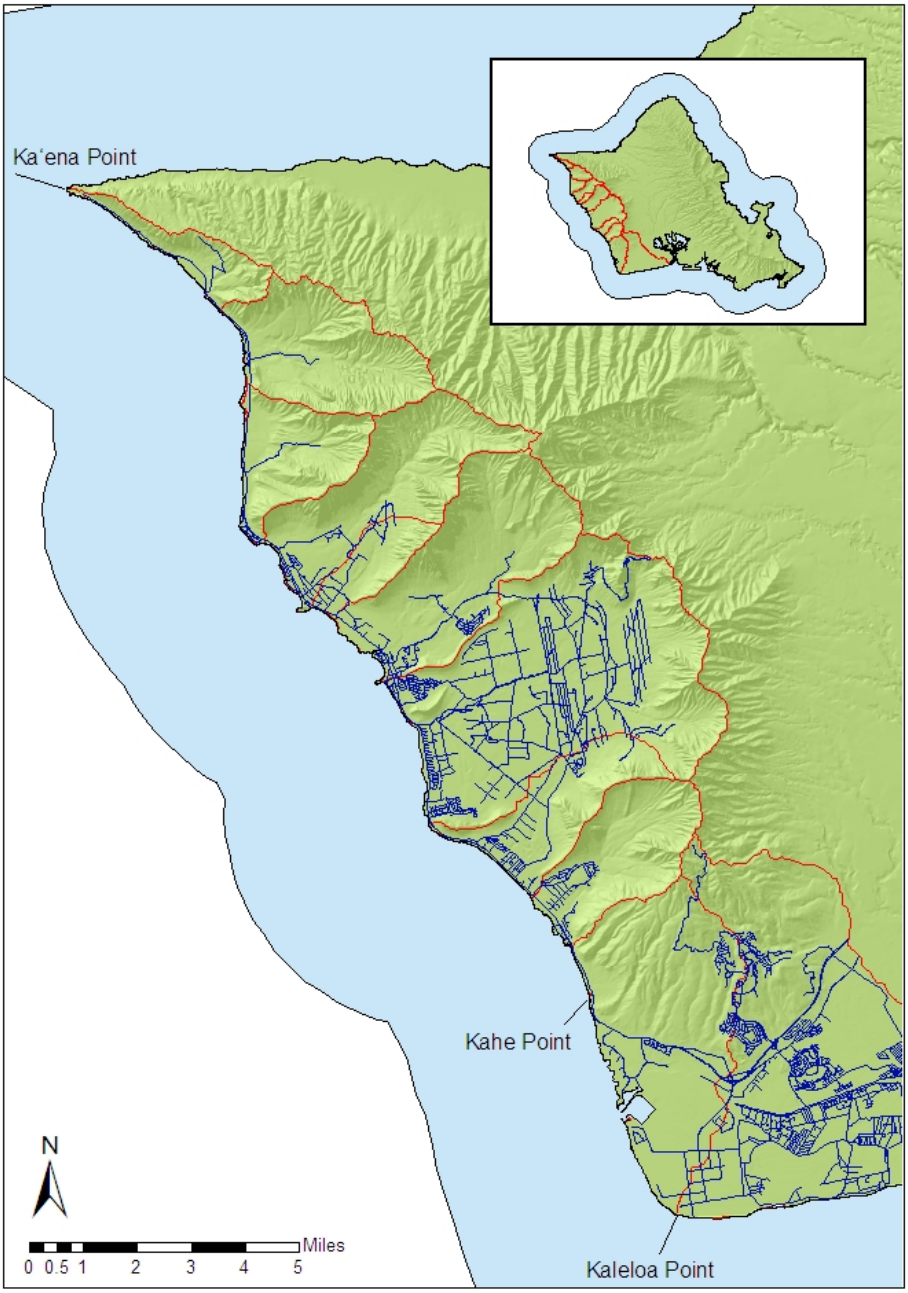

Figure 1.1 Study area from Kalaeloa Point to Ka'ena Point, along the leeward coast of O'ahu, Hawai'i

1.3 Background

Conflicts in ocean use between commercial marine mammal watching tours and commercial fishing vessels off the Wai‘anae coast were identified as early as 1999. The Hawai‘i State Legislature enacted House Concurrent Resolution No. 103, H.D.1, S.D.1, Regular Session of 2000, requesting a study of the impact of commercial marine mammal watching tours on commercial fishing in the waters off the Wai‘anae coast of O‘ahu. The resolution called for following actions:

- Create a task force to review the literature on marine mammal watching, including its effects on marine mammal behavior;
- Review reports on user conflicts between commercial marine mammal watching tours and commercial fishers;
- Study the feasibility of issuing commercial use permits for specific ocean recreational activities off the Wai‘anae coast rather than general access permits; and
- Study the feasibility of establishing a marine mammal watching permit system to better manage ocean activities in waters off the Wai‘anae coast.

The task force was formed and met four times from November 9, 2000, to December 8, 2000. The 10 members of the task force included representatives from the state legislature, harbor facilities, fishermen, commercial tour operators, university, and community representatives. Task force meetings were convened by the chairperson for the Hawai‘i Department of Land and Natural Resources.

Original task force members included the following participants:

- Carl Jellings, Commercial Fisherman
- Kamaki Kanahele, Nanakuli Hawaiian Homestead Association President
- Kevin Shore, Ko Olina Marina
- Dr. Paul Nachtigall, Hawai‘i Institute of Marine Biology
- Victor Lozano, Commercial Marine Mammal Watching Tour Industry
- William Aila, Community Member
- Senator Colleen Hanabusa
- Representative Michael Kahikina, Chairperson
- Representative Emily Auwae

The task force reviewed scientific literature, ongoing studies, and personal experiences of the marine mammal watching industry and on dolphin behavior interactions. A marine mammal expert from the University of Hawai‘i provided information on marine mammals. The task force prepared a report that included a “Gentlemen’s Agreement” to mitigate ocean use conflicts between akule fishermen and

marine mammal tour operators. The report was submitted to the 21st State Legislature Regular Session of 2001 by DLNR on December 2000. The Gentlemen's Agreement set forth voluntary guidelines for resolving ocean use conflicts between the fishermen and marine mammal watching tours off the Wai'anae coast (Table 1.2) in line with the communities desire to resolve these conflicts without additional state regulations. The task force also highlighted the need for a permanent group to deal with ongoing ocean user conflicts in West O'ahu waters and proposed a Leeward Coastal Advisory 'Ohana that would include three representatives of the fishing industry, three representatives of the commercial marine mammal tour industry, a representative of Hawaiian culture, and continued resources and staff involvement from DLNR and the University of Hawai'i. Commercial operators and fishermen agreed to the terms of the Gentlemen's Agreement.

Table 1.2 Key Terms of Gentlemen's Agreement Developed by the Task Force in 2000

Key Terms of Gentlemen's Agreement
• Applies from Barber's Point to Ka'ena Point (areas 402 and 403)
• Operators and researchers must be sensitive while traveling along the coast and work closely with fishing vessels
• Normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions
• Enter into areas at right angles from offshore to inshore
• Work closely on radio channels 78a/68 to minimize conflicts
• Work closely with other marine mammal watching vessels on channel 78a
• Pass location of dolphin pods to other interested parties
• Approach and observe dolphin areas smoothly, quietly, and slowly
• Be conscious and watch for swimmers and divers while traveling en route and at site
• Work closely with dive vessels
• Log activity, amount, direction of travel, type of animal, daily logs
• Pass information along to University of Hawai'i
• Communicate with fishermen
• Do not pass inside of operating fishing vessel

Initially, the Gentlemen's Agreement yielded positive results during early stages of implementation. When commercial ocean tour operators used the transit lane, fishermen began to realize improved catches. Since then, however, the increased number and diversity of ocean users and inconsistent application of the Gentlemen's Agreement have continued to cause conflicts (Townscape 2006). Many in the community feel that, although elements of the agreement are still valid, updates are needed. In addition, the Leeward Coast Advisory 'Ohana, recommended as part of the Gentlemen's Agreement, was never established to resolve ongoing conflicts.

In July 2005, the Legislature passed Act 6. This directed DLNR to establish the West O'ahu waters as an Ocean Recreation Management Area (ORMA). An ORMA and its accompanying administrative rules would limit the locations, times, and types of permitted ocean recreation activities. However, according to the Act, *"the completion of a baseline environmental study is a prerequisite to the establishment of the boundaries of ocean recreation management area."* The baseline study would include:

- Impacts of ocean use activities in the area;
- Mitigation measures to avoid, minimize, rectify, or reduce impacts and user conflicts
- Unresolved issues;
- Statement of purpose and need for ORMA designation;
- Review of cultural, environmental, social, and economic impacts;
- Proposed limitations on ocean use activities, zones, permits, seasons, times, and other restrictions;
- Procedure for conflict resolution between ocean users;
- Rigorous exploration and objective evaluation of the impacts of alternative actions (ORMA, no action, other);
- Compatibility with land use plans and policies; and
- A community consultation process including recordation of all substantive comments and responses.

The Act also imposed a moratorium on new commercial vessel permits in the state small boat harbors involving ocean-related activities for waters between Kalaeloa Point and Ka'ena Point until the boundaries of an ORMA and administrative rules are adopted.

At the time, Act 6 was an unfunded mandate, which limited DLNR's ability to conduct the baseline study. As an interim measure, DLNR wanted to begin public outreach and resolve user conflict issues. In August 2005, DLNR contracted Townscape, Inc. to develop the West O'ahu Ocean Operational Protocols Project (Townscape 2006). This project characterized ocean use issues and made recommendations for improved implementation of the Gentlemen's Agreement.

Funding for the baseline study was allocated in 2006. After a competitive bid process, DLNR awarded the contract to prepare the baseline environmental study to Environet, Inc. This contract was later terminated. After a second competitive bid process, the contract was awarded to Tetra Tech EM Inc.

1.4 Document Organization

This study is organized into 11 sections, including this introduction. This section provides a brief description of each section of the study and the rationale for providing information presented in each section.

Section 1, Introduction, describes the purpose and need for action as the legal impetus for managing ocean recreational use, the issues that need to be addressed, and the objectives and scope of the study. This structure provides the framework which guided the compilation and analysis of information

and data presented in the study. This section also includes background information that is summarized for the reader to appreciate the long history of efforts that have been undertaken to result in this study.

Section 2, Methodology, describes the methods used to conduct the study. These methods included reviewing existing literature, obtaining data sets from federal and state government agencies, and conducting stakeholder meetings and public consultations to gather information and data used to prepare the study. This section also describes limitations of the study based on scope and availability of data.

Section 3, General Description of Leeward Coast, provides a broad description of the study area from Ka‘ena Point to Kalaeloa Point. This general description characterizes the coastal environment, social and cultural environment, and economic conditions. Information and data presented in this section are used to characterize current conditions and future trends in environmental, social, and cultural conditions and economic development.

Section 4, Ocean Resources off the Wai‘anae Coast, describes ocean resources, including coral reefs, demersal and pelagic fish, and special status species from Ka‘ena Point to Kalaeloa Point based on available information and data. Information and data presented in this section are used to characterize current conditions and potential future trends in the condition of ocean resources to support development of alternatives presented in Section 8 and to analyze these alternatives in Section 9.

Section 5, Ocean Uses of the Wai‘anae Coast, characterizes commercial and recreational ocean uses from Ka‘ena Point to Kalaeloa Point based on available information and data. This section includes harbor facilities, recreational activities, and commercial ocean tourism and fishing operations. Information and data presented in this section are also used to support development of alternatives presented in Section 8 and to analyze these alternatives in Section 9.

Section 6, Environmental and Anthropogenic Stressors on Ocean Resources, provides an overview of potential threats to ocean resources in Wai‘anae based on studies conducted in Hawai‘i, other parts of the U.S., and globally. Information from this section is used to analyze the effects of management alternatives described in Section 9.

Section 7, Rules and Tools for Managing Ocean Recreational Use, provides an overview of the policy and regulatory framework for managing ocean use, including non-regulatory measures.

Section 8, Ocean Recreation Management Alternatives, describes alternative approaches to managing ocean use. These alternatives include maintaining the status quo or No Action alternative, ORMA designation alternative, and variations of these alternatives.

Section 9, Analysis of Alternatives, presents an analysis of the effects, including environmental, health and safety, and economic effects of the alternatives compared with the No Action alternative.

Section 10, Recommendations, provides recommendations considering phasing and timing of actions, unresolved issues, and data gaps.

Section 11, References, provides citations of documents referenced in the study.

2.0 STUDY METHODOLOGY

The study methodology consisted of information and data review and public consultation. A number of limitations of the study exist and are described. Management alternatives were developed by applying existing policies, regulations, and tools.

2.1 Information and Data Review

Information and data were compiled from a variety of sources and reviewed to develop this baseline study. Key information sources including the following:

- Participatory mapping of ocean uses by commercial and recreational ocean users
- Division of Aquatic Resource (DAR) commercial fishing data for the Wai'anae coast (Areas 402, 403, 404 and 405) and recreational fishing survey data
- Information and data presented in the Wai'anae Ecological Characterization (Hawai'i Coastal Zone Management [CZM] Program 2005)
- Websites
- Reports and published papers

2.2 Public Review and Consultation

The public and stakeholders groups were consulted throughout preparation of the study. Key stakeholder groups include commercial tour operators currently operating dolphin watching and SCUBA diving tours, fishermen (commercial and recreational), and new developers of resorts and private boat harbors in the study area.

Waianae Neighborhood Board Meetings (December 2007 – April 2008)

- Special Meeting: Study Overview to Nanakuli Board Members, December 12
- Special Meeting: Study Overview and Participatory Mapping, January 9
- Regular Meeting: Study Status Update, February 14
- Special Meeting: Alternatives Review, March 5
- Regular Meeting: Study Status Update, April 10

Individual Stakeholder Meetings (February – May 2008)

- Private and state harbors
- Commercial fishermen
- Commercial marine mammal tour operators

Two special meetings of the Parks and Recreation Committee of the Wai'anae Neighborhood Board were held on January 9, 2008, and March 5, 2008. The first meeting was held to update the community

on the status and purpose of the project and to participate in providing issues and concerns that should be addressed in the study. At the second meeting, Tetra Tech provided large maps and community members were urged to provide information on spatial and temporal use of the ocean by activity type. Project status updates were given to the entire Wai‘anae Neighborhood Board on February 14 and April 10.

In addition to these meetings, commercial tour boat operations, Wai‘anae akule and ‘opelu fishermen, and Wai‘anae community representatives were interviewed. Some of these interviews were at the request of participants at the neighborhood board meetings.

On September 5, 2008, a meeting with relevant divisions of the DLNR, National Oceanic and Atmospheric Administration (NOAA), and U.S. Coast Guard (USCG) was held to brief key management agencies on alternatives considered in the study. Agency attendees provided valuable insight into potential legal and statutory issues and barriers relating to various aspects of each of the alternatives.

2.3 Study Limitations

This study has several limitations that must be considered to better understand the development and analysis of alternatives and recommendations. The bulk of the information for the study was obtained from secondary sources. Primary data collection was limited to participatory mapping with key stakeholder groups. Specific data gaps identified in the conduct of the study included:

- Only anecdotal evidence that:
    - Marine mammal behavior is being altered
    - Fish behavior is being modified by disturbance to fishing grounds and spawning areas
    - Safety incidents are occurring
    - Jet ski traffic is increasing
- Limited data was available on ocean resource status, trends, and impacts along Wai‘anae coast
- Long-term data set on akule and ‘opelu fishing is constrained by reporting area that is too large to discern changes over time
- Must rely on studies conducted from other places to characterize potential impacts

In addition, this study was not intended to meet analysis requirements of an environmental assessment or impact statement conducted under the National Environmental Policy Act or Hawaii Revised Statutes Chapter 343.

3.0 General Description of the Leeward Coast

The leeward coast of O‘ahu spans a distance of approximately 25 miles (39 km) encompassing the coastal area from Ka‘ena Point, at the most northwestern tip of the island, to Kalaeloa Point, the southwestern tip of the island (see Figure 1.1). This section provides a general description of the environmental, social, cultural, and economic conditions along the leeward coast based largely on information presented in the Wai‘anae Ecological Characterization (Hawai‘i CZM Program 2005)

3.1 Coastal Environment

3.1.1 Climate

The trade winds provide a relatively constant source of temperate air across the entire Hawaiian island chain. Wai‘anae is one of the hotter locations on O‘ahu because the Ko‘olau and Wai‘anae mountains block the leeward coast from the trade winds. The usual regime of local breezes in Wai‘anae consists of onshore breezes during the late day and off-shore breezes at night. The onshore breeze (kai a ulu) is created when the air mass over the inner valley heats up and rises and the mass of air is replaced by the more dense, cooler air over the ocean. At night, the wind pattern reverses. The cooler air from the peaks of the Wai‘anae Mountains cools to a temperature less than the air over the ocean. This cooling causes an off-shore breeze as the cooler air moves down the slopes of the mountains and back out over the ocean. Nevertheless, the hills and valleys of the Wai‘anae area create exceedingly complex wind patterns with uneven warming and cooling of air mass over the land. Wai‘anae is relatively dry compared with the rest of O‘ahu. Because of the impact of the rain shadow on storms driven by the trade winds, the average annual rainfall in Wai‘anae is 21.3 inches (55 centimeters), less than half of the average for O‘ahu as a whole.

Traditionally, the Hawaiians distinguished two seasons, *kau* and *ho‘oilo*. Each of these seasons has distinct climate characteristics, including day length and air temperature, wind and wave regime, and rainfall and storm events. The differing characteristics of these two seasons influence seasonal ecology and human activities.

Kau (dry season, May 1 through October 31)

Kau is the fruitful season when the sun is directly or almost directly overhead, when the weather is warmer, and when the trade winds are most reliable. *Kau* is the dry season, extending from May 1 through October 31. The trade winds are fairly constant in speed and direction during the *kau*. The trade winds blow from the northeast quadrant 80 to 95 percent of the time, with speeds measured over the ocean exceeding 12 miles per hours 50 percent of the time. Trade wind storms generally do not reach the Wai‘anae coast because of a rain shadow created by both the Ko‘olau and Wai‘anae mountains. A review of 2,317 recorded annual peak stream discharges with known dates shows that only 11 percent of the peaks occurred during this season (City and County of Honolulu ‘Oahu Civil Defense Agency 2003).

With the exception of waves generated by rare hurricanes and tropical cyclones that pass in the vicinity of Hawai‘i, large waves occur irregularly during this season. Waves from the consistent northeast trade winds, which can reach 4 to 12 feet in height, have their greatest impact on east-facing coasts. South Pacific swells, most common between April and October, generally affect south-facing shores. North Pacific and Kona storms, and the waves they generate, are rare during this period. Waves from hurricanes and tropical storms can reach extreme heights (10 to 35 feet). High waves from hurricanes generally occur between June and October. They most often hit the eastern shores as hurricanes approach the islands from the east, and south- and west-facing shorelines as the storm passes to the south and west.

High waves, in and of themselves, pose a significant threat to the lives of swimmers, boaters, and others who recreate along the shore. With respect to property damage, the greatest threat is posed by coastal flooding and erosion that occur when high waves combine with storm surge and high tides. This situation occurred along the Wai‘anae coast in 1992 during Hurricane ‘Iniki, when coastal roads and properties were overwashed by high waves.

Ho‘oilo (wet season, November 1 through April 30)

Ho‘oilo is the season when the sun is in the south, when the weather is cooler, and when the trade winds are most often interrupted by other winds. *Ho‘oilo* is the wet season, extending from November 1 through April 30. The majority of the precipitation comes from winter storms carried by southwestern winds. The broad local plain and adjacent mountains create a unique wind pattern not experienced in other parts of the island. Kona (leeward) winds approach from the southwest and appear generally in the winter. Kona storms occur most frequently in January, but are common throughout the months of October through May. A review of 2,317 recorded annual peak discharges with known dates shows that 89 percent of the peaks occurred during this period. Eighty-four percent of the floods in the islands occurred during this period (City and County of Honolulu O‘ahu Civil Defense

Agency 2003). The Kona winds usually occur during *ho'oilo*. During this time, the trade winds are not dominant, which allows the Kona winds to develop. The Kona winds blow from the southwest, affecting the leeward side of the island first. Since the winds come from the south, they are generally warmer breezes with the capacity of carrying a great deal of moisture.

The largest waves occur during this season. North Pacific swells, with wave heights generally between 8 and 20 or more feet, and Kona storm swells, with wave heights generally between 10 and 15 feet, are most common between October and May. North Pacific swells have the greatest impact on north-facing coasts, but often wrap around the island, generating large winter waves along the Wai'anae coast. Kona storm swell, generated by central Pacific storms associated with fronts passing just north of the main Hawaiian Islands, have their greatest impact on south- and west-facing coasts, such as Wai'anae.

3.1.2 Watersheds, Streams, Estuarine, Freshwater Seeps

Most of the streams in the *ahupua'a* of the leeward side are intermittent at the coastlines, containing water only after large runoff-inducing rain events or during high tides. Streams flow perennially at higher elevations. These perpetually wet areas were once suited to agricultural endeavors such as *lo'i* taro cultivation. The stone terraces of these ancient *lo'i* are still visible today in the interior valleys of Lualualei, Mākaha, Mākua, and Wai'anae. Streams that have a hydrologic connection to a groundwater aquifer can be a source of groundwater recharge.

Streams in Hawai'i react quickly to storms, often reaching their maximum flow rates in just hours. These high stream flows can transport large amounts of sediment, nutrients, trash, and other debris to the ocean and have a severe impact on coastal areas. The channelization of streams at their lower reaches removes the filtration process of natural streams, increasing the output to the ocean of these pollutants. Corals and intertidal fish nurseries are prone to injury from sedimentation and chemical contaminants. Because healthy, natural streams slow the flow of water to the ocean, they play a critical part in maintaining the quality of downstream waters.

Nearly all of the water used for drinking on O'ahu is derived from groundwater. The region's total estimated capacity of potable groundwater (including the Mākaha and Wai'anae aquifers) is 7.8 million gallons per day (mgd) (City and County of Honolulu, Department of Planning and Permitting 2000). The Commission on Water Resource Management in 1991 concluded in the State Water Resources Protection Plan that the amount of water available in the Mākaha and Wai'anae aquifers, without adversely affecting the quality or quantity, are 4 mgd and 3 mgd. The Honolulu Board of Water Supply has estimated that the water needs of the Wai'anae moku will approach 12.3 mgd by 2020. Although the sustainable yield in the moku is estimated at 7.8 mgd, the average pumping rate in the mid- to late-

1990s was only 4.5 mgd. If pumping of water sources in the moku were to continue at that rate, almost 8 mgd would have to be brought from the Pearl Harbor aquifer or another source to meet Wai‘anae’s projected needs for 2020 (City and County of Honolulu, Department of Planning and Permitting 2000).

3.1.3 Coastal Geological and Physical Features

Coastal erosion and beach loss are a particular concern along some segments of shoreline. Recent studies on O‘ahu, for example, have shown that nearly 24 percent, or nearly 17 miles, of an original 72 miles of sandy shoreline has been either significantly narrowed or lost since the 1940s (Fletcher and others 1997). Along the Wai‘anae coast, approximately 1 mile of sandy shoreline in the Mā‘ili-Mākaha area has been lost or narrowed, and 25 percent of the shoreline has been classified as degraded (Coyne and others 1996; Fletcher and others 1997). Causes of long-term or permanent coastal erosion include high waves from coastal storms, hardening of the shoreline with seawalls and revetments, and sea level rise. These issues are discussed in Section 6.

3.2 Social and Cultural Environment

3.2.1 History of Wai‘anae

Settled more than 2,000 years ago, the moku of Wai‘anae is believed to be one of the first areas on O‘ahu to be inhabited by the ancient Hawaiians. Its *‘āina*, suited for wet and dry land agriculture and productive fisheries were key factors in this area's early settlement. Wai‘anae’s once perennial streams poured life into the surrounding Pacific Ocean, creating estuarine and coastal ecosystems that provided the best fishing grounds anywhere on O‘ahu (McGrath and others 1973). Wai‘anae translates to “the waters of the mullet.” “To the ancient Hawaiians, the mullet's annual migration around O‘ahu and their return to Wai‘anae to mature and spawn, symbolized a spiritual rebirth of the ocean, land, and its people” (Interview with William Aila, Wai‘anae harbormaster *in* Institute for Sustainable Development 1998).

Being on the leeward side, ancient Hawaiians had to adapt to the area’s frequent drought conditions since rains brought by the northeast trade winds would fall predominantly on the windward side of the Wai‘anae Mountain Range. These harsh conditions shaped the values, resourcefulness, and determination of its people to create a sustainable community that continues to stand the test of time.

Communities subsisted on the natural resources that the ocean and land provided within their *ahupua‘a*. The *ali‘i* assigned *konohiki* to manage each *ahupua‘a* to assure the productivity of resources to support a growing population. Within the *ahupua‘a*, the *maka‘āinana* were free to use the land

from the mountains to the sea. Resources were often traded between villages located along the coast and within the valley as well as within and among various *ahupua‘a*.

This lifestyle was governed by strict *kapus* (religion-based restrictions) and *kānāwai* (laws of the land). Some of these restrictions prevented people from catching certain types of fish during known spawning periods or imposed rules for the equitable use and management of stream water. These spiritual-based restrictions and rules not only governed the use of resources, but also their restoration. For instance, if a koa tree was harvested to build a canoe, it was the *kānāwai* to plant 10 more in its place to restore the resource. This *kānāwai* reflected a deep respect and care for the land known as *mālama ‘āina*.

The 1870s witnessed the rise of ranching as Wai‘anae’s leading industry. Ranching was concentrated in the Wai‘anae, Nānākuli, and Lualualei ahupua‘a. In 1879, the first sugar plantation was started on 25 acres in Wai‘anae. This acreage increased to 600 acres by 1890. Although the Wai‘anae Sugar Company provided new jobs and brought people back to the Wai‘anae district, the clearance of land for sugar fields and the construction of irrigation ditches and buildings irreparably destroyed numerous cultural sites such as the *Haua Heiau* and brought increasing importance to the issue of water rights. The sugar industry also brought in new migrant workers from the Philippines, Japan, China, and Portugal.

Wai‘anae's sugar industry thrived until World War II, when the draft created labor shortages, and plantation lands were used for military exercises. These setbacks and the lack of water resources eventually caused the Wai‘anae Sugar Plantation to cease operations in 1946. The military presence in Wai‘anae during and after World War II made profound changes to the cultural, social, environmental, and economic climate. “The military took over Mākua Valley as a target area. Hawaiian landowners received token payment for their parcels. Practice depth charges killed thousands of akule. Everyone moved out” (McGrath and others 1973).

The second half of the 20th century saw new opportunities for residential and commercial investment along the Wai‘anae coast, with its corresponding population growth. Progress brought increased housing and land costs, higher rents, taxes, and infrastructure demands that began to price the native Hawaiian population out of their own land. Opportunities and challenges continue to be met by a community that has struggled to maintain its culture, identity, values, and sense of place.

These efforts are elaborated upon in the Wai‘anae Sustainable Communities Plan (City and County of Honolulu, Department of Planning and Permitting 2000), whose vision is

> “a community living by values and customs that are firmly embedded in the rural landscape, the coastal shorelands, the ocean waters, the forested mountains, the

diversity of cultures, the warmth of family and friends, and the Wai‘anae traditions of independence, country living, and aloha.”

The community has overwhelmingly supported limitations on commercial development, especially for tourism. The focus on Wai‘anae as a rural community, widespread with small family farms and fishermen harvesting the sea’s bounty, both supplying sustainable goods for the local community, is a difficult path. However, this struggle has given rise to Wai‘anae’s relentless spirit to meet these challenges head on and to rally grass-roots support in deciding and shaping its own future.

3.2.2 Demographics

The population history of the leeward coast of O‘ahu reflects important trends that affected the Hawaiian Islands as a whole. At the time of Western contact, around 1780, an estimated 4,000 to 6,000 people lived on the Wai‘anae coast (McGrath and others 1973). Western contact brought disease, including an epidemic in 1804 that is thought to have claimed up to half of the population throughout the islands. By 1880, the Wai‘anae coast population dropped to its all-time low of about 500 people (McGrath and others 1973). Figure 3.1 shows the growth in population since that time.

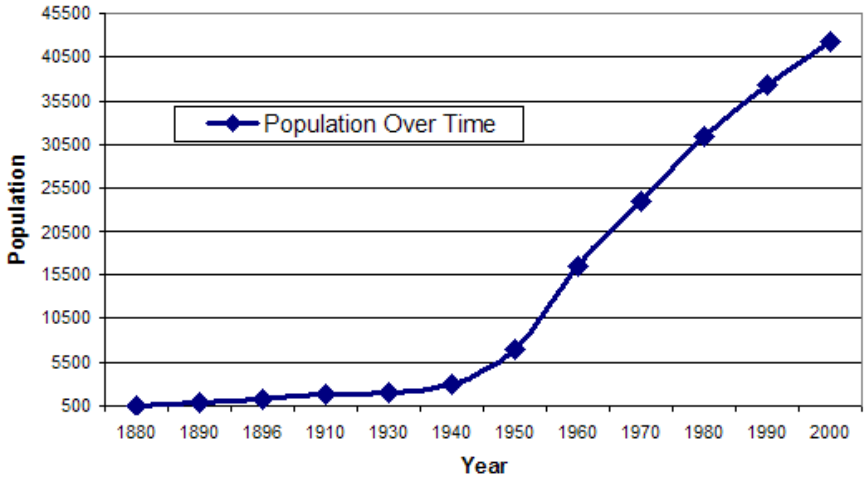

Figure 3.1 Population Trend on the Wai‘anae Coast
Source: McGrath and others 1973, U.S. Census Bureau 1990, 2000.

The Wai‘anae coast population has increased dramatically since 1950, from about 7,000 people to 42,259 as of 2000. The rate of increase outpaced both O‘ahu and the state between 1970 and 2000 (DBEDT 2002), but is expected to grow at a slower pace than the rest of the state between 2000 and 2030. By 2030, the population estimate for the leeward coast is just over 50,000, consisting of 3.3 percent of the state’s population, the same proportion of the whole population calculated in 1980 (City and County of Honolulu Department of Planning and Permitting 2000).

Along the leeward coast, Wai‘anae is the most populous community, with 32 percent of the population. Lualualei is the next most populous, with 19 percent of the population (Figure 3.2).

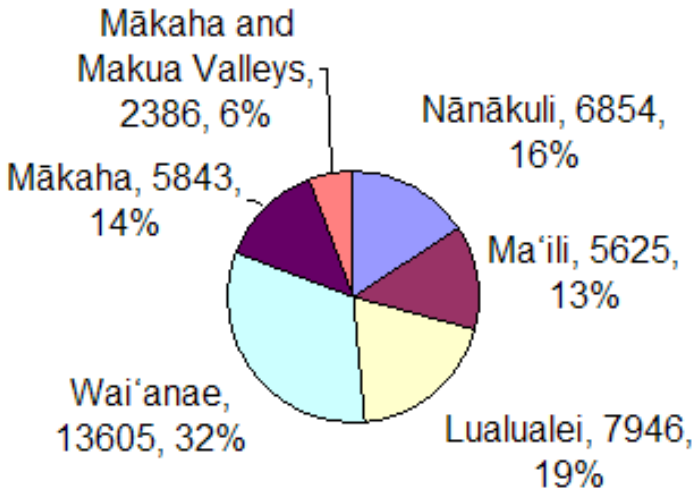

Figure 3.2 Distribution of Population in the Wai‘anae Moku
Source: U.S. Census Bureau 2000

3.2.3 Cultural Diversity

The Wai‘anae coast has a high concentration of Native Hawaiians, with more than 62 percent identifying themselves as Hawaiian or part Hawaiian, compared with 20 percent on O‘ahu and 21 percent statewide. Of those, 22.9 percent are *kanaka maoli*, or full-blooded Hawaiian, compared with only 5.6 percent of the population for O‘ahu, and 6.6 percent for the State of Hawai‘i (Figure 3.3). The remaining population represents a diversity of racial and ethnic backgrounds, including Caucasian, Filipino, Japanese, Samoan, Chinese, Korean, Vietnamese, African, and other Asian and Pacific Island races.

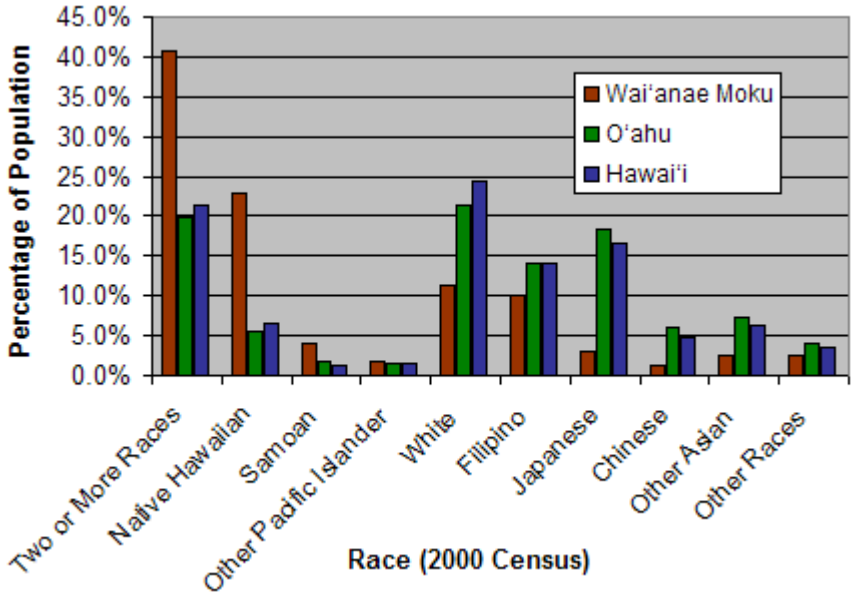

Figure 3.3 Racial Composition of Wai'anae Moku, O'ahu, and the State
Source: U.S. Census Bureau 2000.

The high concentration of Native Hawaiians is the result of many factors. Wai'anae's relative isolation from the seat of government in Honolulu during the missionary period, the dissolution of the monarchy, and Hawai'i's annexation to the United States helped preserve the area's tradition of independence and Hawaiian identity (McGrath and others 1973). The Wai'anae Sugar Plantation, which provided a steady source of jobs during its operation from 1880 to 1946, helped maintain the local population. The government's designation of 200,000 acres in the Wai'anae moku as Hawaiian Homelands in 1920 brought an influx of Hawaiians from elsewhere on O'ahu to the Wai'anae coast to claim homesteads (Figure 3.4). Finally, the availability of low-cost land after the sugar plantation closed led to further growth of the Native Hawaiian population (McGrath and others 1973).

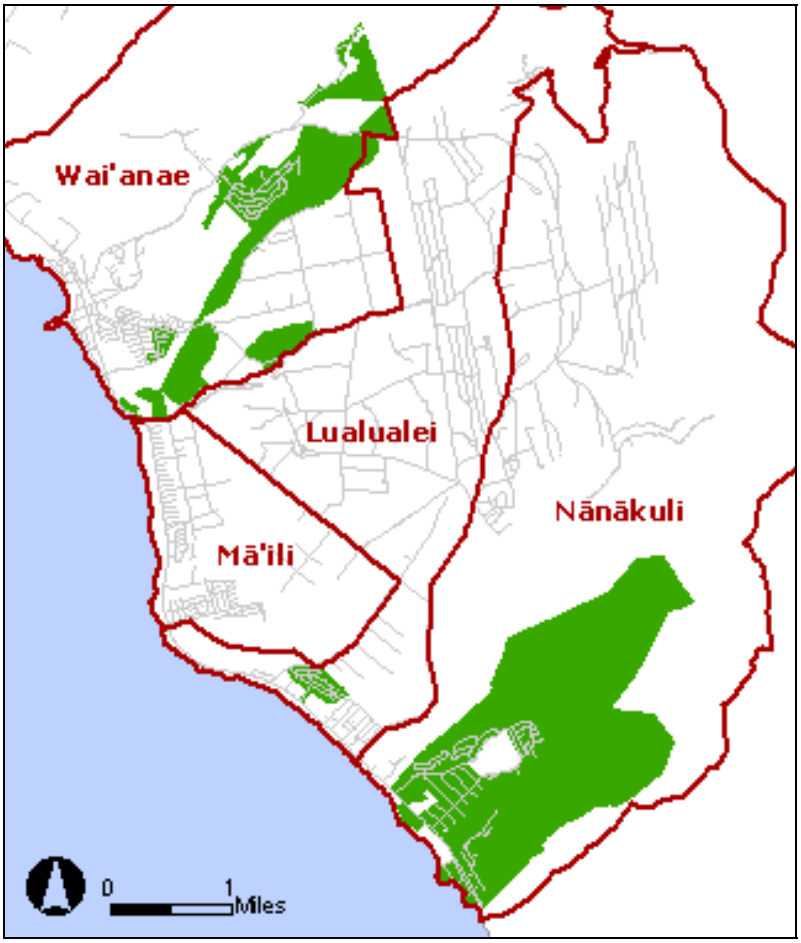

Figure 3.4 Hawaiian Homelands in Waiʻanae
Source: CZM Hawaiʻi, 2001

3.3 Economic Conditions

Per capita income, household income, and rates of employment are among the many economic indicators that are assessed in the U.S. Census. The Waiʻanae coast ranks behind the rest of Oʻahu and the state in each of these important economic areas. However, many community-based resources exist within Waiʻanae to combat poverty and related problems.

3.3.1 Household Income

The median household income of Waiʻanae residents is $42,451 and and per capita income is $13,029 (Figure 3.5). These levels are lower than for residents for both Oʻahu and statewide (U.S. Census Bureau 2000). The percentage of residents living below the poverty level, 21.9 percent, is more than double the percentage of Oʻahu residents as a whole (where 9.9 percent are below the poverty level).

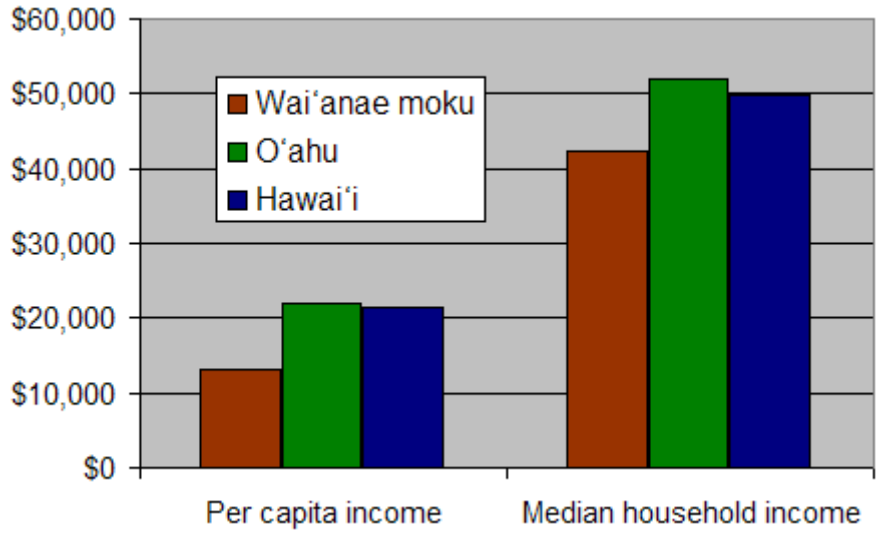

Figure 3.5 Income Comparison of Waiʻanae, Oʻahu, and the State
Source: U.S. Census Bureau 2000.

Although some Waiʻanae moku residents struggle with unemployment and poverty, getting by on little money has long been part of the way of life on the Waiʻanae coast. Families have traditionally supplemented low incomes with fishing and subsistence farming, as well as by sharing through an ʻohana social network (McGrath and others 1973). Many residents have low housing costs, which helps offset the effects of relatively low incomes. In addition, many organizations and resources exist in the community to support people in need. Some of the organizations that are dedicated to helping Waiʻanae's residents socially and economically are the Cultural Learning Center at Kaʻala, Mala Ai ʻŌpio , Hoa ʻĀina O Mākaha, Hoomau Ke Ola, Nani O Waiʻanae, and the Waiʻanae Coast Comprehensive Health Center.

3.3.2 Local Economy

Only 6 percent of the total land area of the Waiʻanae moku is developed. Of that 6 percent, which represents 2,292 acres (3.6 square miles) of developed land, about 90 percent is residential development, and 10 percent is zoned as commercial, industrial, or resort development (Figure 3.6).

As of 2004, 266 businesses were operating along the leeward coast, employing 3,275 residents with an annual payroll of $81,911,000. Transportation and warehousing, health care and social assistance, accommodation and food services, and other services represented 158 of the 266 businesses (U.S. Census Bureau).

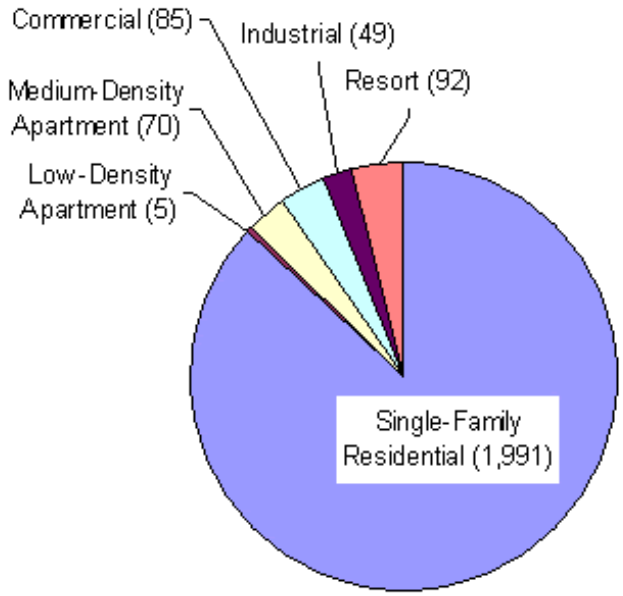

Figure 3.6 Development in the Waiʻanae Moku in Acres
Source: City and County of Honolulu, Department of Planning and Permitting 2000.

Most of the existing urban and suburban development in the Waiʻanae District is clustered along Farrington Highway, in a developed strip that varies from about ¼ to 1 mile wide. Two major commercial centers are the Waiʻanae Mall and Nānākuli's Pacific Shopping Mall. Local small businesses and light industry are an important source of jobs for the community.

Mākaha Valley is the only valley in the moku that has substantial urban and resort development, including the Mākaha Resort Golf Club, Mākaha Valley Towers condominiums, Mākaha Valley Plantation townhouses, and Mākaha Estates gated community. The valley is home to two 18-hole golf courses.

The Mākaha Resort Golf Club was formerly the Sheraton Mākaha Resort. In its heyday in the 1970s and 1980s, the resort employed as many as 300 people (City and County of Honolulu, Department of Planning and Permitting 2000). Today the Mākaha Resort Golf Club employs about 125 people. The

300-acre resort includes one of O‘ahu's top-rated golf courses and a 173-room hotel with a swimming pool, meeting and banquet facilities, and a restaurant and lounge. The resort changed ownership in 2004, and planned renovations will ultimately result in the sale of timeshare interests (Schaefers 2004).

3.3.3 Economic Development

The Wai‘anae Sustainable Communities Plan, which presents guidelines for the sustainable development of the moku up to the year 2020, proposes that the Wai‘anae town center be designated as a “Country Town” commercial and service center, in keeping with Wai‘anae Town’s historical role as the hub of settlement in the moku. The envisioned development of Wai‘anae Country Town would extend from Wai‘anae Mall to Old Government Road, and from Pōka‘ī Bay Beach Park to Wai‘anae Elementary School, covering about 100 acres in total. It would include development of a community gathering place at Pōka‘ī Beach Park, the revitalization of low-rise commercial properties on both sides of Farrington Highway, and the gradual development of about 40 acres of clustered residential use, mainly as two-story townhomes, duplexes, and clustered single-family homes on modest lots.

3.3.4 Education and Employment

In the Wai‘anae moku, 77.9 percent of adults 25 years or older are high school graduates. Only 8.2 percent of moku residents have earned a bachelor's degree or higher, less than one-third the percentages for the island of O‘ahu (27.9 percent) and the State of Hawai‘i (26.2 percent) (Figure 3.7). The civilian unemployment rate on the leeward coast is 14.9 percent, more than double the levels for O‘ahu and the state (6.2 and 6.3 percent).

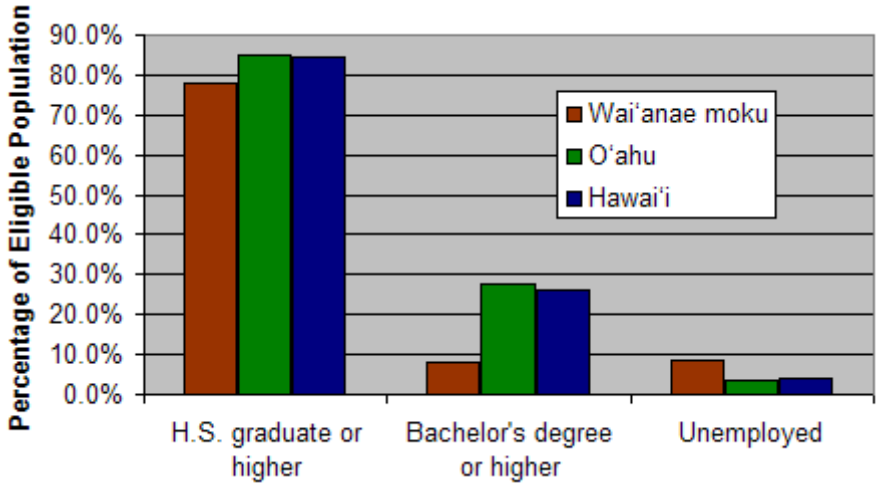

Figure 3.7 Educational Attainment and Employment in Wai‘anae, O‘ahu, and the State
Source: U.S. Census Bureau 2000

The percentage of residents with college degrees declined in the period between 1990 and 2000; however, there was a significant increase in the percentage of residents who completed high school.

4.0 OCEAN RESOURCES OF THE WAI‘ANAE COAST

Ocean resources of the Wai‘anae coast include coral reef ecosystems, demersal and pelagic fish, and special status species. This section provides a summary of the status and trends of ocean resources along the Wai‘anae coast based on available information and data. Threats to the marine environment and ocean resources are also summarized.

4.1 Coral Reef Ecosystem

Coastal sites with high wave exposure have the lowest coral cover (less than 10 percent), while bays and wave-protected coastal areas have the highest coral cover (70 to 80 percent) (Brainard and others 2002). Coral cover is low along the Wai‘anae coast (1 to 2 percent of bottom area), a condition typical of shallow, flat, low-relief bottoms in this area (Russo 1997). A 20-year monitoring study of high surf and hurricane impacts on the Wai‘anae coast concluded that although hurricanes have a significant impact on the coral reef environment (namely, the reduction of coral cover), impacts from high surf and storm surge are much less predictable (Coles and Brown 2007). Most of the seafloor along the Wai‘anae coast is uncolonized pavement, a flat hardbottom of volcanic or limestone rock, interspersed with sand channels. However, corals thrive on the artificial reefs and on the armor rock at the inshore wastewater effluent pipeline, probably because of artificial topographic relief (Harrison 1987).

The Wai‘anae coast is dominated by two coral species, *Pocillopora meandrina* and *Porites lobata* (Russo 1997). *P. lobata*, a massive and encrusting species, is the most common coral in the main Hawaiian Islands (MHI). It is surge-tolerant and can be found in a variety of habitats, from tide pools to depths of 45 meters (approximately 145 feet). It is most common on wave-exposed reef slopes between 3 and 14 meters (approximately 10 to 45 feet). *P. meandrina* is one of the four most abundant species of Hawaiian reef-building corals. It is a surge-tolerant species that inhabits exposed shorelines and the surge zone of reef slopes. Its dense skeleton, sturdy branches, and symmetrical head formation suit it to the moderate wave action encountered close to the surface. It is the dominant coral species on reef slopes at depths of less than 3 meters (10 feet), but can also be found to 27 meters or more (greater than 85 feet in depth). The thin encrusting species *L. purpurea*, is also found in these waters.

There is only one long-term monitoring site along the Wai’anae coast. The coral assemblages in the Kahe nearshore area have been under intensive investigation since 1970, when the first surveys of the effects of the Kahe Power Station thermal outfall were conducted by Jokiel and Coles (1974). The Kahe Coral Monitoring Study began in 1980 as part of the monitoring required for obtaining and

maintaining the National Pollutant Discharge Elimination System (NPDES) permit for operation of the thermal outfall associated with the Kahe Generating Station. Since 1998, this site has been included in the state-wide Hawai'i Coral Reef Assessment and Monitoring Program (CRAMP) designed "to identify the controlling factors, both natural and anthropogenic, contributing to the stability, decline, or recovery of Hawaiian reefs (CRAMP 2008)." The Kahe site is one of 30 CRAMP sites across the MHI.

4.1.1 Benthic Habitats

Most of the reefs along the Wai'anae coast are known as fringing reefs, growing near the shoreline. These reefs form in areas of low rainfall runoff. Typical reef zonation consists of (1) reef flat zone (0 to 2 meters or 0 to 6.5 feet), (2) reef bench zone (2 to 10 meters or 6.5 to 32.8 feet), (3) reef slope zone (10 to 30 meters or 32.8 to 98.4 feet) and (4) rubble zone (30 to 40 meters or 98.4 to 131 feet) (AECOS, Inc. 2002).

Off the Wai'anae coast, sand is affected by substantial wave energy, especially during the winter because of the wrap-around effect from North Pacific storms. Sand does not continue below the waterline; instead, there is a limestone platform, or reef flat, that extends several meters offshore. This platform is virtually barren of macroinvertebrates and macroalgae, although it is covered with short turf algae. Compact and sturdy corals, such as the cauliflower coral (*P. meandrina*), are distributed in patches on the reef flat. Animals living in this zone contend with strong surge and crashing waves by either boring into the rock (urchins), or by darting out between waves from a protective hole to feed on turf algae (AECOS, Inc. 2002).

The limestone platform drops off vertically within 10 to 20 meters (approximately 30 to 65 feet) from shore, and the deeper vertical portions, known as the reef bench, contain the corals *P. meandrina*, *P. lobata*, and *L. purpurea*. The common brown algae (*Padina* spp.) and red algae (*Liagora* spp.) are present around boulders. Unattached benthic invertebrates, such as sea urchins, are rare. Reef fish are moderately abundant around the boulders, and in the deeper areas of the shoreline bench (AECOS, Inc. 2002).

Wave energy subsides at the depth of the reef slope zone, and the more delicate finger coral begin to appear. The greatest concentration of living material is here, at the reef's seaward edge, where plankton and clear water of normal salinity are dependably available. The characteristics of the seafloor are of great importance in structuring fish communities and in determining the number of fishes living in the area. A high abundance and diversity of fishes are present in areas of high relief, where fish can seek refuge. Large schools of ta'ape (bluelined snapper; *Lutjanus kasmira*), kole (goldring surgeonfish; *Ctenochaetus strigosus*), aloiloi (black damselfish; *Dascyllus albisella*), and

other common fish species are present swimming over these rocks (Russo 1997). Sandy bottoms or pavement rock generally attract few fish to the area (AECOS, Inc. 2002).

Coral cover diminishes in the rubble zone, and coral rubble and sand dominate the seascape. Fish concentrations drop off considerably, as the habitat provides little refuge in this zone (AECOS, Inc. 2002).

4.1.2 Reef Fish

There are 557 documented species of reef and shore fish in Hawai‘i, of which 135 are endemic. Surgeonfish are the dominant fish group, and herbivores generally account for more than 70 percent of the total reef fish biomass, followed by invertebrate feeders (13 percent) and plankton feeders (9.7 percent). Predators are rare, accounting for 3.8 percent of reef fish biomass (Brainard and others 2002).

The highest numbers and species of fish are found in locations of moderate wave exposure. The lowest biomass is found in areas exposed to north and south swells. Increasingly complex habitats contain more fish and a greater variety of species, which illustrates the importance of shelter as a refuge for some fish to avoid predation (Jokiel and others 2001). Exceptions occur in a few places around the islands where high fish biomass occurs in sites with low habitat complexity, but these sites are protected from fishing. The Wai‘anae coast has few locations with complex habitat and no designated no-fishing areas. Thus, most of the reef along the coast has low species diversity and biomass.

Although the Wai‘anae coast in general offers relatively few fish species and low numbers of fish, there are exceptions where large schools of reef fish have been documented. They include the three artificial reefs: Pōka‘ī Bay Artificial Shoal (created with old cars, concrete pipes, and a steel barge in 1963), the Mahi shipwreck (sunk in 1982) and the seaplane wreck (sunk in 1986), the outfall pipe of the wastewater treatment plant in Wai‘anae town; and the thermal outfall of the Kahe power plant just south of the Wai‘anae moku (Kanenaka 1991; Russo 2001a, b; Harrison 1987).

Weke (yellowstripe goatfish; *Mulloidichthys flavolineatus*), na‘ena‘e (surgeonfish; *Acanthurus dussumieri*), u u (menpachi; *Myripristis berndti*), and the saddleback wrasse (*Thalassoma duperrey*) occur in large schools at these sites (Hobson 1984). Also common are the brown surgeonfish (*Acanthurus nigrofuscus*), Pacific gregory (*Stegastes fasciolatus*), goldring surgeonfish (*Ctenochaetus strigosus*) and the blackfin chromis (*Chromis vanderbilti*). Armor rock surrounding pipes and artificial reefs provide ample habitat space for hiding and mating, ample surface for the colonization of food sources, and a reference point above the seafloor for aggregation and maintenance of schools.

Artificial structures placed in areas normally devoid of bottom relief can attract large numbers of fish and provide surfaces for coral and other sessile organism attachment.

4.2 Demersal and Pelagic Fish

4.2.1 Ulua

Locally, the term "ulua" refers to members of the jack family that are 10 pounds or more in weight, while those under 10 pounds are referred to as "papio." These species (such as the bluefin, black and giant trevally) contribute to and account for the most popular recreational fishery in the state. Yet, little information is available on the status of these species in Hawai'i. In general, smaller fish species are found in shallower waters, while larger species are found in deeper waters (Figure 4.1). Large adults of this species can be caught relatively close to shore, including by shoreline casters, because the seafloor drops quickly off the Wai'anae coast.

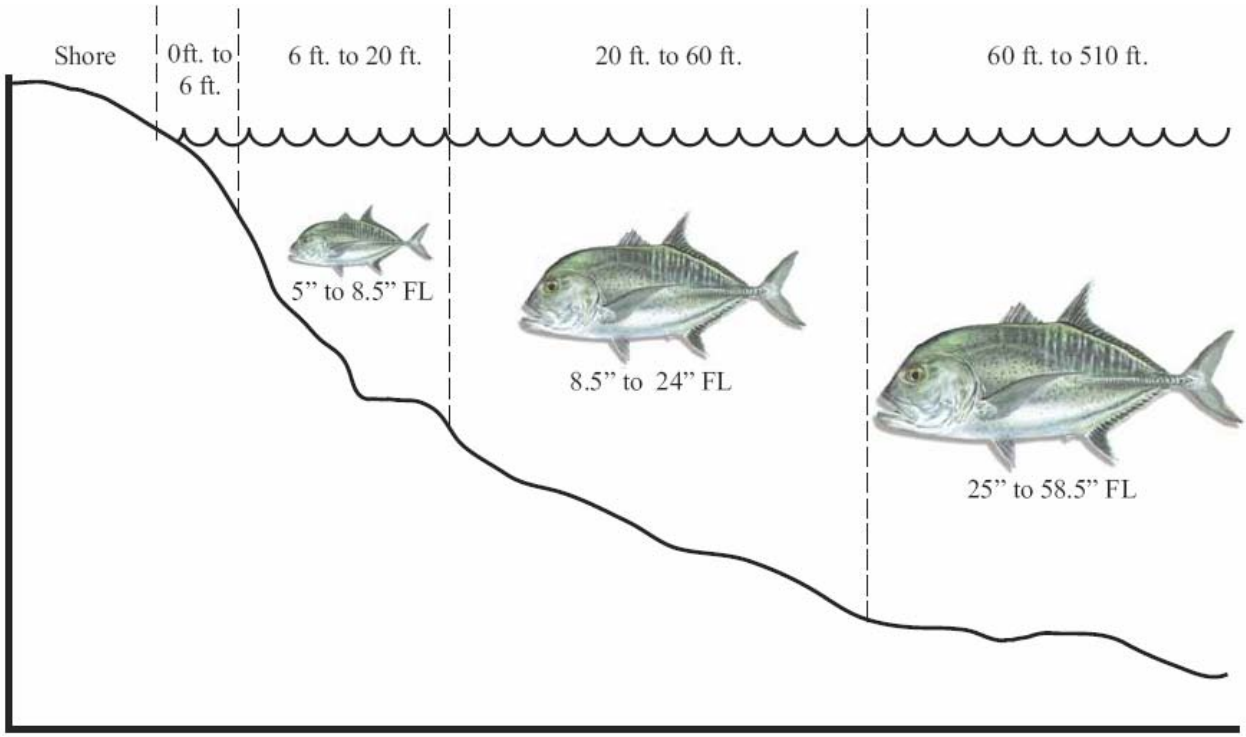

Figure 4.1 General Size Distribution of White Ulua/Papio by Depth
Source: Hawaii's Ulua and Papio Tagging Project, DAR 2006

4.2.2 Akule and 'Ōpelu

Although nearshore fisheries account for only a minor portion (about 7 percent) of the total landed catch in Hawai'i, they are important to small-scale local recreational and commercial fishers, both as food fish and bait for larger pelagic species. Big-eye and mackerel scad, akule and 'ōpelu, are

culturally important to native Hawaiians, who have been fishing for these two species for generations. These two species account for approximately 79 percent of the total commercial catch of coral reef-associated species (WPRFMC 2002), with much of the catch occurring in the nearshore waters from Pearl Harbor to Ka‘ena Point. Akule and ‘ōpelu are small, fast-growing pelagic fishes and are thought to have a short life cycle (less than 5 years). They are fished by handline and surround net, methods that involve low bycatch and negligible impact to seafloor habitats. Because akule and ‘ōpelu inhabit mostly nearshore waters (they are rarely found in waters deeper than 100 m), they are managed by the State of Hawai‘i through a set of administrative rules that seek to maintain the stock through gear restrictions, bag limits, and area and time closures.

Based on local fisher knowledge and scientific studies, the approximate seasonal rhythms of the nearshore species are as follows: ‘ama‘ama (mullet) spawn between December and February, akule spawn between April to November (Kazama 1977), and ‘ōpelu spawn between November and March. The halalū (offspring of the akule) are in the nearshore waters between August and November, and the ‘oama (offspring of the weke) are in the nearshore waters between July and September (Hawai‘i CZM Program 2005; Institute for Sustainable Development 1998). The spawning grounds and nursery for these fish appear to be located in the nearshore waters between Kepuhi Point and Ka‘ena Point at the northern end of the Wai‘anae coast (W. Aila, pers. comm.)

4.2.3 Bottomfish

Bottomfish is a generic term for species that reside on or near the ocean bottom. These commercially valuable species belong to the taxonomic groups Lutjanidae (snappers), Serranidae (groupers), Carangidae (jacks) and Lethrinidae (emperors). These species generally inhabit waters between 328 and 1,312 feet (100 and 400 meters) deep, although two species (*Aprion virescens* and *Epinephelus quernus*) are found regularly in shallow-reef habitat (WPRFMC 2004).

Recent scientific studies and fishers’ accounts indicate these species have a patchy and clumped distribution, requiring specific bottom characteristics. Primarily, bottomfish quality habitat must include a ridged or corrugated bottom, with cavities and holes for prey species and overhangs for shelter. A minimum of sedimentation, facilitated by steep slopes and strong currents, is also desired. A submersible-supported study of bottomfish at four banks in the Northwestern Hawaiian Islands (NWHI) provides evidence of a direct relationship among the level of ridged habitat, prey species, and apex predator bottomfish (Kelley and others 2006).

Recent studies indicate that bottomfish stocks around the MHI are facing unsustainable fishing pressure. These studies estimate that the level of fishing effort needs to decrease at least 24

percent to reach levels that are sustainable. Therefore, commercial bottomfish fishing has been prohibited from May 15 to October 1 since 2007.

4.2.4 Tuna and Billfish

Tuna and billfish are seasonal inhabitants off the Wai‘anae coast. Seasonal runs of yellowfin ahi (*Thunnus albacares*), wahoo (*Acanthocybium solandri*), and the schooling inshore pelagic species big-eyed scad or akule (*Selar crumenophthalmus*) lure fishermen in huge numbers to the area. Fishery data indicate that tuna runs appear to occur between May and August, while billfishes are found more frequently during September through December. Mahi mahi are most common in August through November (Glazier 1999).

4.3 Special Status Species

The Hawaiian archipelago is home to an array of large marine animals, including whales, dolphins, the endangered Hawaiian monk seal, several species of sea turtle, and an array of sea birds. These animals have been afforded special protection status under a number of federal and state laws, including the Marine Mammal Protection Act (MMPA), Endangered Species Act, HRS 195D, and the Migratory Bird Treaty Act. The MHI and NWHI serve as foraging, nesting, and birthing areas for many of these animals.

4.3.1 Spinner Dolphins

The Hawaiian name for the spinner dolphin is Nai‘a. The ancient Hawaiians recognized the special quality of dolphins and designated them as a form of Kanaloa (the god of the ocean) in the Kumulipo, the Hawaiian chant of creation. Spinner dolphins (*Stenella longirostris*) are small delphinids that range in length from 120 cm (4 feet) to 210 cm (7 feet) and weigh 45 to 75 kg (100 to 160 pounds). They have slender bodies, a relatively flat melon, and a long, narrow, well-defined beak. The general body color pattern includes a dark dorsal cape, lighter gray sides, and a white or light gray belly. The upper jaw is gray, and the lower jaw is white; the beak has a dark tip, and there is a dark border along the mouthline.

The status of spinner dolphins in Hawaiian waters, let alone the waters off the Wai‘anae coast, is relatively unknown, and there are insufficient data to evaluate trends in abundance (NOAA 2004). Spinner dolphins feed at night. They feed on fish and squid that, during the day, remain deep in the ocean but migrate to surface waters (upper 200 m) at night. A study of food habits and energetics found that spinner dolphins likely need to consume one organism per minute during their foraging periods to maintain their energetic needs (Benoit-Bird 2004). Research suggests that spinner dolphins

forage cooperatively to concentrate the density of their prey. Spinner dolphins return to the coast in the morning, after a long night of foraging. Typically, they return between 6:00 and 9:00 a.m. on the west coasts of both Hawai‘i (Ke‘alakeku‘a Bay) and O‘ahu (Maku‘a beach, Figure 4.2). The dolphins descend into rest; aerial behavior subsides considerably, the school tightens, movements become stealthy, and most time is spent below the surface. Spinner dolphins use shallow coastal waters to rest. The areas that are used most frequently are wind protected, typically less than 50 m in depth, and have sandy bottoms (presumably to aid in the detection of predators). During rest, spinner dolphins continue to move but typically in a slow, back-and-forth pattern.

The most closely studied population of spinner dolphins, for which published data exist, is located around the island of Hawai‘i. Researchers concluded that the local population was open and that certain individuals moved regularly in and out of different areas. Certain recognizable individuals, though, consistently used particular areas around the island for resting. It is possible that the carrying capacity of spinner dolphins is determined by the size and distribution of usable rest areas. The MHI are large and offer many potential resting areas.

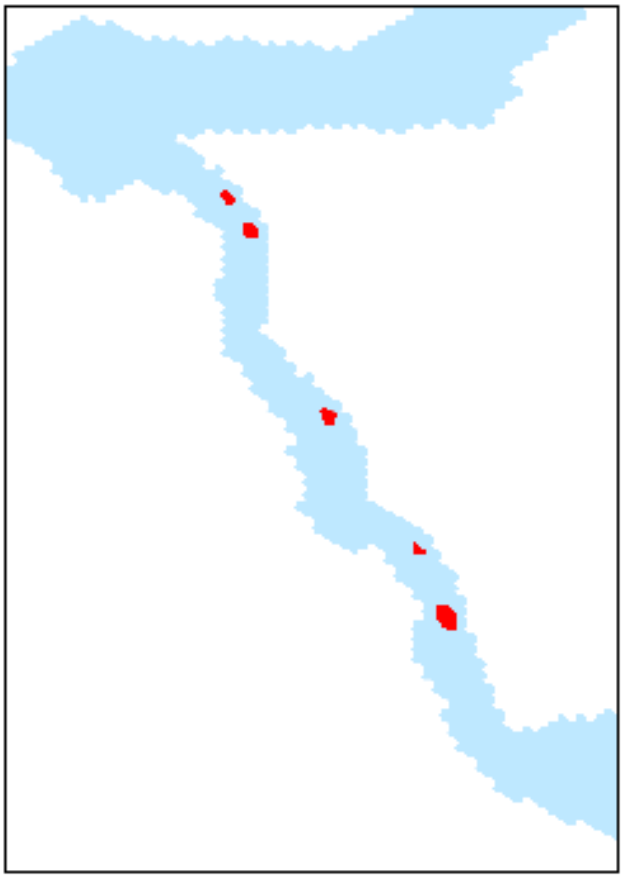

Figure 4.2 Resting Areas for Spinner Dolphins along the West Coast of O‘ahu
(Hawaii’s Natural Heritage Program; http://hbmp.hawaii.edu/mgap/maps.html)

The spinner dolphin is not classified as an endangered species but is protected under the MMPA, which makes it illegal to capture, kill, hunt or harass any marine mammal. Any action that 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" constitutes harassment (Sec. 3, 16 USC 1362) and is a violation of the MMPA. A habitat issue of increasing concern is the potential effect of swim-with dolphin programs and other tourism activities on spinner dolphins around the MHI. Information on fishery-related mortality of cetaceans in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. Gillnets appear to capture marine mammals wherever they are used and float lines from lobster traps and longlines can be expected to occasionally entangle whales (Perrin and others 1994). In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; NMFS/PIR, unpublished data), but no estimate of annual human-caused mortality and serious injury is available because the nearshore gillnet fisheries are not observed or monitored.

4.3.2 Humpback Whales

Humpback whales appear in Hawaiian waters between November and April, when they socialize, mate, and give birth. They frequent the waters off the Wai'anae coast during this time. As part of the Hawaiian Islands Humpback Whale National Marine Sanctuary's Annual Ocean Count, the number of humpback whales sighted from various shore sites around the islands is recorded in a 4-hour period (Figure 4.3). Not only has this volunteer activity proven to be fun for residents and visitors, but it also helps to provide important population and distribution information on humpback whales around the Hawaiian Islands. Ocean count stations for the west side of O'ahu are Ewa Beach, Ko Olina, Ma'ili Point, Makua Cave, and the west side of Ka'ena Point (Figure 4.4).

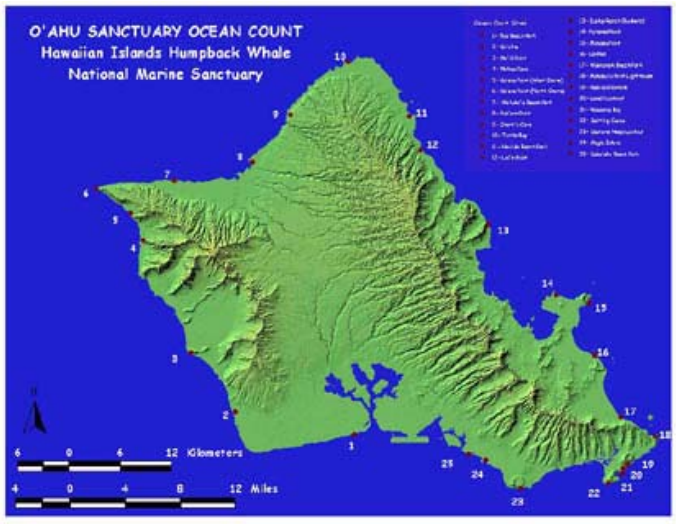

Figure 4.3 Locations of Stations for Annual Surveys of Marine Mammals

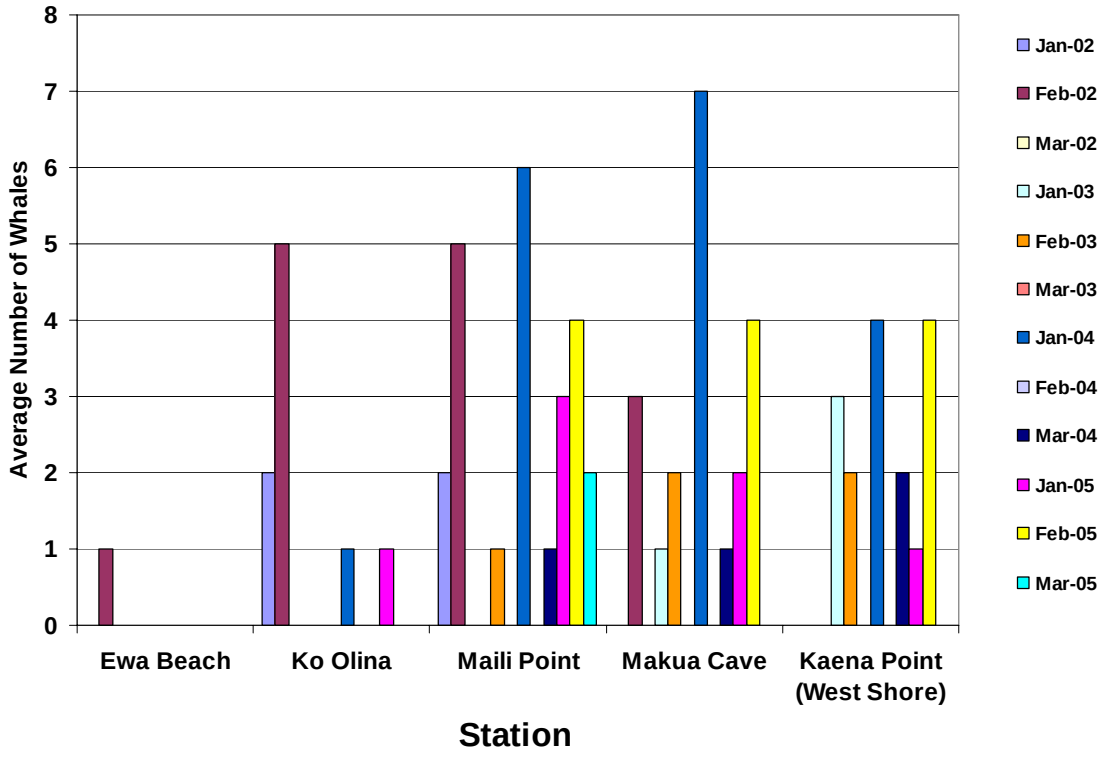

Figure 4.4 Average Number of Whales by Station during Nine 15-minute Periods between 8:00 and 12:15 p.m. between January and March 2002 – 2005 (NOAA 2008)

The Hawaiian Islands Humpback Whale National Marine Sanctuary (Figure 4.5), which includes nearshore waters along parts of all the MHI, was established to protect the largest breeding grounds for the humpback whale. Humpback whales migrate annually from Alaska to Hawaiian waters, covering nearly 3,000 miles of open ocean in less than 2 months' time. Approximately 2,000 to 5,000 individuals come here each year, constituting a significant portion of the total North Pacific population of 6,000 to 10,000 whales. Around O‘ahu, the estimated highest density of humpback whales occurs along the northern and northwestern coastal areas (Figure 4.6).

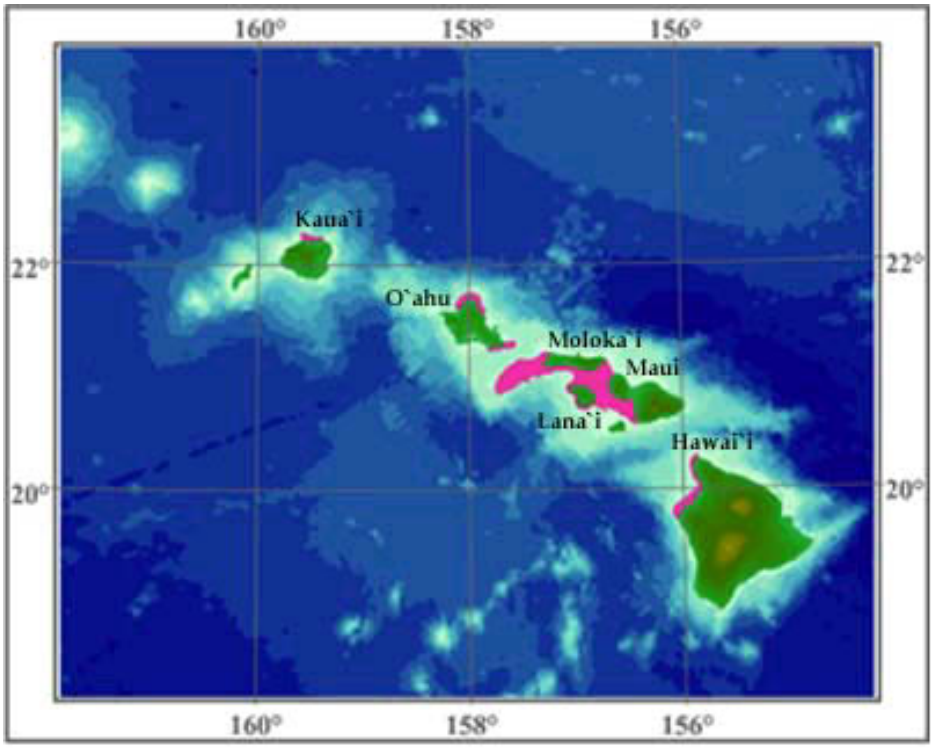

Figure 4.5 Location of Hawaiian Islands Humpback Whale National Marine Sanctuary (pink shaded areas)

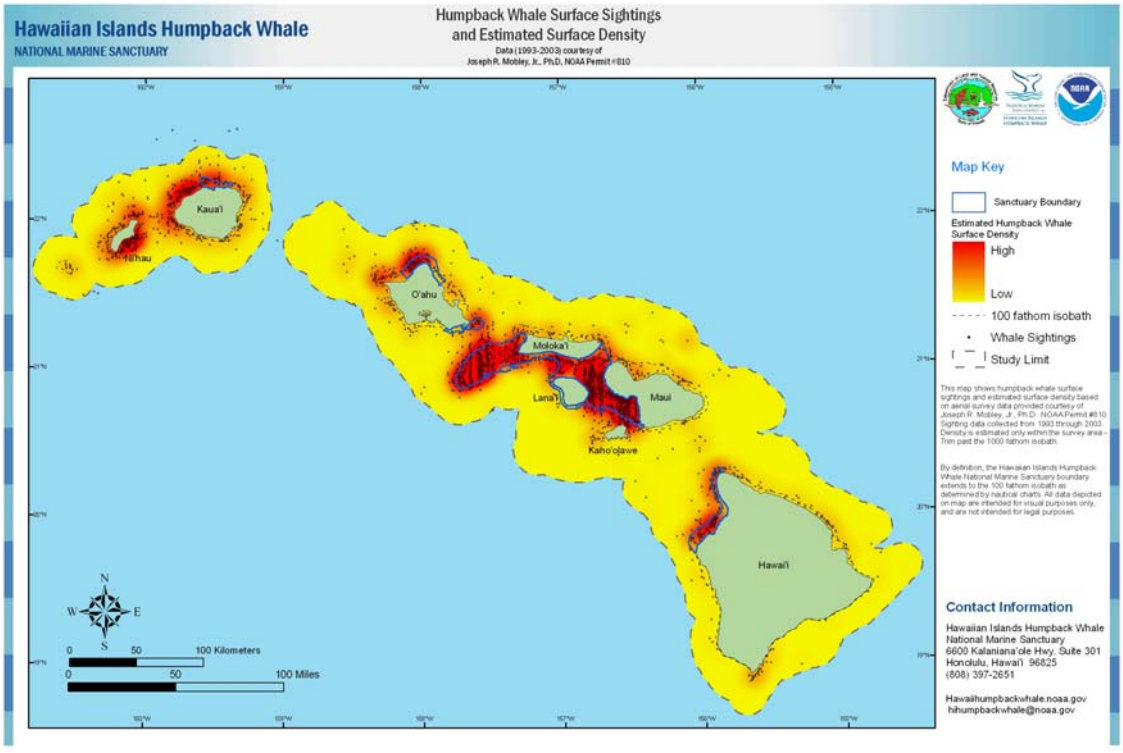

Figure 4.6 Humpback Whale Surface Sightings and Estimated Surface Density around the Main Hawaiian Islands.

4.3.3 Other Cetaceans

An estimated 24 species of whales and dolphins have been sighted around the Hawaiian archipelago and may occur in the waters off Wai‘anae. In addition to the humpback whale and spinner dolphins, other whales and dolphins may occur off the waters of Wai‘anae, including the fin (*Balaenoptera physalus*), blue (*B. musculus*), sei (*B. borealis*), Pacific right (*Eubalaena glacialis*) and one species of toothed whale, the sperm whale (*Physeter macrocepalus*). In addition to the spinner dolphin, the spotted dolphin (*Stenella attenuatta*), Pacific bottlenose dolphin (*Tusriops truncates*), rough-toothed dolphin (*Steno bredanensis*), false killer whales (*Pseudorca crassidens*), and the short-finned pilot whale (*Globicephala macrorhynchus*; Mobley and others 2000) may be spotted off Wai‘anae.

4.3.4 Hawaiian Monk Seal

The endangered Hawaiian monk seal (*Monachus schauinslandi*) population has been declining for more than 20 years, with a 2006 population estimate of approximately 1,200 individuals (Antonelis and others 2006). Modeling predicts that the species’ population will fall below 1,000 animals by the year 2012. Approximately 90 percent of these seals are found in the NWHI, where the population continues to decline, although a small, growing sub-population exists in the MHI. Aerial surveys of all the MHI were conducted in 2000 and 2001 and counted 45 and 52 seals. In 2007, the minimum number of seals identified in the MHI was 88 (Wurth and others 2008). The number of annual births has steadily increased since the mid-1990s, with 13 pups born in 2007. Although these trends are promising for the species’ future in the MHI, there are challenges that come with recolonizing in an area densely populated by humans. One Hawaiian monk seal is routinely spotted at Ka‘ena Point. Other monk seals have been sighted around the MHI, and there are reports that they have been spotted occasionally along the Wai‘anae coast.

4.3.5 Sea Turtles

Green turtles (*Chelonia mydas*) are the most abundant sea turtle in Hawaiian waters and may be seen off the waters of Wai‘anae. Four other species of sea turtles inhabit waters of the Hawaiian Islands: loggerhead (*Carretta carretta gigas*), leatherback (*Dermochelys coriacea schlegeli*), hawksbill (*Eretmochelys imbricata*), and olive ridley (*Lepidochelys olivacea*). These species are considered uncommon in Hawai‘i.

Green turtles, known locally as honu, can be seen foraging along the Wai‘anae coast (National Marine Fisheries Service [NMFS] and U.S. Fish and Wildlife Service [USFWS] 1998). The Hawai‘i population of the green turtle is listed as threatened under the Federal Endangered Species Act throughout its Pacific range (except for the population that nests on the Pacific coast of Mexico, which is listed as endangered). Nesting occurs throughout the Hawaiian archipelago, but more than 90 percent occurs

in the NWHI. In the NWHI, green turtles migrate 1,300 kilometers (more than 700 miles) from the MHI to French Frigate Shoals.

Juvenile green turtles that have grown to about 30 to 35 centimeters (12 to 14 inches) live in the near-shore environments and are herbivorous, feeding on macroalgae and seagrasses. Young turtles (post-hatchling and juveniles) live in offshore pelagic habitats and are carnivorous, feeding primarily on invertebrates and fish eggs. Green turtle populations in Hawai‘i are faring better than in other parts of the Pacific, possibly a result of protection of primary nesting sites in the NWHI and improved enforcement that prohibits harassment or harvest of the species (NMFS and USFWS 1998).

4.3.6 Seabirds

The Ka‘ena Point Natural Area Reserve at the north end of the Wai‘anae coast is home to many seabirds. Albatross and shearwaters are pelagic birds, spending the majority of their lives at sea.

Both Laysan albatrosses and wedge-tailed shearwaters have re-established breeding colonies in the reserve. Currently, approximately 60 pairs of Laysan albatross nest at Ka‘ena Point, along with more than 1,500 pairs of wedge-tailed shearwaters (DLNR 2007). Shearwaters will usually depart the colony before dawn and return after dusk. Adults usually arrive in March, and females lay a single egg in June. As ground-nesting birds, shearwaters face threats from feral predators at nesting sites and are also easily disoriented by urban lights.

White-tailed tropicbirds, or koa‘e kea (*Phaethon lepturus*), have also been known to nest at Ka‘ena Point in small numbers. Other seabirds, including redfooted (*Sula sula*), brown (*S. leucogaster*), and masked (*S. dactylatra*) boobies, collectively known as ‘ā; brown (noio kōhā, *Anous stolidus*) and black noddies (noio, *A. minutus*); ‘ou or Bulwer’s petrel (*Bulweria bulwerii*) and an occasional ka‘upu or black-footed albatross (*Phoebastria nigripes*) have been observed from the point. Great frigatebirds, or ‘iwa (*Fregata minor*); and greybacked (pākalakala, *Sterna lunata*), sooty (‘ewa‘ewa, *S. fuscata*), and white (manu-o-Kū, *Gygis alba*) terns have been observed at Ka‘ena on occasion, and any number of other seabirds could be seen here. Migratory shorebirds, including the wandering tattler, or ‘ūlili (*Heteroscelus incana*); Pacific golden-plover, or kōlea (*Pluvialis fulva*); and ruddy turnstone (‘akekeke, *Arenaria interpres*) may also be seen.

All of the seabirds and shorebirds found at Ka‘ena Point are federally protected under the Migratory Bird Treaty Act of 1918. Human disturbance and decline in fish stocks from overfishing and climate change and variability are key threats to seabird populations.

5.0 OCEAN USES OFF THE WAI‘ANAE COAST

This section provides a summary of ocean recreational use, both public and commercial, along the Wai‘anae coast based on existing information and data and input from stakeholders and includes maps showing spatial and temporal aspects of ocean recreational use (Figure 5.3)[1].

5.1 Harbor Facilities

Harbor facilities on O‘ahu include small boat harbors, launch ramps, piers, anchorages, and deep draft harbors (Figure 5.1). These facilities are owned and operated by federal, state, and county government and private entities.

The west coast of O‘ahu has one state-owned harbor, the Wai‘anae Small Boat Harbor, and one privately owned marina, the Ko Olina Marina. Both facilities include slips for commercial and private sailing and motor vessels. A third private marina is planned as part of the Ocean Pointe development in ‘Ewa. The deep draft harbor, located at Barber’s Point, does not have facilities for private or commercial ocean recreational uses and is not further discussed in this study.

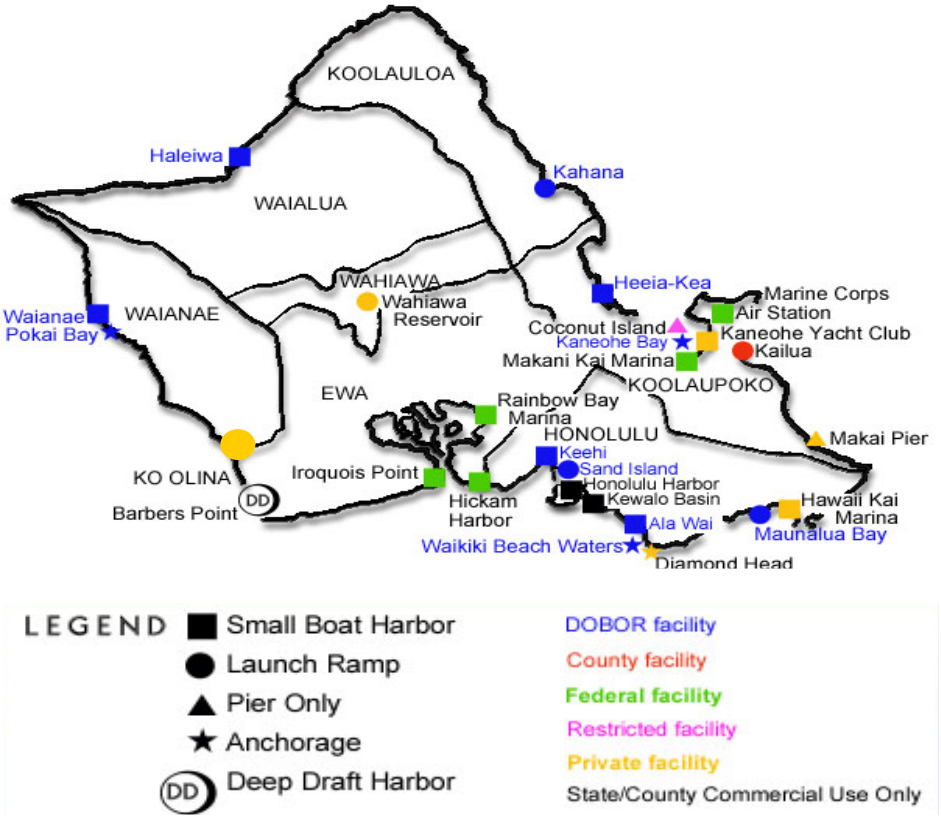

Figure 5.1 Harbor Facilities around O‘ahu, Hawai‘i

[1] A large-scale map of this figure can be found as an attachment to this report.

5.1.1 Wai‘anae Small Boat Harbor

The Wai‘anae Small Boat Harbor is owned and operated by the Division of Boating and Ocean Recreation (DOBOR) of the Hawai‘i State DLNR. Of the harbor’s 146 slips, 94 are occupied (W. Aila pers. comm.). The remaining 52 slips are out of service. The harbor is equipped with seven boat launching ramps, a vessel washdown area, a fish hoist, and a marine sanitation device pumpout facility. In addition, DLNR allows anchoring at Pōka‘ī Bay for periods of less than 72 hours.

A total of 16 vessels, approximately 10 percent of the harbor’s capacity, are running commercial operations. The types of commercial vessel operations are summarized below and are detailed in Table 5.1. No commercial sailing operations or pleasure cruises are operating out of the Wai‘anae boat harbor.

- Three charter fishing boats with a maximum capacity of six passengers
- Seven marine mammal and snorkeling tour boats with a maximum capacity ranging from six to 149 passengers
- Six SCUBA diving tour boat with a maximum capacity ranging from six to 31 passengers

Slip rental at the Wai‘anae small boat harbor is $3.75 per foot per month for residents. Commercial vessels pay $7.50 per foot per month or 3 percent of gross sales, whichever is greater. The ramp fee for commercial operators is $200 per month or 3 percent of gross sales, whichever is greater.

Wai‘anae Small Boat Harbor master plan calls for eventual build out to 250 slips.

Table 5.1 Commercial vessels and services offered at Wai'anae Small Boat Harbor

Vessel Name	Operator	Length (feet)	COI Capacity (people)	Primary Services Offered				
				Fishing	Sailing	Marine Mammal Watching	Snorkeling	SCUBA Diving
'Ohana	'Ohana Sport Fishing	30'	6	•				
Live Bait	Ocean Quest, Inc.	31'	6	•				
Megan	Megan Sportfishing Inc.	32'	6	•				
Hoku Naia	Aquamarine Waikiki, Inc	65'	149			•		
Naia	Dolphin Excursions	32'	30			•	•	
Island Spirit	Wildside Speciality Tours	39'	36			•	•	
Alakai	Wildside	34'	6			•	•	
Nani Wahine	Club Kona	32'	24			•	•	
Boat 2	Club Kona	19'	6			•		
Island Princess[1]	Real Hawaii Tours	38'	24			•	•	
Moonlight	Kai 'Ohana	36'	6					•
Melekai	Sea Eagle Diving Adventures	33'	31					•
The Beach	Akamai Navigation, Inc.	42'	20					•
South Seas II	BOT Inc.	38'	25					•
Hapa	Makoto Scott Cameron	27'	6					•
Leila[2]	Honu Watersports Inc.	21'	6					•

Notes:
1 – Island Princess also carries kayaks on board
2 – Leila is permitted to use the launch ramp to conduct commercial business

5.1.2 Ko Olina Marina

The Ko Olina Ocean Marina is a private marina situated on 43-acres at the Ko Olina Resort. Established in 2004, the marina has 330 full-service slips accommodating vessels up to 150-feet in length. Twenty-three of the slips are reserved for commercial operations. The remaining slips are for private vessels.

All slips are leased on a monthly basis with a 30-day notice required by the boat owner or by the marina to terminate the lease. The marina has a full-service fuel dock with gasoline, diesel, and pump-out services, and a boat launch ramp. Commercial or private use of thrill craft, such as jet skis and parasailing, is not allowed from the marina or anywhere at Ko Olina.

Currently, 300 slips are occupied. Thirteen vessels are running commercial operations. Commercial tours and vessels operating from the Ko Olina Ocean Marina along the Wai‘anae coast are summarized below and are detailed in Table 5.2.

- Five charter fishing boats with a maximum capacity of 6 passengers
- Three charter sailboats with a maximum capacity of 6 passengers
- Four marine mammal and snorkeling tour boats with a maximum capacity of 49 passengers
- One SCUBA diving tour boat with a maximum capacity of 12 passengers

Ko Olina is continuing to expand the resort and timeshare capacity through construction of new buildings. Ko Olina phase I (first building) began operations in 2004. Phases II and III (second building) were completed in 2006. Phases IV and V (third building) will be completed in 2009. Phases VI and VII (fourth building) will be completed in 2011.

Table 5.2 Commercial vessels and services offered at Ko Olina Ocean Marina

Vessel Name	Operator	Length (feet)	COI Capacity (people)	Primary Services Offered				
				Fishing	Sailing	Marine Mammal Watching	Snorkeling	SCUBA Diving
Boom Boom I	Boom Boom Sport Fishing	40’	6	•				
Boom Boom II	Boom Boom Sport Fishing	50’	6	•				
Patty S.	Jimmy Zablan	42’	6	•				
Islander	Islander Sport Fishing	35	6	•				
Best Bet	Hawaii Offshore Fishing	35’	6	•				
Leid Back	Hawaii Nautical	38’	12		•			
Private sailboat	Sailing Club of Hawaii	52’	6		•			
Private sailboat	Sailing Club of Hawaii	47’	6		•			
Ko Olina Cat	Hawaii Nautical	53’	49		•	•	•	
Kai ‘Oli’Oli	Ocean Joy Cruises	56’	49			•	•	
Pacific Passion I	Ko Olina Ocean Adventures	40’	29			•	•	
Pacific Passion II[1]	Ko Olina Ocean Adventures					•		
Ko Olina Explorer	Ko Olina Ocean Adventures	44’	29			•	•	
Sea Dream II	Hawaii Nautical	40’	12					•

Notes:
1 – Used as backup vessel when additional capacity is needed

5.1.3 Planned Harbor Facilities

The Walt Disney Company will construct facilities at Ko Olina with an expected completion date of 2011. No additional boating facilities will be added and the existing marina will not be expanded. Commercial tour boat numbers and activity levels will remain constant despite the addition of these facilities.

The Hoakalei development will cover 726 acres and include a marina, resort, golf course, and resort residences in the orange sections shown in Figure 5.2. Access to the marina will be provided through new roads that will transect the development. Although excavation is about 70 percent complete; the marina is not expected to be completed for several years.

Figure 5.2 Hoakalei Master Plan

The new marina is being constructed in ‘Ewa Beach. This marina, first called the ‘Ewa Marina and later renamed the Ocean Pointe Marina, was projected to be approximately 120 acres with 1,400 slips. Now called the Hoakalei Marina, the proposed marina would be constructed on approximately 52 acres and the number of slips will be reduced to 600 to 800 slips, depending on the layout of the marina and the size of the slips to be offered. Fifty percent of the slips will be open to the public. The remaining 50 percent will be maintained as part of the overall Hoakalei development. At this time, no information is available on operation of the marina or the number of commercial ocean tour operators that will be based at the site. Before the harbor can open, the developers must build two fishing piers for the community with 24-hour access.

5.2 Commercial Ocean Tourism Activities

5.2.1 Marine Mammal and Snorkeling Tours

Commercial tour operations for marine mammal watching tours along the Wai‘anae coast were initiated by two boats in 1999 (Table 5.3). The number of tour boats offering these services has increased six-fold in the last 10 years.

Currently, daily marine mammal and snorkeling tours are offered by seven vessels from the Wai‘anae Small Boat Harbor (Table 5.1) and by four vessels from Ko Olina Marina (Table 5.2). One vessel from the Wai‘anae Small Boat Harbor, Island Princess, operates two trips per day. Three of the Ko Olina Marine vessels, Ko Olina Cat, Kai ‘Oli ‘Oli, and Pacific Passion conduct two trips per day. These vessels operate from 7:00 a.m. to 4:00 p.m. (Table 5.4). Trip length is approximately 4 hours. The fourth Ko Olina vessel, Ko Olina Explorer, is used as a backup vessel to Pacific Passion when additional capacity is needed. Approximately 50 percent of the people on marine mammal and snorkeling tours by Ko Olina vessels comes from outside Ko Olina and the remaining 50 percent are guests at Ko Olina. The Ko Olina Cat and occasionally the Kai ‘Oli ‘Oli conducts sunset cruises from 5:30 to 7:30 p.m. These vessels operate along the entire coastline, communicating with each other to locate the dolphin pods.

Table 5.3 Marine Mammal/Snorkeling Tour Activity Levels and Timing by Vessels off the Wai‘anae

Vessel	Year Initiating Operation of Vessel for Commercial Ocean Tour									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Ko Olina Cat				•						
Kai ‘Oli’Oli					•					
Pacific Passion 1		•								
Pacific Passion 2										•
Ko Olina Explorer						•				
Hoku Naia									•	
Naia	•									
Island Spirit	•									
Alakai									•	
Nani Wahine					•					
Boat 2					•					
Island Princess			•							
Cumulative Number of Vessels	**2**	**3**	**4**	**5**	**8**	**9**	**9**	**9**	**11**	**12**

Table 5.4 Marine Mammal Tour Activity Levels and Timing by Vessels off the Wai'anae Coast

Vessel	Time of Day Vessel Operates									
	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600
Ko Olina Cat			•	•	•	•				
							•	•	•	•
Kai 'Oli'Oli[1]		•	•							
				•	•	•	•			
Pacific Passion										
					•	•	•	•		
Ko Olina Explorer[2]	•	•	•	•						
					•	•	•	•		
Hoku Naia			•	•	•					
Naia		•	•	•	•					
Island Spirit	•	•	•	•						
Alakai		•	•	•	•					
Nani Wahine		•	•	•	•					
Nani Wahine (Boat 2)		•	•	•	•					
Island Princess	•	•	•	•						
					•	•	•			
Number of Vessels	3	8	10	10	10	5	5	3	1	1

Notes:
1 – Kai Oli Oli's first trip is marine mammal watching only, not snorkeling
2 – Ko Olina Explorer is back-up boat to accommodate additional passengers above capacity of Pacific Passion

5.2.2 SCUBA Diving Tours

Commercial SCUBA diving boat tours operate out of both Ko Olina and Wai'anae Small Boat Harbor on a daily basis. Six vessels operate out of the Wai'anae harbor (Table 5.1) and one vessel operates out of Ko Olina (Table 5.2). Occasionally, vessels from other harbors are known to conduct dive tours in the area. Additionally, most O'ahu dive shops offer shore diving and snorkeling packages to the Wai'anae coast. Popular destinations for these shore dives are Electric Beach, Tech Reef, and Makua Valley Ridge. Popular boat tour destinations are the Mahi Shipwreck, Land of OZ, Makaha Caverns, Ulua Cave, and the Landing Craft Utility and BeechCraft wrecks.

5.2.3 Other Commercial Ocean Tourism Activities

Other commercial ocean tourism activities along the Wai'anae coast include equipment rental and lessons. These include:

- Two surf shops (Hale Nalu in Wai'anae) and Keaulana Surf Shop (Makaha) that rent surfboards, snorkel gear, boogie boards, and kayaks
- Wai'anae Army Recreation Center

Charter sailboats and fishing boats operate out of Ko Olina approximately two to three times per week. Charter fishing boats offer the following services in nearshore and offshore waters along the Wai‘anae coast:

- Trolling for tuna, marlin, and mahi mahi (4- or 8-hour charters)
- Big game drift fishing targets giant trevally, amberjack, snapper and tuna using deep-jiggling and baiting, both on the bottom and mid-depth. (8-hour charter)
- Bottom fishing with light tackle
- Bait-fishing in protected, near-costal waters for smaller varieties of snapper, jack, mackerel and other reef-dwellers (4-hour charter)
- Overnight, offshore fishing for large snapper, sea bass, giant trevally, tuna and others (12-hour charter, 8 p.m. to 8 a.m.)

5.3 Public Ocean Recreational Uses

Canoe clubs and after-school paddling teams conduct daily practices in the inshore waters along the coast. Schedules for these activities are generally set for the season, allowing for accommodation from motorized watercraft to limit user conflicts. Unfortunately, conflicts regularly occur, as tour vessels cut directly through canoe paddling routes to and from the harbor. Occasionally, tour boats and private boats drive at high speeds inside the reef, which has led to verbal confrontations between paddlers and boat drivers. Private boats also anchor in canoe paddling paths, causing additional user conflict and potential damage to reefs.

SCUBA diving and snorkeling occur at site-specific locations along the coast. The thermal outfall of the Kahe power plant, known locally as “Electric Beach,” is a favorite dive site.

Recreational boat-based fishing is popular along the Wai‘anae coast, with people coming from all parts of O‘ahu to launch vessels from the public boat ramps on the leeward coast. These ramps can get busy on calm weekend days. These weekend anglers, known as the mosquito fleet, generally troll for pelagic species in deep offshore waters away from the conflicts associated with the coastal activities. The annual Ahi Fever Fishing Tournament has occurred every June since 1997. It is the largest fishing tournament in Hawai‘i, based on total number of anglers and boats registered. A maximum of 260 boats can participate, and the spots fill up well before the tournament begins. Approximately 1,000 anglers compete for more than $50,000 in prizes. The seven launch ramps run all day long for this primarily trailer-boat tournament.

Recreational shore casting and spear fishing on the reef are common along the entire Wai‘anae coast. Anglers can be seen every day of the week fishing up and down the coast, and most will keep their catch, either for dinner or to distribute to friends and family.

Surfing becomes a popular activity at selected spots along the coast during the winter. Recently, stand-up paddle boarding and stand-up paddle surfing have become popular amongst recreational ocean users and are expected to become more prevalent in the future.

Recreational thrill craft operations occur all along the coast. Current regulations require these vehicles to operate only in state waters between 500 feet from the shoreline and 2 miles offshore. Thrill craft must not exceed a speed of slow-no-wake (generally less than 5 mph) within 300 feet from shore (HAR §13-256-17). Although these rules are currently in place, many Wai‘anae residents have observed that the total number of thrill craft launched from the Wai‘anae Boat Harbor is increasing, with many operating illegally within 500 feet of the shore.

Figure 5.3 Map of the Wai'anae Coast Showing Location of Commercial and Public Ocean Uses

5.4 Commercial Fishing

Skipjack tuna or aku (*Katsuwonus pelamis*) is the top species landed in this district, and the small fleet of aku pole and line fishery (currently three vessels) lands more than 1 million pounds of fish from Hawaiian waters, as shown in Figure 5.4. Yellowfin (*Thunnus albacares*) and bigeye ahi (*Thunnus obesus*), akule (*Selar crumenophthalmus*) and blue marlin (*Makaira mazara*) are also caught in greater numbers than at most places in the state (DLNR 2001) a result mostly of the comfort of fishing in the calm lee of the island and the convenience of deep waters close to shore.

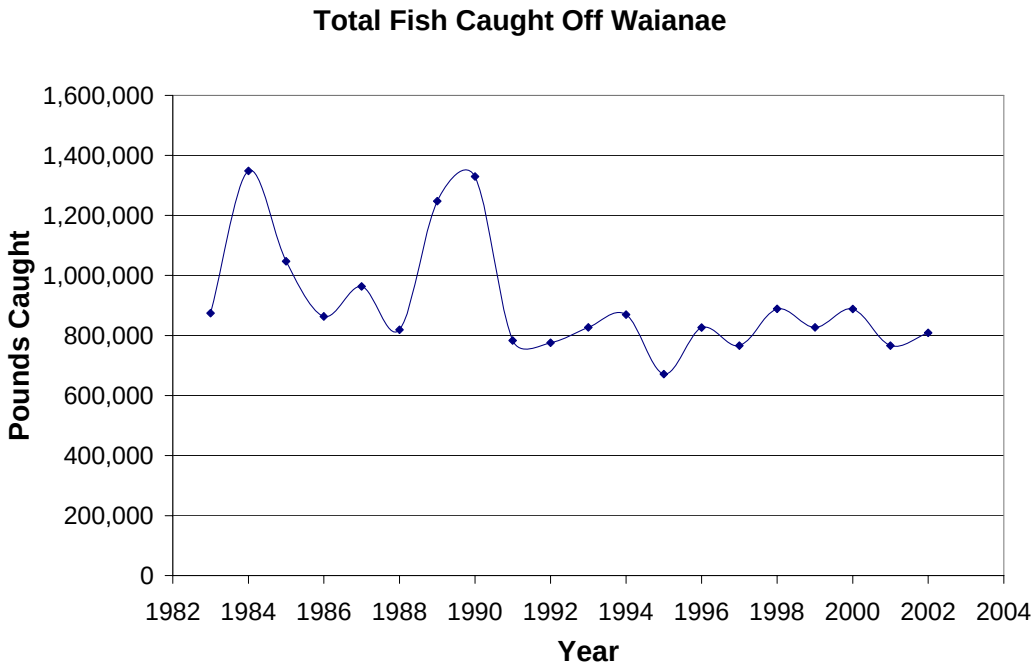

Figure 5.4 Total Pounds of Fish Caught off Wai‘anae, 1983 to 2002 (DAR 2005)

5.4.1 Akule and ‘Ōpelu Fishing

Commercial catch data for the nearshore waters of Leeward O‘ahu (Areas 402 and 403) indicate that ‘ōpelu and akule are caught year round, with peak landings in the spring (DAR 2005). In 2006, 48,522 pounds of akule and 115,063 pounds of ‘ōpelu were commercially caught in these nearshore waters (DAR unpublished data). This total constitutes 9 percent of akule and 36 percent of ‘ōpelu catch island-wide for 2006. A number of the fishermen are members of the Wai‘anae community, although fishermen come from all parts of O‘ahu to participate in the commercial akule and ‘ōpelu fishery. In all, approximately six active commercial fishing vessels participate in each of the akule and ‘ōpelu fisheries (W. Aila, pers. comm.).

5.4.2 Other Commercial Fishing Activities

Fish Aggregating Devices (FADs)

Pelagic fishes aggregate around logs, nets, and other debris floating on the sea surface. Fish aggregation devices, or FADs, are large buoys anchored at depth in open ocean to simulate floating debris and attract fish, making it easier for fishermen to find and catch them.

The first FADs were experimental floating rafts installed in 1977 by the NOAA's National Marine Fisheries Service (NOAA Fisheries). In 1980, the State of Hawaii's DAR designed, constructed, and deployed 26 FADs in waters around the main Hawaiian Islands. The FADs were located 2.4 to 25 miles offshore and in depths of 80 to 1,510 fathoms, as recommended by Hawaii's fishermen through statewide public meetings.

In 1996, the state FAD program came under the operation of the Hawai'i Institute of Marine Biology (HIMB), School of Ocean, Earth Science and Technology, of the University of Hawai'i, in cooperation with the DAR. Over the last 16 years, FAD design and deployment has been greatly improved to increase the life and effectiveness of the system. Currently, 55 FADs are monitored and maintained statewide (HIMB 2009). There are four FADs off the Wai'anae coast:

Buoy CO: Ka'ena Point at a depth of 1,010 fathoms
Buoy V: Mākua, at a depth of 309 fathoms
Buoy S: Pōka'ī Bay at a depth of 460 fathoms
Buoy R: Mākaha at a depth of 460 fathoms

Pelagic Fisheries

Commercial fisheries data from the state DAR ranks the waters off the Wai'anae coast first or second for total pounds of all species landed. In 2006, landings off the Wai'anae coast totaled 592,935 pounds, or approximately 10 percent of the total landings in MHI waters (DAR 2006). More than 200,000 pounds of this catch consisted of tuna and billfish. Skipjack tuna or aku (*Katsuwonus pelamis*) is the top species landed in this district, and the small fleet of aku pole and line fishery (currently three vessels) landed more than 600,000 pounds of fish from Hawaiian waters in 2006, although confidentiality of data restricts describing where the aku were caught (DAR 2006).

Bottomfish Fisheries

Although both commercial and recreational bottomfish fishing are important activities across the state, the waters off of the Wai'anae coast are not heavily used in this fishery. An average of 1,631 pounds of the "Deep 7" species (Opakapaka, Onaga, Lehi, Ehu, Hapu, Gindai, and Kalekale) combined are

commercially landed from waters off the Wai‘anae coast (DAR unpublished data).[2] This total constitutes approximately 0.3 percent of the total commercial “Deep 7” catch for all Hawaiian waters (DAR 2006).

Inshore Fishing

Although far fewer inshore reef fish are caught in Wai‘anae than in other sites around the islands, goatfish or weke (*Mulloidichthys* spp.) and the introduced blue-lined snapper or ta‘ape (*Lutjanus kasmira*) are taken in fairly large numbers (DAR 2006).

[2] Because of confidentiality requirements, meaning fewer than three individuals reported landings in any given month, commercial landings of the “Deep 7” bottomfish species are reported in 5-year trends.

6.0 ENVIRONMENTAL AND ANTHROPOGENIC STRESSORS ON OCEAN RESOURCES

This section describes environmental and anthropogenic stressors that are affecting or could affect ocean resources along the Wai‘anae coast. These stressors are highlighted as emerging management concerns for the coast.

6.1 Global Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level (IPCC 2007).” Furthermore, “[m]ost of the observed increase in globally-averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations (IPCC 2007).”

The best available estimate from the IPCC is that the global mean surface temperature will increase by about 0.5 to 2 °C (roughly 1 to 3.5° F) over the period from 1990 to 2050. This global phenomenon will affect or has the potential to affect Hawai‘i and the leeward coast through (1) sea level rise, with subsequent coastal erosion and saltwater intrusion into fresh groundwater supplies, (2) change in rainfall patterns that could cause either severe drought or coastal flooding, (3) warming of seawater and ocean acidification, causing coral bleaching, reduced coral growth, and other stressors that will severely impair the coral reef and associated ecosystem, (4) increased severity of storms from increased surface water temperature.

Increasing ocean temperature and ocean acidification are particularly significant stressors of ocean resources. Ocean warming directly reduces coral cover through coral bleaching. Bleaching occurred throughout the state in 1996, with the most severe impact on O‘ahu reefs (Jokiel and Brown 2004). Much of this bleaching occurred in the shallow waters of Kane‘ohe Bay, which experiences reduced water movement. Mass coral bleachings also occurred in the Northwestern Hawaiian Islands in 2002 (Aeby and others 2003) and 2004 (Kenyon and Brainard 2006), associated with an El Niño phenomenon. Coral bleaching occurs when the ocean temperature rises above a threshold that stresses coral polyps, causing them to expel their symbiotic zooxanthellae, often leading to coral death.

The increase of atmospheric carbon dioxide concentration caused by burning fossil fuels also increases its absorption into the ocean, making the ocean more acidic. Approximately 25 percent of the carbon dioxide that enters the atmosphere ultimately passes to the ocean in the form of carbonic acid. Between 1751 (the start of the industrial revolution and its concurrent burning of fossil fuels) and 1994,

the surface pH of the ocean is estimated to have decreased from approximately 8.179 to 8.104 (Orr and others 2005, Key and others 2004). Although this decrease in pH may appear minor, several experiments have demonstrated that even modest decreases in pH can slow coral growth and make the secretion of their carbonate skeleton energetically more costly. In addition to bleaching, sea level rise, and disease, this change in pH compounds the coral reef's existing natural stress from storm events, predation, and competition with other organisms.

6.2 Ocean Tourism and Recreation

Recreational overuse is considered one of the six primary threats to the health of coral reef ecosystems in Hawai'i and the U.S (NOAA 2002). Ocean recreation is increasing in Hawai'i as a result of population growth and the demand for new products and destinations in a mature tourism market (Hillel 2006).

Coral reefs around the world attract tourists for snorkeling and diving. Historically, ocean tourism has been considered low impact compared with fishing or other ocean extractive activities. Many studies have provided evidence, however, that ocean recreation can result in a number of impacts to the marine environment. Impacts of ocean recreation on coral reef ecosystems include:

- Physical damage to the coral skeleton and tissue from snorkeling, diving, and anchoring;
- Behavior modification of marine life from human presence or harassment, such as fish feeding or disturbing threatened and endangered species;
- Water pollution from improper waste disposal and bilge water discharges from boats; and
- Spread of invasive marine species from boat hulls, diving gear, and bilge water.

Ocean recreation results in additional stress to the already compromised health of many coral reef ecosystems degraded from a variety of other stressors, including land-based pollution, overfishing, marine invasive species, and global climate change.

6.2.1 Physical Damage from Snorkelers and Divers on Coral Reefs

Snorkelers and divers may damage coral reefs through direct physical contact. The impact of SCUBA diving and snorkeling on substrates was surveyed in Hawai'i Marine Life Conservation Districts (MLCD) at Honolua-Mokuleia, Kealake'akua Bay, Manele-Hulopoe, and Pupukea by Holland and Meyers (2003). Divers were followed and observed to record the number of contacts with different substrate types and the impact of those contacts. Rates of substrate contact and coral damage observed were low, 0.7 percent of all substrate contacts, compared with studies from other geographic regions and considering the relatively high number of annual visitors (up to 100,000) to MLCDs in Hawai'i. Snorkeling, the dominant activity at all sites, had significantly less interaction with the substrate on average than SCUBA divers.

Holland and Meyer (2003) quantified habitat use patterns and impacts for snorkelers and divers. Most of the snorkeling and SCUBA diving was concentrated within an area of 59,600 square meters (m^2) representing 33 percent of the total Mokule'ia-Honolua MLCD and 55 percent of Honolua Bay. The reef area along the north side of the bay, an area of 6,800 m^2, was the most intensely used area of the bay for snorkeling and SCUBA diving, representing 11.4 percent of the total reef area within Honolua Bay. The majority of substrate contacts, 73 percent, were clustered along the boulder shoreline where snorkelers entered and exited the water. The average total number of substrate contacts at Honolua Bay was 3.1 per dive and 5.9 per hour, with 12.9 percent of the total contacts made on live coral.

More than half of the 1,340 total substrate contacts observed in the study were made by only 16 percent of the individuals. The majority of coral breakage was unintentional contacts by inexperienced snorkelers and SCUBA divers. Holland and Meyer (2003) concluded that human impacts were minor at the four MLCDs investigated, despite the relatively high use (up to 100,000 snorkelers per year) of these areas.

Holland and Meyer (2003) further concluded that snorkeling and SCUBA diving at Honolua Bay were sustainable. They found that the majority of the contacts between snorkelers and the substratum, 73 percent of the total contacts, occurred in shallow depths around the bay perimeter on entry and exit to the water and on top of reefs. The average substrate contacts by snorkelers and SCUBA divers combined was 6.1 contacts per dive and 3.1 contacts per hour. Substrate contact levels at Honolua Bay were significantly lower than the other sites studied. The incidence of contact with live coral was about 12.9 percent of the total contacts around the reef perimeters in Honolua Bay. Although benthic assemblages at Honolua Bay contained relatively fragile coral species, these corals grew at deeper depths, and so were not influenced by snorkeling. Holland and Meyer (2003) concluded; however, that a significant increase in number of SCUBA divers visiting Honolua Bay should be avoided because of the likelihood that damage would increase to susceptible coral species during dives.

The behavior of individual snorkelers and SCUBA divers was considered an important factor in assessing the overall impact of recreational activities on living coral reef cover (Holland and Meyer 2003). Underwater photographers supported the highest substrate contact rates, both unintentionally and intentionally. As noted by Holland and Meyer (2003) and this study, snorkelers stand on corals unaware that it is a living organism that can be damaged or because they are tired or inexperienced. Most coral damage was identified as unintentional; however, deliberate damage was observed in several cases.

Diver carrying capacity is usually expressed as a maximum number of divers per site per year that a site can sustainably support without becoming degraded (Jameson 1999). Salm (1986) introduced the

concept of diver carrying capacity. Estimates of the maximum annual number of SCUBA divers that can be sustained at a dive site without damaging corals vary by an order of magnitude, from 500 (Chadwick-Furman 1996) to 4,000 to 6,000 (Dixon and others 1993; Hawkins and Roberts 1997; Hawkins and others 1999; Zakai and Chadwick-Furman 2002). In selected areas, the number of divers could be as many as 10,000 to 15,000 per year (Hawkins and Roberts 1992). Hawkins and Roberts (1997) suggest 5,000 to 6,000 dives per site per year as a good rule of thumb in the absence of site-specific data. The large range in the number of divers per year that can be sustainably accommodated is related to a number of factors, including site characteristics, coral type and species, and behavior of individual divers (Medio and others 1997; Rouphael and Inglis 1997, 2001; Jordan and Samways 2001).

6.2.2 Behavior Modification and Disturbance to Marine Life

Feeding has been shown to produce changes in fish behavior (Orams 2001), including aggression toward humans, changes in foraging patterns and home range, reproductive activity, population density, migration patterns, and species composition caused by an increase in the larger, more aggressive species.

New threats to cetaceans have arisen with the expansion of the whale-watching industry. The pursuit and close approach of boats and swimmers to whales and dolphins may have negative impacts on cetacean health and behavior. Examples include long-term displacement from preferred habitat, chronic or acute stress, disruption of feeding and group cohesion, change in swim speed or direction, and change in surfacing, breathing, or dive patterns. Encounters with humans at resting sites may have a significant effect on the spinner dolphins' ability to rest. A study off Maku'a beach on O'ahu suggests that the presence of swimmers in the morning may delay and compress the period of rest for the local population of spinner dolphins (Danil and others 2005). In addition, the dolphins departed earlier from the area as the number of swimmers increased. Researchers have also found that resting spinner dolphins in Hulopoe Bay, Lana'i could be easily disturbed by approaching swimmers and boats and that a single swimmer could repeatedly disturb a school (Driscoll-Lind and Östman-Lind 1999). In addition, they reported that it was likely that, in some areas, humans would try to approach and interact with schools of spinner dolphins during most of their resting period. Two recent studies reported that spinner dolphins in Kealake'akua Bay prematurely curtailed resting during repeated boat and swimmer approaches (Würsig 1996; Courbis 2007).

6.2.3 Impacts of Anthropogenic Noise on Marine Mammals

Marine mammals are affected by human-produced underwater noise. Sources include transportation (such as boats, helicopters, and fixed-wing aircraft), offshore drilling, seismic surveys, explosions, dredging, construction, and sonar. The effects on marine mammals include temporary loss of hearing, permanent loss of hearing, disruption of foraging or resting, disruption of communication, change in

directional course, change in habitat use, stranding, and chronic or acute stress; all of which can lead to reduced fitness and reproduction, disease, and death. In 2004, more than 150 melon-headed whales (typically deep-water species) congregated in the shallow waters of Hanalei Bay, Kaua‘i. The whales remained in the bay for approximately 24 hours until they were gently urged back to the open ocean by stranding responders. Although the exact cause of this unusual event was not identified, scientists concluded that U.S. Navy sonar exercises may have contributed.

6.3 Fishing

6.3.1 Overfishing

The Pacific Islands Fisheries Science Center of NOAA Fisheries has been responsible for conducting stock assessments, identifying overfishing parameters, and assessing the health of the commercially valuable bottomfish stocks for more than 20 years. Bottomfish stocks in the MHI are under tremendous fishing pressure and are considered at or approaching both an overfished condition (low total biomass) and in a state of overfishing (too many people fishing) (Figure 6.1). This finding prompted state and federal fishery managers in 2007 to implement a seasonal closure in the MHI from May 10 to September 30. This seasonal closure was extended in 2008 between May 1 and August 31. The regulations were ordered to prevent continued overfishing of the species until a long-term management program is developed and implemented. In addition, the state currently has 12 bottomfish restricted fishing areas (BRFAs) that continue to be closed to bottomfishing during the open season (between September 1 and April 30). One of these, BFRA-D, occurs north of Ka‘ena Point (Figure 6.2).

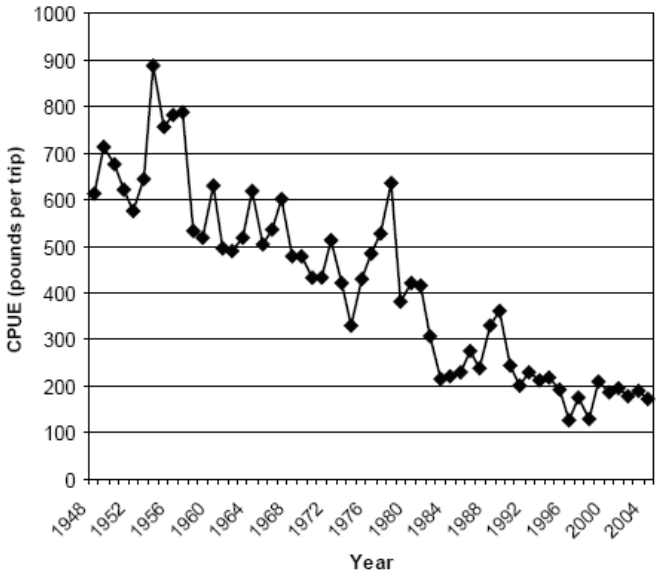

Figure 6.1 MHI Bottomfish Catch Per Trip (CPUE) by Year (Moffitt and others 2004)

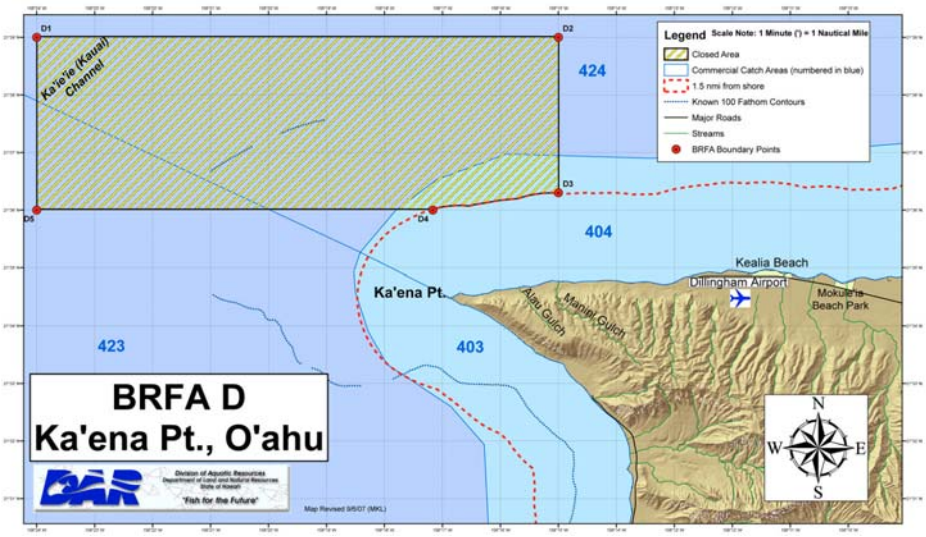

Figure 6.2 Bottomfishing Restricted Area

6.3.2 Fishery Interactions with Marine Mammals

Fisheries can also have a negative impact on cetacean populations. Equipment used to catch fish (including hooks, lines, nets, floats, and traps) has the potential for injuring or ensnaring whales and dolphins. Entanglement in fishing gear results in reduced fitness, increased stress, and even death (from chronic infection or drowning). Information on fisheries-related cetacean mortality in Hawaiian waters is limited, but the gear that is used in Hawaiian fisheries is known to injure and kill marine mammals in other U.S. fisheries. For example, observations of the set gillnet fishery in California (1990 to 1995) found that only five out of 1,263 entangled mammals were released alive (Julian and Beeson 1998). In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993), but no estimate of annual human-caused mortality and serious injury is available because the nearshore gillnet fisheries are not observed or monitored. New regulations on nearshore stationary gill nets (lay nets), enacted in 2007, require inspection every 2 hours to facilitate the live release of any entangled threatened and endangered species, and retrieval every 4 hours. Each fisher may deploy only one lay net at a time (HAR 13-75).

6.4 Other Stressors

Coastal pollution and infectious diseases, transmitted by domesticated animals via freshwater runoff, are an increasing threat to the health of marine mammals. During the 1990s (1992 to 1999), infectious diseases and biotoxins were the dominant diagnoses of the documented unusual mortality events (UMEs) that affected marine mammals in the U.S. In the main Hawaiian Islands, exposure to a number of infectious diseases (*Chlamydophilus abortus, Sarcocystis neurona, Taxoplasma gondii, and E. coli)*

has been observed in monk seals. Spinner dolphins have not been tested for these diseases, but their use of nearshore habitats puts them at risk of exposure.

Coastal water bodies that do not meet state water quality criteria are listed as impaired water bodies on the Hawai‘i Department of Health’s 303(d) List of Impaired Waters (Hawai‘i State Department of Health 2006). Along the Wai‘anae coast, the open coastal waters of Hawaiian Electric Beach and the open coastal and oceanic waters of Pōka‘ī Bay are listed as impaired water bodies.

Marine debris is another issue in Hawaiian waters. Plastics and derelict fishing gear can be particularly harmful. A recent study in the Hawaiian Archipelago found plastic debris on all of the nine beaches (on Hawai‘i, O‘ahu, Moloka‘i, French Frigate Shoals, and Midway) that were sampled. Ingestion of plastics can have harmful effects such as diminished food consumption, loss of nutrition, internal injury, intestinal blockage, starvation, and death of marine organisms. Plastic particles do not biodegrade and may be passed up the food chain, transferring chemical pollutants to organisms including cetaceans. Derelict fishing gear is a particular problem in the northwest Hawaiian Islands. During a removal effort from 1996 to 2000, more than 63 tons of derelict fishing gear was collected within a 9-square-km area of reef.

7.0 RULES AND TOOLS FOR MANAGING OCEAN USE

The legal impetus for establishing a management regime to address conflicts in ocean use along the Wai‘anae coast was Act 6, Special Session Laws of Hawai‘i 2005. This act directed the DLNR to establish an ORMA in the waters along the west coast of O‘ahu (see Section 1.2 for background on Act 6). An ORMA and its accompanying administrative rules would limit the locations, times, and types of permitted ocean recreation. Recognizing the potential for alternative management approaches to resolving ocean use conflicts, the act required a baseline environmental study to describe and analyze the effects of various alternatives to an ORMA. This section describes the regulatory framework and management tools available at the federal, state, and county levels to manage ocean recreational use.

7.1 Legal and Regulatory Framework and Responsibilities

The state and county establish legal and regulatory measures to manage ocean use (Table 7.1). The management goals differ for each type of regulatory measures.

The primary regulatory tool for managing conflicts in ocean use in the state is the ORMA (Table 7.1). State waters are designated as either ORMAs or non-designated ORMAs. The management goal of an ORMA is to reduce conflicts between ocean users. Currently, the leeward coast of O‘ahu is a non-designated ORMA. In addition, small areas of ocean waters can be designated for special uses such as swimming and canoeing.

Conflicts in ocean use will need to be addressed by a range of strategies and actions planned and implemented through the combined efforts of a number of public and private-sector entities (Table 7.2). DLNR is the primary agency responsible for managing ocean resources and resource uses in state waters and for enforcing state rules and regulations. When proposals for commercial activity are submitted or management actions on state-owned lands and waters are considered, the Board of Land and Natural Resources policy dictates that DLNR will use the following hierarchy of priorities:

- Natural or Cultural Resources – The highest priority should go to conservation of the resource. Only if the activity can be carried out in a way that does not unduly damage the resource should it be allowed.
- General Public – If use or activity by the public can be carried out without undue damage to the resource, it should be the next priority
- Commercial activities – Commercial activities should be considered only if their impacts do not impinge on the two previous priorities

Although the DLNR has a central role in managing ocean recreational use, other agencies and organizations, such as USCG, NOAA, community groups and nongovernmental organizations, commercial tour operators, and private land owners and developers, have roles and responsibilities. Some of the roles and responsibilities of these groups are summarized in Table 7.2.

Table 7.1 State and County Regulatory Tools to Manage Ocean Resources and Use Conflicts along the Waiʻanae Coast

Tools	Management Goals	Features	Implementing Authority/ Arrangements	Examples
Non-Designated Ocean Recreation Management Area (§13-256)	• Establishes rules for all other waters (not designated as ORMAs) within 3,000 feet seaward of the base line of the territorial sea	• Recreational thrill craft operators may operate in state waters only between 500 feet from the shoreline and 2 miles offshore • Commercial thrill craft operations prohibited	DLNR, requires DLNR to maintain a Recreation Advisory Committee(§13-256-3(b)	Leeward Oʻahu
Designated Ocean Recreation Management Area (ORMA) (§13-256)	• Reduce conflicts among ocean water users, especially in areas of high activity • Establishes spatial boundaries and use zones	• Recreational and commercial thrill craft operations restricted so specific spatial zones • Access to and from designated operating areas must be the most direct route, and thrill craft operators may not exceed slow-no-wake speed when within 300 feet of the shoreline	DLNR, requires DLNR to maintain a Recreation Advisory Committee(§13-256-3(b)	West Maui ORMA(§13-256:64); Windward Oʻahu ORMA (§13-256: 71-77)
Local and Special Rules – Ocean Waters (§13-244)	• Reserves ocean waters for specific uses such as swimming and bathing, outrigger canoe activity • Restricts other uses within these areas	• Specific features vary by site	DLNR	Pokai Bay (§13-244:33)
Fishery Management Area	• Manage fishing in specific locations through restrictions on species, number, sizes and prohibitions	• Specific features vary by site	DLNR	Pokai Bay (§13-188-36); Kealakekua Bay (§13-244:30)
Marine Life Conservation District	• Protect marine ecosystem diversity and health through area specific restrictions on use	• Specific features vary by site	DLNR	Honolula Bay, Maui
Commercial Ocean Recreational Activity (CORA) permits	• Manage commercial activity in County beach parks	• Establishes requirement for CORA permits	County	Maui County

Table 7.2 Roles and Responsibilities for Managing Ocean Recreational Use off Waiʻanae

Agency/ Organization	Roles and Responsibilities
US Coast Guard	• Ensure ports, waterways and coastal security • Maintain aids to navigation • Conduct boat inspections and issue certificate of inspection to commercial and private vessels • Conduct at-sea safety inspections of all types of vessels • Enforce maritime and fisheries laws • Perform search and rescue
National Oceanic and Atmospheric Administration	• Manage commercial and recreational uses related to marine mammals under the authority of the Marine Mammal Protection Action • Manage fisheries in federal waters
Hawaiʻi State Department of Land and Natural Resources	• Review and issue Conservation District Use Permits (CDUP) • Enforce ORMA, MLCD and natural resource regulations • Establish and manage ocean recreational management areas (ORMA) • Establish ocean use rules and regulations including prohibitions fish feeding • Issue and review permits for commercial tour boat operators, surf schools, and land-based commercial recreational operations • Establish limits on the number of permits and specific conditions to protect sensitive environments • Establish and implement regulations on safe boating, including mooring use • Monitor recreational use and marine ecosystem status
Hawaiʻi State Department of Transportation	• Maintain state highways with appropriate rules, signage, and other features to protect the public from hazardous road conditions • Establish prohibitions for parking along state highways
Hawaiʻi State Department of Health	• Monitor coastal water quality conditions • Determine if water quality conditions exceed state standards • Establish total maximum daily load allocations to improve water quality
County and County of Honolulu	• Regulate commercial ocean recreational activity through permits and prohibitions for county beach parks • Review special management area permits
Community groups and non-governmental organizations	• Report violations of ocean-related regulations to appropriate authority • Conduct education campaigns to increase awareness of residents on rules and regulations on ocean recreational use and resource protection • Provide volunteers to support beach cleanups and other community stewardship activities • Provide technical assistance and funding for management interventions
Commercial Tour Operators	• Conduct safe and environmentally-sound tourism operations • Conduct operations in a culturally appropriate manner • Comply with all relevant federal, state, and local laws and permit terms and conditions • Conduct educational briefings for visitors aimed at increasing awareness of environmental and cultural values and reducing impacts on the marine ecosystem
Private Developers/ Landowners	• Comply with all federal, state, and county laws, rules, and regulations • Provide public access to beaches and coastal areas • Minimize impacts of development on the ecosystem

7.2 Supporting Management Tools

Laws and regulations alone will not resolve conflicts in ocean resource use. Other management tools are needed to support voluntary compliance with regulations and to provide sound information and data to facilitate adaptive management.

7.2.1 Community Participation and Stewardship

Community participation in management is essential for promoting sound use of ocean resources. Trained community groups and organizations working in partnership with government agencies are capable a wide range of stewardship activities that can support ocean resource management. For example, DLNR's Makai Watch program provides opportunities to engage the community and assist the government in enforcing regulations on ocean use.

7.2.2 Public Education and Outreach

Public education and outreach are powerful management tools that increase awareness of citizens on ocean use issues and promote voluntary compliance. A combination of methods, including websites, talk story sessions, training workshops, and booklets, are needed depending on the subject and the stakeholder group.

7.2.3 Research and Monitoring

Research and monitoring are essential elements of ocean resource management. Scientific studies can provide site-specific data on human-caused impacts of ocean resources. These data are critical to develop management measures for existing and emerging issues. Long-term monitoring studies provide information on the status and trends in ocean resource conditions and uses to inform management decision-making. The Coral Reef Assessment and Monitoring Program is one of the few long-term monitoring efforts on ocean resource conditions in the state.

7.2.4 Place-Based Planning

Community and place-based planning provides an opportunity for a community to define goals and address issues of relevance to a specific area. The community vision defined through development of the Wai'anae Sustainable Communities Plan is

> *a community living by values and customs that are firmly embedded in the rural landscape, the coastal shorelands, the ocean waters, the forested mountains, the diversity of cultures, the warmth of family and friends, and the Wai'anae traditions of independence, country living, and aloha.*

Other plans and programs at the state and county levels can also serve as a framework to address ocean use conflicts (Table 7.3).

Table 7.3 Hawai'i State and City and County of Honolulu Plans as a Framework to Address Commercial and Recreational Ocean Use Conflicts

Policies and Plans	Relevant Plan Vision and Goals
Wai'anae Sustainable Communities Plan County	• Vision: A community living by values and customs that are firmly embedded in the rural landscape, the coastal shorelands, the ocean waters, the forested mountains, the diversity of cultures, the warmth of family and friends, and the Wai'anae traditions of independence, country living, and aloha • Recognize traditional ahupua'a land divisions of the Wai'anae coast and adapt the ahupua'a concept as a framework for planning • Special attention should be given to protection and preservation of Wai'anae's coastal resources, including beaches and coral reefs o Preserve all lands north of Kepuhi Point as open space lands o Restrict coastal urban/suburban or resort development makai of Farrington Highway o Plan and implement safety improvements and beautification programs for Farrington Highway to bring the community closer to the beaches and coastline
Wai'anae Watershed Management Plan Honolulu Board of Water Supply	• Goal: to formulate an environmentally holistic, community-based, and economically viable watershed management plan that will provide a balance between: (1) the preservation and management of O'ahu's watersheds, and (2) sustainable groundwater and surface water use and development to serve present users and future generations o Promote sustainable watersheds o Protect and enhance water quality and quantity o Respect Native Hawaiian rights and traditional and customary practices (Water Code prioritizes instream uses and water for traditional and customary rights and domestic use as public trust uses having higher priority than agricultural and commercial uses of water (§174C-101)) o Facilitate public participation, education, and project implementation
Hawai'i Ocean Resources Management Plan Hawai'i CZM Program	• Preserve our ocean heritage o Improve the health of coastal and ocean resources for sustainable traditional, subsistence, recreational, and commercial uses ▪ Develop ecosystem-based approaches for nearshore fisheries management ▪ Improve enforcement capacity and voluntary compliance with existing rules and regulations for ocean resource protection ▪ Enhance the conservation of Hawaii's marine protected species, unique habitats, and biological diversity o Promote appropriate and responsible ocean recreational and tourism that provide culturally informed and environmentally sustainable uses for visitors and residents ▪ Develop community-based frameworks and practices for identifying and mitigating ocean recreational use conflicts ▪ Promote responsible and sustainable ocean-based tourism
Hawaii's Local Action Strategy to Address Recreational Impacts to Reefs Multi-Stakeholder	• To determine the impacts of marine recreation activities on Hawaii's coral reef ecosystems and develop innovative management techniques that increase the environmental sustainability of those activities o Data Objective – improve understanding of impacts of moorings, cruise ships, artificial reefs, kayaks, underwater recreation, and jet skis on reef health and provide scientific data for management decisions o Management Objective – to implement management tools (regulations and infrastructure) to support a reefs carrying capacity or control user behavior at various sites o Outreach Objective: improve awareness and engage stakeholders in reef education, monitoring, and stewardship efforts

Place-based management plans for ocean resources provides an important opportunity to engage the community in managing a specific coastal area. The Wai'anae coast maintains many distinctive features as an ocean recreational area. Seabirds, sea turtles, and a variety of marine mammals are found all along the coast. Spinner dolphins, humpback whales, and other marine mammals use the area for resting, foraging, and nursing young. The northern end of the coast, from Kepuhi Point to

Ka‘ena Point, has abundant wildlife and cultural significance. Generally calm sea conditions are conducive to snorkeling and SCUBA diving. Improved area management is needed to minimize current impacts of recreational use and to proactively address future threats to preserve these features and guide ocean recreational use in line with community’s vision. Illustrative management goals to preserve these values along the Wai‘anae coast are listed in Table 7.4, along with indicators to measure long-term trends. Monitoring studies, needed to measure change over time, are largely absent along the Wai‘anae coast.

Table 7.4 Illustrative Management Goals and Indicators for Long-term Monitoring

Management Goals	Indicators to Monitor Achievement of Management Goals
Minimize ecological impacts of ocean resource use and other stressors to the marine ecosystem	▪ Average number of substratum contacts by divers and snorkelers per hour in high-use areas ▪ Long-term trends in percent living coral cover and coral reef species diversity in selected sites along the coast ▪ Presence, distribution, and abundance of invasive marine species ▪ Marine water quality
Protect special status marine species	▪ Number, location, and behavior of spinner dolphins, humpback whales, and other marine special status species along the coast ▪ Number of human interactions with threatened and endangered species and marine mammals
Ensure traditional nearshore fisheries are sustained to provide livelihood and subsistence	▪ Catch per unit effort aggregated in smaller reporting areas to enable analysis of changes in distribution and behavior of akule, opelu, and other species along the coast ▪ Biomass, density, and other fishery independent measures of fish stock and productivity needed for akule, opelu, and other species important for commercial and recreational fishing
Preserve rural setting and scenic vistas	▪ Area of land by land use categories (for example, agricultural, conservation, urban, or military) ▪ Area and length of coastline preserved as scenic vistas and “wilderness” setting along the coast and especially from Kepuhi Point to Ka‘ena Point ▪ Coastal bluffs and associated endemic species set aside from development
Preserve Native Hawaiian cultural practices in coastal areas	▪ Awareness levels of Native Hawaiian culture ▪ Native Hawaiian cultural practices in coastal areas
Provide positive, safe, and ecologically and culturally appropriate recreational experiences for residents and visitors	▪ Number commercial ocean tour operators (SCUBA, marine mammal watching, and snorkeling), average annual number of passengers, and areas frequented ▪ Visitor satisfaction as a percent of respondents on surveys ▪ Incidence of reported accidents and safety issues ▪ Awareness levels of special status species and marine ecosystems and appropriate behavior

8.0 OCEAN RECREATION MANAGEMENT ALTERNATIVES

Alternative management regimes to address conflicts in ocean use along the Wai‘anae coast were developed considering the purpose and need described in Section 1.1, using available regulatory and non-regulatory management tools described in Section 7, and examples provided in Act 6. Ocean recreation management alternatives include the status quo, or No Action alternative, and three management alternatives. The key provisions of each alternative are compared in Table 8.1.

Table 8.1 Comparison of Key Provisions of Ocean Recreation Management Alternatives for the Waianae Coast

Provision	No Action Alternative	Alternative 1	Alternative 2	Alternative 3
Maintain Non-Designated ORMA	●	●		
Maintain Gentlemen’s Agreement	●			
Establish Ocean Users Code of Conduct (based on modified Gentlemen’s Agreement)		●		
Designate ORMA based on Ocean User Code of Conduct			●	●
Require all commercial tour vessels to obtain a permit to operate within the ORMA with specific permit conditions on type of services and area of operation			●	●
Establish cap on number permits and capacity of commercial tour operators operating within the ORMA			●	●
Establish Marine Life Conservation District from Kepuhi Point to Ka‘ena Point prohibiting all commercial activities				●

8.1 No Action Alternative: Maintain Non-Designated ORMA and Existing Gentlemen’s Agreement

Under the No Action alternative, the existing non-designated ORMA together with the Gentlemen’s Agreement would be used to minimize conflicts in ocean use (Figure 8.1). Ocean recreational activities off the Wai‘anae coast would continue with minimal regulation and management and would continue to operate under the rules of a non-designated ORMA (Table 8.2). The non-designated ORMA currently prohibits commercial use of controlled ocean sports (jet ski, wave runner, and high-speed boating) and restricts recreational thrill craft to operate in state waters from 500 feet from the shoreline to 2 miles offshore.

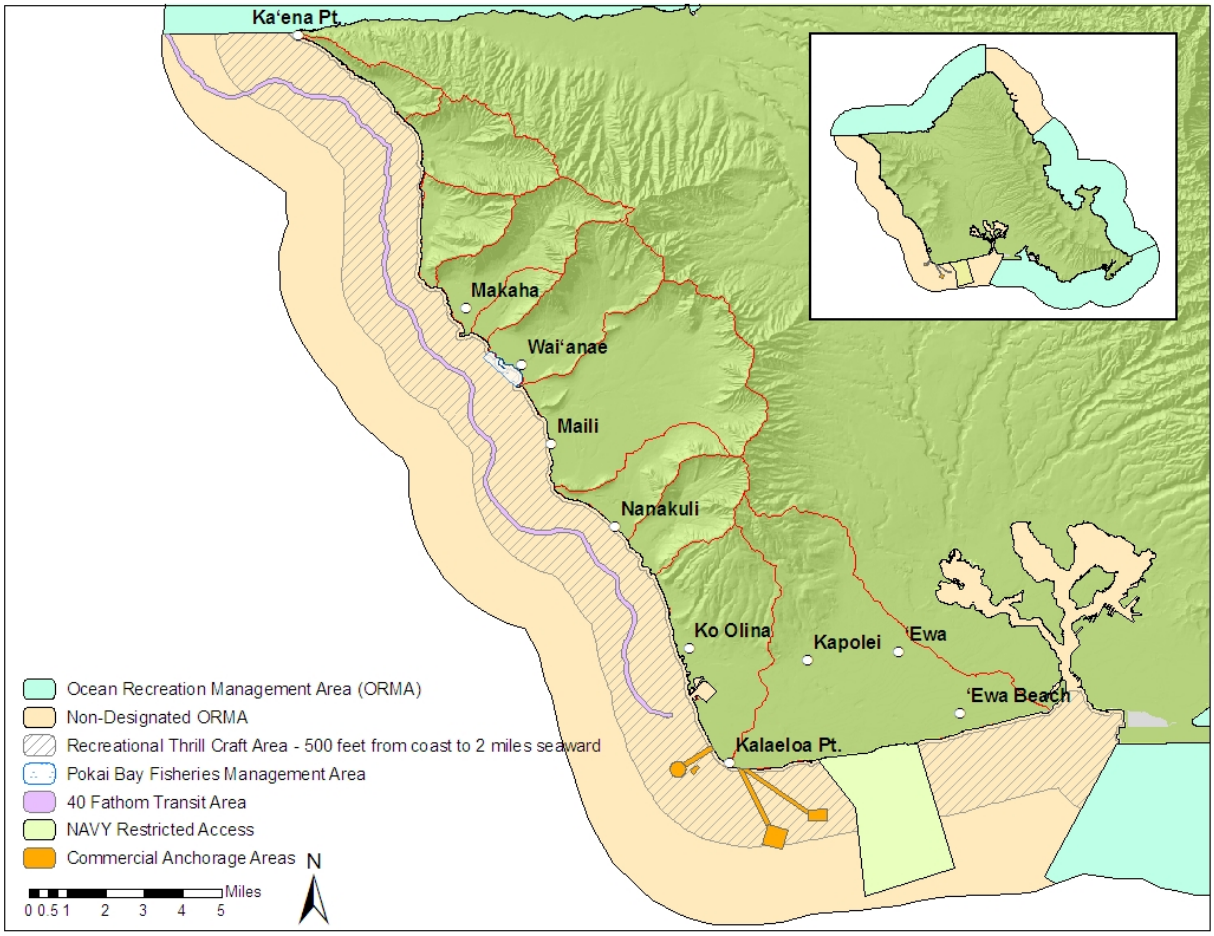

Figure 8.1 Spatial Aspects of the No Action Alternative: Non-designated ORMA and Gentlemen's Agreement

The provisions of the existing Gentlemen's Agreement (Table 1.2) developed by the 2005 task force would remain in place as a non-regulatory management tool for resolving conflicts in ocean use along the Wai'anae coast. Conflicts in ocean use between fishermen and commercial tour operators would be expected to continue as a result of inconsistent application of the provisions of the Gentlemen's Agreement. Conflicts between various ocean users would continue to be resolved on an ad hoc basis without establishment of the Leeward Coast Advisory 'Ohana.

In 2005, "Act 6 placed a moratorium on the issuance of new commercial vessel permits in state small boat harbors involving ocean-related activities for ocean waters between Kalaeloa Point and Ka'ena Point until the boundaries of a Kalaeloa to Ka'ena ORMA are designated and administrative rules on recreational boating activities and commercial vessel activities are adopted" (DLNR Report to the 24th Legislature 2008 Regular Session). Although this moratorium holds the number of commercial tour operations based out of state harbors to 2005 levels, the number of commercial ocean tour operators continues to increase with increasing tourism and marina development along the leeward coast. Under

the No Action alternative, DLNR only regulates the number of permits for vessels using state facilities to launch or dock. Permitting would continue to be used primarily as a revenue-generating mechanism and not as a tool to manage impacts on ocean resources and conflicts between ocean users by limiting the number of permits, incorporating specific permit conditions, and applying and enforcing these permits. Commercial tour operators based in privately owned harbors would continue to be excluded from DLNR requirements to obtain permits to operate in state waters. New entrants would be able to operate their businesses from these harbors.

Table 8.2 No Action Alternative: Non-designated ORMA and Gentlemen's Agreement

Non-Designated ORMA
• Non-Designated ORMA currently: o Establishes rules for all other waters (not designated as ORMAs) o Prohibits commercial use of controlled ocean sports o Restricts recreational thrill craft (jet ski, wave runner, and high-speed boating) to operate in state waters from 500 feet from the shoreline to 2 miles offshore
Gentlemen's Agreement
• Applies from Barber's Point to Ka'ena Point (areas 402 and 403) • Operators and researchers must be sensitive while traveling along the coast and work closely with fishing vessels • Normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions • Enter into areas at right angles from offshore to inshore • Works closely on radio channels 78a/68 to minimize conflicts • Work closely with other marine mammal watching vessels on channel 78a • Pass location of dolphin pods to other interested parties • Approach and observe dolphin areas smoothly, quietly, and slowly • Be conscious and watch for swimmers and divers while traveling en route and at site • Work closely with dive vessels • Log activity, amount, direction of travel, type of animal, and daily logs • Pass information along to University of Hawai'i • Communicate with fisherman • Do not pass inside of operating fishing vessel • Convene the Leeward Coast Advisory 'Ohana
Commercial Ocean Operator Permits
• Permit required only for commercial tour boats operating out of Wai'anae Boat Harbor (or launching at ramp), and some permits specify the types of services that can be offered • Commercial tour operators originating out of private harbors are not required to obtain permits from the state • Commercial ocean tour operators allowed to pick up and drop off passengers from beaches and other land-based access points, although usually passengers are loaded and unloaded from Wai'anae Small Boat Harbor and Ko Olina Marina • Commercial Marine License required for commercial fishing
Other Ocean Use Regulations
• Pōka'ī Bay Fishery Management Area (§13-188-36) o Sets gear restrictions for fish, crab, and shrimp for bait
• Pōka'ī Bay Special Ocean Waters (§13-244:33) currently designated two zones: o Zone A: Swimming o Zone B: Canoe paddling

8.2 Alternative 1: Maintain Non-Designated ORMA with Ocean Users Code of Conduct (Modified Gentlemen's Agreement) and Additional Management Measures

Under Alternative 1, the existing non-designated ORMA together with an Ocean Use Code of Conduct (modified Gentlemen's Agreement) and additional management measures would be used to minimize ocean use conflicts (Figure 8.2; Table 8.3). Ocean recreation off the Wai'anae coast would continue with additional regulation and management and would continue to operate under the rules of a non-designated ORMA as described in the No Action Alternative. The provisions in the Gentlemen's Agreement would be modified; however, to include additional commercial and recreational ocean users and address management goals related to resource preservation.

Federal guidelines for marine mammal watching would be incorporated into the Gentlemen's Agreement. Protocols would reinforce a hierarchal system where the first vessel governs access to an area. Fishing vessels would be required to fly a flag when fishing and report catch offshore of the leeward coast by smaller quadrants established by DLNR.

Permits would still be required only for commercial ocean tour boats operating out of state harbors, and no new permits would be issued per directive of Act 6. Commercial ocean tour boats operating out of private harbors, including the Ko Olina marina, would remain unpermitted, allowing for new commercial ventures to operate in the area of concern. Permitted ocean tour operators would be required to participate in annual orientation on the Code of Conduct, and unpermitted operators would be encouraged to do so as well. Additional resources would be allocated to develop and distribute public education and outreach on Code of Conduct and ocean regulations through the DLNR website and other mechanisms, as well as to increase seaborne enforcement presence by USCG and DLNR's Division of Conservation and Resource Enforcement (DOCARE) along the Wai'anae coast.

The Leeward Coast Advisory 'Ohana would be established by DLNR as a forum to discuss and resolve conflicts in ocean resource use. The harbor masters of the State Wai'anae Boat Harbor and Ko Olina Marina, USCG, and representatives from both DAR and DOBOR would be included as members of the group. The group would provide recommendations to DAR and DOBOR to revoke permits of commercial tour operators for noncompliance with the Gentlemen's Agreement.

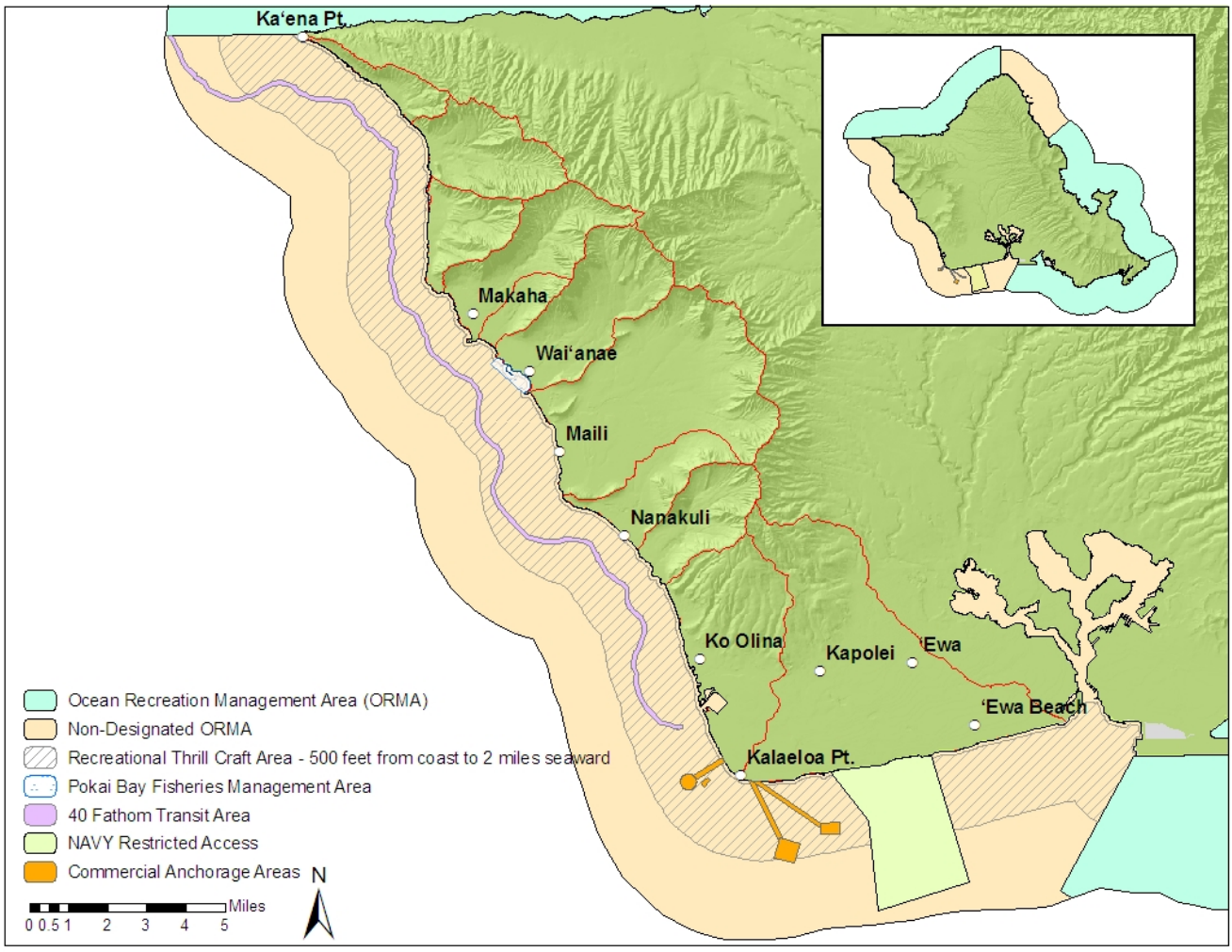

Figure 8.2 Spatial Aspects of Alternative 1: Non-Designated ORMA and Ocean Users Code of Conduct (Spatial Features are the Same as the No Action Alternative)

Table 8.3 Alternative 1 – Maintain Non-Designated ORMA with Ocean Users Code of Conduct and Additional Management Measures

Non-Designated ORMA

• Maintain Non-Designated ORMA as described in the No Action alternative
• Non-Designated ORMA currently:
  o Establishes rules for all other waters (not designated as ORMAs)
  o Prohibits commercial use of controlled ocean sports
  o Restricts recreational thrill craft (jet ski, wave runner, high speed boating) to operate in state waters from 500 feet from the shoreline to 2 miles offshore

Ocean Use *Code of Conduct* (Modified Gentlemen's Agreement)
Leeward Coast Advisory Ohana
• Establish a chartered advisory body, *Leeward Coast Advisory 'Ohana*, with a coordinator that is funded annually and conducts regular meetings and activities to serve as a mechanism to address potential future conflicts in ocean use and to provide recommendations to DLNR to revoke permits of repeat offenders • Expand recommended membership for the *Advisory 'Ohana* from existing Gentlemen's Agreement to include the harbor masters from Ko Olina Marina and Wai'anae Small Boat Harbor and representatives from the USCG, DAR, DOBOR, and police • Establish and maintain an updated *Commercial Ocean Users Directory for the Leeward Coast* with cellular phone numbers and radio frequencies used by commercial tour and fishing operators • Establish an *Ocean Use Incident Report Form* available on-line at DOBOR's website and in hard copy at the public library, boat harbor, satellite city hall, and police stations to register ocean use conflicts, safety incidents, and non-compliance with regulations and the *Code of Conduct* with the *Advisory 'Ohana* • Establish a process for the Coordinator to review complaint forms, meet with parties affected, and prepare an incident report for review by the *Advisory 'Ohana* • Encourage all commercial tour operators to participate in annual orientation on the *Code of Conduct* • Monitor compliance of ocean users with regulations and the *Code of Conduct* and make recommendations to DLNR to revoke commercial tour operator permits, harbor access, and other mechanisms, such as publishing an annual list of commercial tour operators with good compliance records • Conduct training of Makai Watch Network to monitor and report on violations of regulations and noncompliance with the *Code of Conduct* to the Advisory 'Ohana using the *Ocean Use Incident Report Form*
Makai Watch Network
• Establish a network of Makai Watch members along the leeward coast trained to monitor and report to the Advisory 'Ohana on potential violations to regulations and noncompliance with the *Code of Conduct* using the Ocean Use Incident Report Form • Conduct education and outreach activities to inform private recreational users of regulations and the *Code of Conduct*
Commercial Marine Mammal/Snorkeling Tour Boats

• Fly a dolphin flag
• Implement federal guidelines on marine mammal viewing, including:
  o Stay at least 100 yards from humpback whales
  o Stay at least 50 yards from dolphins
  o Move away cautiously if dolphins show signs of disturbance
  o Always put the engine in neutral when dolphins are near
  o Refrain from swimming with, touching, or feeding wild dolphins
• Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore
• Respect the hierarchy system where first vessel governs access: avoid areas where commercial fishing vessels are operating
• Use *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of fishing activity
• Adopt NOAA's Dolphin SMART Program to promote voluntary compliance
• Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Commercial Fishing Vessels
• Fly fishing flag

- Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore
- Respect hierarchy system where first vessel governs access: avoid areas where commercial marine mammal and snorkeling tours are operating
- Report fish catch by smaller reporting squares (smaller reporting areas would have to be established by DLNR)
- Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Commercial SCUBA Diving Charters

- Fly a dive flag
- Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore
- Use official day moorings
- Do not moor or enter when high surf advisories are in effect for west shores
- Do not alter any permanent moorings
- Do not feed fish
- Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Public Recreational Ocean Users

- Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions and enter into areas at right angles from offshore to inshore
- Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*

Commercial Ocean Operator Permits

- Permit required only for commercial tour boats operating out of Wai‘anae Boat Harbor (or launching at ramp), and some permits specify the types of services that can be offered
- Commercial tour operators originating out of private harbors are not required to obtain permits from the state
- Commercial ocean tour operators allowed to pick up and drop off passengers from beaches and other land-based access points although usually passengers are loaded and unloaded from Wai‘anae Small Boat Harbor and Ko Olina Marina
- Commercial Marine License required for commercial fishing

Other Management Measures

- Monitor and conduct studies on resource status and impacts of ocean use along the Wai‘anae coast to fill data gaps and improve management decision making
- Increase seaborne enforcement presence by USCG and DOCARE along the Wai‘anae coast
- Establish Makai Watch and train community to assist DOCARE
- Use DLNR website and other mechanisms to conduct regular public education and outreach on *Code of Conduct* and ocean regulations

8.3 Alternative 2: Designate an ORMA

Under Alternative 2, an ORMA would be designated to manage ocean recreational use to minimize use conflicts (Figure 8.3, Table 8.4). The ORMA would formalize through regulations some, but not all, of the provisions of the Code of Conduct described in Alternative 1.

The ORMA would extend from Ka‘ena Point to just north of Kalaeloa Point (Figure 8.3). The transit lane described in the Ocean Use Code of Conduct (and Gentlemen’s Agreement) would be formally established within the ORMA boundary. A public recreational thrill craft zone would be established in the ORMA. Commercial thrill craft and other controlled ocean sports would be prohibited by regulation in the ORMA.

Permits would be required for all commercial ocean tour boats operating within the borders of the ORMA, with the number of permits issued based on the existing number and capacity of boats capped as the 2008 baseline by this study. Permits would not be transferable, and permit conditions would stipulate the type of services offered. Research and monitoring on the impacts of ocean recreation on marine mammals and other ocean resources would be required to modify the number of permits.

Federal guidelines for marine mammal watching would be incorporated into the Gentlemen’s Agreement. Protocols would reinforce a hierarchal system where the first vessel governs access to an area. Fishing vessels would be required to fly a flag when fishing and report catch offshore of the leeward coast by smaller quadrants established by DLNR.

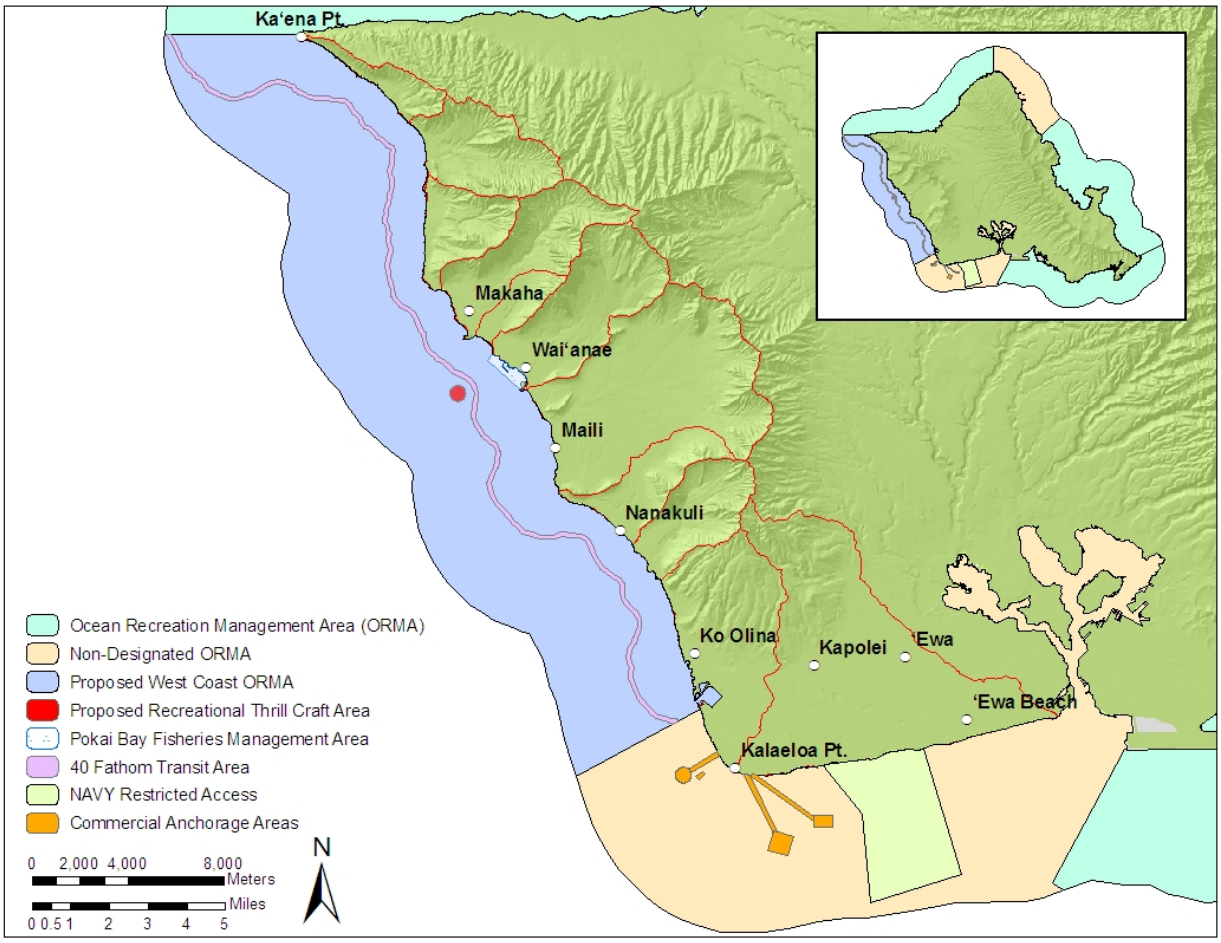

Figure 8.3 Spatial Aspects of the Alternative 2: ORMA and Additional Management Measures

Table 8.4 Alternative 2 – Ocean Recreation Management Area and Additional Management Measures

ORMA
• Establish a recreational thrill craft zone offshore from Waiʻanae Small Boat Harbor • Prohibit all forms of commercial thrill craft with the ORMA • Establish transit zone along 40-fathom depth contour • Access to and from designated operating areas must be the most direct route, and thrill craft operators may not exceed slow-no-wake speed when within 300 feet of the shoreline • Incorporate all provisions of Ocean Users Code of Conduct, such as establishment of a *Leeward Coast Advisory ʻOhana* (except those related to commercial marine mammal watching tours) as rules within the ORMA
Code of Conduct for Public and Commercial Marine Mammal Watching
• Fly a dolphin flag • Implement federal guidelines on marine mammal viewing, including: o Stay at least 100 yards from humpback whales o Stay at least 50 yards from dolphins o Move away cautiously if dolphins show signs of disturbance o Always put the engine in neutral when dolphins are near o Refrain from swimming with, touching, or feeding wild dolphins • Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore • Respect hierarchy system where first vessel governs access: avoid areas where commercial fishing vessels are operating • Use *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of fishing activity • Adopt NOAA's Dolphin SMART Program to promote voluntary compliance • Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*
Commercial Ocean Operator Permits
• Require all commercial tour boats (from private marinas and state harbors) to obtain a permit from DLNR to operate within the waters of the ORMA • Cap the number of commercial ocean tour boat permits (charter fishing, marine mammal and snorkeling, sailing, and SCUBA diving tour boats) operating from the Waiʻanae Boat Harbor and the Ko Olina Marina at baseline study reference levels • Make all permits vessel specific and non-transferable • Establish permit conditions that specify services (for example, charter fishing or marine mammal watching and snorkeling) that operators can provide and incorporate the *Code of Conduct* as permit conditions • Restrict pick up and drop off of passengers to the Waiʻanae Small Boat Harbor and Ko Olina Marina • Allow the number of permits to decrease if vessels are taken out of service and do not issue permits for new vessels until a comprehensive study of impacts of commercial tour operations on spinner dolphins and other marine mammals along the leeward coast has been completed
Other Management Measures
• Monitor and conduct studies on resource status and impacts of ocean use along the Waiʻanae coast to fill data gaps and improve management decision making • Increase seaborne enforcement presence by USCG and DOCARE along the Waiʻanae coast • Establish Makai Watch and train community to assist DOCARE • Use DLNR website and other mechanisms to conduct regular public education and outreach on *Code of Conduct* and ocean regulations

8.4 Alternative 3: Designate MLCD and ORMA

Under Alterative 3, multiple place-based management tools would be employed along with additional management measures to regulate ocean use to achieve multiple goals of protecting ocean resources, preserving traditional and cultural uses, and minimizing conflicts in ocean use (Figure 8.4, Table 8.5).

A Marine Life Conservation District (MLCD) would be established from Kepuhi Point to Ka‘ena Point to protect the diversity and health of the marine ecosystem. All commercial activities would be prohibited within the boundaries of the MLCD. All other provisions would be the same as for Alternative 2.

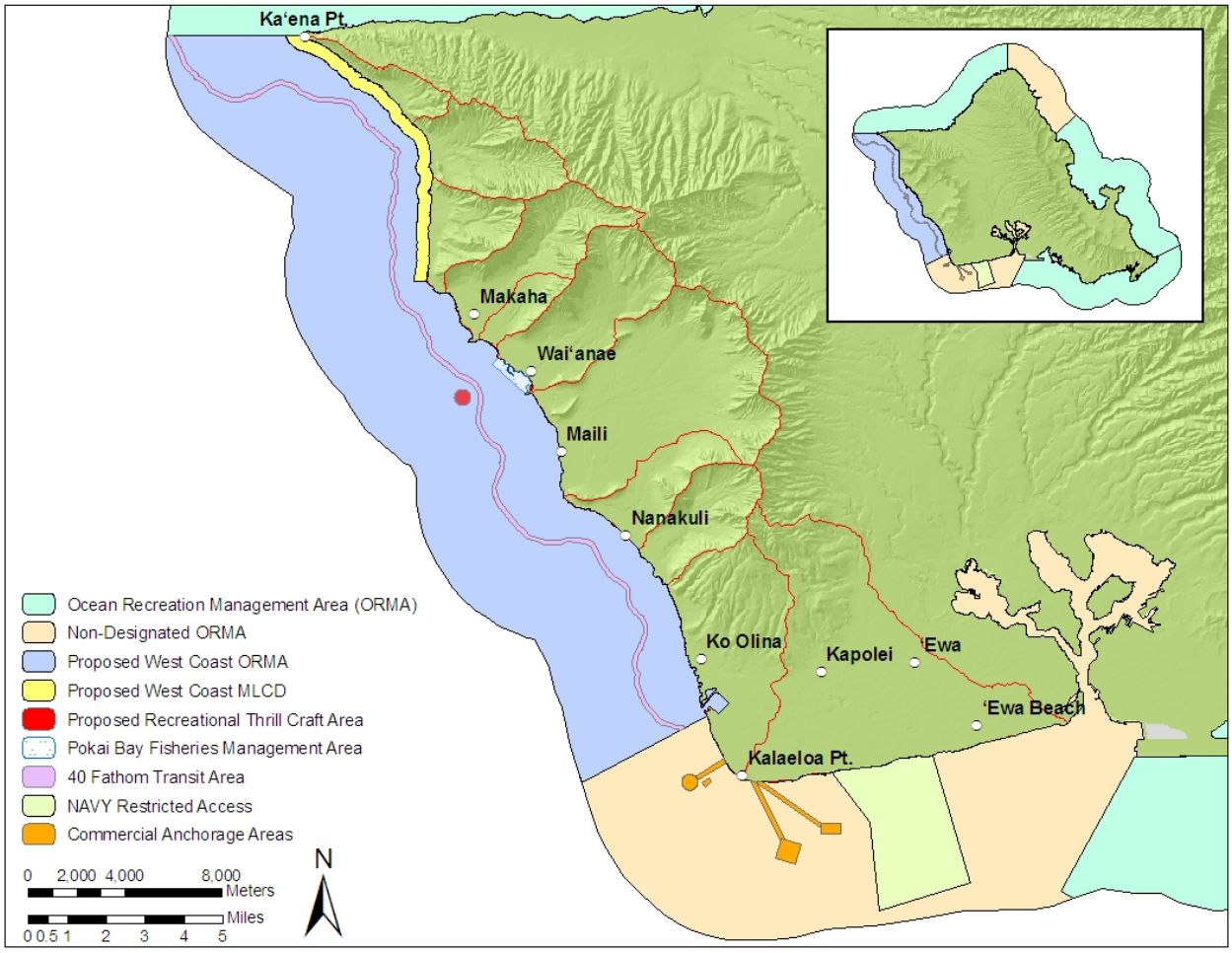

Figure 8.4 Spatial Aspects of Alternative 3: ORMA and MLCD

Table 8.5 Alternative 3 – Ocean Recreation Management Area and Marine Life Conservation District

MLCD
• Establish area from Kepuhi Point to Ka‘ena Point as an MLCD to protect the diversity and health of the marine ecosystem • Prohibit all commercial activity within the MLCD • Allow appropriate recreational activity to occur within the MLCD
ORMA
• Establish a recreational thrill craft zone off shore from Wai‘anae Small Boat Harbor • Prohibit all forms of commercial thrill craft with the ORMA • Establish transit zone along 40-fathom depth contour • Access to and from designated operating areas must be the most direct route, and thrill craft operators may not exceed slow-no-wake speed when within 300 feet of the shoreline • Incorporate all provisions of *Ocean Users Code of Conduct* from Alternative 1 (except those related to commercial marine mammal watching tours) as rules within the ORMA
Code of Conduct for Public and Commercial Marine Mammal Watching
• Fly a dolphin flag • Implement federal guidelines on marine mammal viewing, including: o Stay at least 100 yards from humpback whales o Stay at least 50 yards from dolphins o Move away cautiously if dolphins show signs of disturbance o Always put the engine in neutral when dolphins are near o Refrain from swimming with, touching, or feeding wild dolphins • Conduct normal transit offshore along the 40-fathom depth contour but no less than 25 fathoms, depending on sea conditions, and enter into areas at right angles from offshore to inshore • Respect hierarchy system where first vessel governs access: avoid areas where commercial fishing vessels are operating • Use *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of fishing activity • Adopt NOAA’s Dolphin SMART Program to promote voluntary compliance • Be knowledgeable of and comply with ocean regulations and the *Code of Conduct*
Commercial Ocean Operator Permits
• Require all commercial tour boats (from private marinas and state harbors) to obtain a permit from DLNR to operate within the waters of the ORMA • Cap the number of commercial ocean tour boat permits (charter fishing, marine mammal/snorkeling, sailing, and SCUBA diving tour boats) operating from the Wai‘anae Boat Harbor and the Ko Olina Marina at baseline study reference levels • Make all permits vessel specific and non-transferable • Establish permit conditions that specify services (such as charter fishing or marine mammal watching and snorkeling) that operators can provide and incorporate the *Code of Conduct* as permit conditions • Restrict pick up and drop off of passengers to the Wai‘anae Small Boat Harbor and Ko Olina Marina • Allow the number of permits to decrease if vessels are taken out of service and do not issue permits for new vessels until a comprehensive study of impacts of commercial tour operations on spinner dolphins and other marine mammals along the leeward coast has been completed
Other Management Measures
• Monitor and conduct studies on resource status and impacts of ocean use along the Wai‘anae coast to fill data gaps and improve management decision making • Increase seaborne enforcement presence by USCG and DOCARE along the Wai‘anae coast • Establish Makai Watch and train community to assist DOCARE • Use DLNR website and other mechanisms to conduct regular public education and outreach on *Code of Conduct* and ocean regulations

9.0 ANALYSIS OF ALTERNATIVES

This section analyzes alternatives for managing recreational use in the waters off the Wai'anae coast compared with the No Action alternative. Although this project's primary purpose is to address user conflicts, the analysis also takes into account DLNR's hierarchy of for resource use: (1) resource protection, (2) public use, and finally (3) commercial use. The No Action alternative serves as a baseline for analysis of each alternative. In general, Alternatives 1, 2, and 3 provide increasing protection for ocean resources (beneficial environmental effects), varying beneficial and adverse socioeconomic impacts, depending on the specific user group analysis, and increasing levels of management, enforcement, and overall cost.

9.1 Comparison of Effects of Alternatives

This section provides a comparison of alternatives in a matrix format (table 9.1) showing a summary of key aspects of the analysis, including unresolved issues and unknowns.

Table 9.1 Summary of Effects by Alternative

Impact Category	No Action	Alternative 1	Alternative 2	Alternative 3
Environmental	• Potential impacts to ocean resources from unchecked commercial ocean tourism growth and high speed traffic in shallow waters • Reduces disturbance to marine life by prohibiting recreational thrill craft within 500 feet of shoreline and commercial thrill craft	• Potential to minimize impacts on ocean resources if *Code of Conduct* is fully implemented and collaboration with NOAA for adoption of the Dolphin Smart Program should improve dolphin tour practices • Reduces disturbance to marine life by prohibiting recreational thrill craft within 500 feet of shoreline and commercial thrill craft	• Potential to minimize impacts on ocean resources by limiting commercial growth to 2009 level • Potential to reduce disturbance to marine life by prohibiting commercial thrill craft and limiting recreation thrill craft to a specific zone • Enforceable regulations and additional surveillance should limit detrimental practices	• Potential to minimize impacts on ocean resources by limiting commercial growth to 2009 level • Potential beneficial effects on ocean resources through the establishment of an MLCD and prohibiting all commercial activities • Potential impacts on ocean resources if MLCD transfers some commercial operations to more crowded areas
Socioeconomic	• Non-designated ORMA is the wish of Wai'anae residents, prohibits commercial thrill craft • Unchecked commercial tourism could degrade community's sense of place • Continued user conflicts, including some not covered by Gentlemen's Agreement • Permits not required of all commercial ocean operators impedes equity and effectiveness of management • Resource stress may impact fishing and other commercial operations	• Retain non-designated ORMA status, including prohibition on commercial thrill craft • Unchecked commercial tourism issue remains • Permits not required of all commercial ocean operators • Resource stress may impact fishing and other commercial operations • Voluntary annual orientation on *Code of Conduct* could reduce user conflicts	• Permit requirements and regulations could impact small businesses • Potential conflict between commercial operators and Makai Watch/Advisory 'Ohana regarding revoking permits • Limit on commercial operators could benefit existing permit holders • ORMA opens door for commercial activities not wanted by Wai'anae residents • Restricts certain uses through zoning	• Permit issues same as Alternative 2 • ORMA issues same as Alternative 2 • Prohibits commercial activities in MLCD • MLCD could lead to increased conflicts outside its boundaries • Recreational users benefit from MLCD
Management	• Simplest regime, requiring no additional resources • No mechanism to address growth at Ko Olina & Hoakalei limits effectiveness of management • Some key players not	• Active advisory council can address emerging issues • Need to develop protocols of advisory council • Includes role for key players to improve effectiveness	• Need to develop new permit system, including legal and just method of permit issuance and revocation • New thrill craft zone, transit corridor, no-wake zone, and other spatial tools will require continuous public education,	• Zoning issues same as Alternative 2 • Need to develop management goals for MLCD • MLCD creation requires public process

Impact Category	No Action	Alternative 1	Alternative 2	Alternative 3
	involved in Gentlemen's Agreement (USCG, harbor masters, Ko Olina personnel) • Does not effectively manage user conflicts	• NOAA increases involvement in dolphin issues • New fishing reporting grids increase burden and improve quality of data • Untested ocean incident report may or may not improve user conflict resolution	but could limit user conflicts • Easier management by restricting pick-up and drop-off of passengers to harbors	
Enforcement	• No additional enforcement	• Additional sea (USCG, DOCARE) and land (Makai Watch) enforcement presence	• Codifying Code of Conduct into permits and ORMA regulations clarifies and eases response from USCG and DOCARE • No shoreside pick-up and drop-off eases monitoring • ORMA zoning increases responsibilities	• New regulations provide same benefit as Alternative 2 • Additional zone to enforce
Cost	• Lowest cost	• New costs for Advisory 'Ohana, impact studies, enforcement, directory, incident report and orientation training	• Same cost as for Alternative 1 • Additional cost to manage ORMA and permitting system	• Same cost as for Alternative 2 • Additional cost to monitor MLCD

9.2 Environmental Effects

This section describes potential environmental effects of each alternative compared with No Action, including short-term uses of the marine environment compared with long-term maintenance of the productivity of the marine environment, as well as the trade-offs between the two. Two key environmental concerns have been raised by stakeholder groups and in consultation with the public — the impacts of increased boat traffic on the West O'ahu spinner dolphin pod, and the impacts on akule schools from Pearl Harbor to Ka'ena Point. Although the expansion of the Ko Olina resort and development of the Hoakalei Marina will likely increase boat traffic in the coming years, increasing potential environmental impacts to all sea life and habitat along the Wai'anae coast, analysis of these impacts is covered as a single issue under coral reefs. Impacts to spinner dolphins and akule are covered in greater depth.

No Action Alternative

Under this scenario, the Gentlemen's Agreement would remain the primary tool to address user conflict and environmental issues associated with the various ocean activities occurring along the Wai'anae coast. The Gentlemen's Agreement of 2000, developed through a collaborative effort between akule fishermen and commercial dolphin tour boat operators, was successful at addressing these conflicts for a number of years. Shortfalls in the Gentlemen's Agreement that have led to a recent increase in user conflicts include:

- New operators who are not informed of or beholden to the Gentlemen's Agreement
- Conflicts with ocean users who are not party to the Gentlemen's Agreement
- Overall increase in number of dolphin tour vessels operating in the area
- Sporadic compliance with the Gentlemen's Agreement because of the lack of penalties (Townscape 2006)

Since Act 6 was enacted, which noted the increase in user conflicts, three more commercial tour operators have joined the fleet, which as of February 2009 totals 12 vessels. The Gentlemen's Agreement does not have the capacity to limit the growth of the commercial tour boat operations, and the state does not currently issue permits that could limit this growth. As such, under the current management regime, the expansion at Ko Olina will provide more potential customers, likely leading to an increase in the number of commercial dolphin tours in the coming years.

Impacts on Spinner Dolphins

The difficulty in assessing the ecological impacts of dolphin tours, and specifically how many dolphin tours operating on the Wai'anae coast is too many, stems from a limited knowledge of how stress and distress are expressed (Bejder and Samuels 2003). Furthermore, short-term behavioral or even

physiological changes caused by interactions with dolphin tours are not necessarily harmful to an animal's welfare (Bejder and Samuels 2003). A recent Master's thesis studying the response of spinner dolphins to vessel and swimmer traffic in Hawai'i (Courbis 2004) concluded that no significant correlations were found between frequency of dolphin aerial behavior and intensity of vessel and swimmer traffic. As a result, dolphin entry, exit, and residence times did not differ from those reported in previous studies of this bay.

The primary ecological concern relates to the encroachment on the sensitive habitat areas that the dolphins use for resting and sheltering. Spinner dolphins hunt in large groups at night in the deep waters off shore on prey that undergo diel vertical migrations, making prey inaccessible to dolphins during the day (Benoit-Bird 2004). During their nighttime feeding, spinner dolphins need to consume an estimated minimum of 1.25 prey items per minute to meet their maintenance energy needs. During the day, they enter the shallow coves and bays of the Hawaiian Islands to rest, socialize, care for their young, and escape predators. There is concern that tour boats, kayakers, and swimmers targeting these animals during their resting phase are disturbing their behavior and that they may abandon preferred resting areas as a result of human encroachment (Würsig 1996). Regular disturbance by tour groups during the critical resting phase nights of intense feeding activity could impair the health of both juvenile and adult dolphins just as sleep deprivation affects humans, limiting both the effectiveness of feeding as well as predator avoidance in addition to health impacts associated with lack of sleep. Although this assertion has not been critically studied, it is plausible based on general mammalian physiology. Currently, as many as eight tour boats are taking passengers to find and interact with these resting pods by 8:00 a.m. every day of the year.

Although the long-term impacts are unknown, the increased popularity of these tours has led the National Marine Fisheries Service (NMFS) to develop a *Code of Conduct for Responsible Dolphin Viewing* in Hawaiian waters. In addition to these guidelines, the Gentlemen's Agreement recommends that boats approach and observe dolphin areas smoothly, quietly, and slowly. In spite of these non-regulatory measures and federal regulations that protect dolphins under the MMPA, an apparent lack of compliance occurs when no one is watching (Townscape 2006).

In summary, the number of tour operations continues to increase every year, and the total number of potential patrons and slips available for commercial tour operators is also increasing with the expansion of the harbor facilities at Hoakalei and possibly Ko Olina. Although long-term impacts to the health of the spinner dolphin population from interactions with swimmers, kayakers, and tour boats is unknown, there appears to be a common consensus that they are most vulnerable to anthropogenic disturbance in the early morning hours, when the pod is resting after their night feeding. The level of

disturbance and potential stress depends on the total number of vessels, swimmers, and kayakers in the vicinity of the pod, but also the distance from the pod where the activities are occurring.

Impacts on Akule

Akule (*Selar crumenophthalmus*) is a commercially-important fish, ranking second only to the tunas and billfish in annual landings (DAR 2006). The fishery is also culturally important in Hawai'i. Commercial catch data for akule along the Wai'anae coast over the past 20 years (1984-2004) indicates that catch levels are stable, with fluctuations related to the number of active fishers in a given year. The primary environmental concern for the akule schools along the Wai'anae coast is the change in the distribution of akule schools caused by increased vessel traffic in the area. This concern led to the introduction of SB 3137, which would provide appropriations for a study to monitor the movements of akule from Pearl Harbor to Ka'ena Point. Impacts relating to decreased reproductive success and increased predation can only be hypothesized because no scientific data are available regarding this phenomenon, or even data to understand the level the vessels actually disrupt natural movement and distribution.

Impacts on Coral Reefs

Outside of a single location — the CRAMP Kahe Point study site — little is known about the conditions of coral reefs along the Wai'anae coast. Dive charters operating out of both the Wai'anae Small Boat Harbor and Ko Olina marina, as well as shore-based diving, occurs at numerous sites along the coast. Although day moorings are available at some sites, the consistency of their use by commercial and private vessels has been questioned by other ocean users. Specifically, canoe clubs have reported private vessels anchoring on coral reefs. The Kahe Point site is popular with shore-based divers, and as a result of an often strong current, divers sometimes grab onto coral or live rock to steady their position. The day marker off Kahe Point is missing and is a potential hazard to vessels transiting close to the shoreline. Vessels operating in shallow waters could run aground here or at any reef location along the coast. The No Action alternative includes no measures to address these concerns or the potential for increased SCUBA and snorkel activity in the future.

Alternative 1

Alternative 1 continues to maintain the non-designated ORMA, modifies the Gentlemen's Agreement to an *Ocean Use Code of Conduct* that would include more vessel types as well as recreational users, and establishes the Leeward Coast Advisory 'Ohana to address ocean resource use conflicts. The advisory 'ohana membership is expanded to include representatives from USCG, Ko Olina and Wai'anae harbor masters, DAR, DOBOR, and police. Alternative 1 also anticipates support from USCG, NOAA, and Makai Watch, in addition to implementing new management measures, to improve compliance with the *Code of Conduct* through voluntary training, outreach, and increased at-sea presence.

Impacts on Spinner Dolphins

Although the potential impacts to spinner dolphins remain the same as were described under the No Action alternative, this alternative presents numerous measures intended to improve ocean user behavior through primarily voluntary means that will limit impacts to spinner dolphins. The establishment of the advisory ‘ohana provides a mechanism to address conflicts and bad behavior through the *Ocean Use Incident Report* form and a review process. NOAA’s Dolphin Smart program, successful in promotion of responsible stewardship among commercial dolphin tour operations in the Florida Keys National Marine Sanctuary, would be adapted for Hawaiian waters. DLNR, in association with Makai Watch, would provide an annual *Code of Conduct* orientation for owners, captains, and crew of all commercial vessels operating in the waters off leeward O‘ahu. The *Code of Conduct* would incorporate federal guidelines for marine mammal tours to ensure that the industry with both the greatest potential impact and the most to gain from a healthy, wild stock will be informed of the best available information for self-regulation.

Expanding the types of users covered in the *Code of Conduct*, developing activity-specific guidelines for all commercial ocean operators, and providing voluntary education and outreach will provide the information and motivation to reduce both individual impacts on all ocean resources as well as the cumulative impact on specific resources. Increased surveillance and enforcement presence by Makai Watch, USCG, and DOCARE will also dissuade users from straying from the rules when “no one is watching,” as discussed in the Townscape study (2006). NOAA’s Dolphin Smart program will add a voluntary management measure proven to minimize adverse impacts from commercial dolphin tours. These new measures and additional agency involvement should benefit dolphin stock over the No Action alternative, However, Alternative 1 will have similar lack of success in meeting existing and emerging ocean resource and user conflict issues faced under the No Action alternative if funding is not appropriated on a regular basis for these new management measures, or partner federal agencies place these efforts as low priority.

Impacts on Akule

As discussed in the No Action alternative, the distribution of the akule schools along leeward O‘ahu is being altered, possibly by increased vessel traffic and increased vessel speed. Long-term impacts on the species are unknown, but it may be assumed that this unnatural condition is detrimental to the health of the stock. Impacts from all vessels can be reduced by including more vessel types in the *Code of Conduct* and providing education and outreach for all ocean users. One example from the *Code of Conduct* that will minimize impacts on akule schools is to restrict commercial ocean operators to picking up and dropping off of passengers only at the Wai‘anae Small Boat Harbor and Ko Olina Marina instead of various access points along the coast. Encouraging the use of the transit corridor and

entering and exiting access areas at right angles to the shore may limit the inshore traffic of commercial vessels operating under the *Code of Conduct*.

The community's concerns for private vessels and jet skis operating at high speed in nearshore waters will be addressed through the principles of the advisory 'ohana, including outreach efforts, the *Ocean Incident Report*, and conflict resolution. Increased enforcement efforts from DOCARE and USCG, along with the presence of a Makai Watch program, should improve compliance with existing regulations, all of which should decrease the amount of inshore high-speed traffic and its impacts on the coastal pelagic fisheries.

This alternative would also require commercial fishers to report their catch by smaller grids to improve the spatial understanding of both akule and opelu and ultimately to improve management of these fisheries.

Alternative 1 is an improvement over the No Action alternative based on increased involvement of relevant agencies, the community and resource users, as well as proposed new initiatives from DLNR. Without consistent agency support and allocation of resources, these new initiatives will not be fulfilled, resulting in similar shortcomings as those under the No Action alternative.

Impacts on Coral Reefs

Alternative 1 expands on the Gentlemen's Agreement in the *Code of Conduct* to include commercial SCUBA charters and recreational users. Although measures within the *Code of Conduct* are voluntary, increased public outreach and establishment of the Makai Watch program will aid in compliance with environmentally-friendly SCUBA diving principles. The guidance stresses the use of day moorings instead of anchoring as well as avoiding use of moorings during high surf conditions. As necessary, the annual orientation on the *Code of Conduct* can provide additional safe diving practices to protect the reef. Divers are also encouraged to not feed fish, which will alter their natural behavior and in some situations, can alter the species composition at a site. Finally, the advisory 'ohana provides a mechanism to document bad behavior and address it quickly and appropriately. These factors promote safeguards against improper techniques and associated damage to the coral reef ecosystem.

Alternative 2

This alternative builds on the voluntary management measures described in Alternative 1 by requiring permits for all commercial ocean recreation vessels operating out of both state and private harbors as part of the designation of the area as an Ocean Recreation Management Area (ORMA). The ORMA would extend from Ka'ena Point to just north of Kalaeloa Point. New requirements and most of the

provisions of the *Ocean Users Code of Conduct* (a modified Gentlemen's Agreement) would be formalized through regulations within the ORMA. These new requirements include:

- Establish a recreational thrill craft zone offshore from Wai'anae Small Boat Harbor
- Prohibit commercial recreational thrill craft
- Establish a transit zone along the 40-fathom depth contour
- Require vessels to access and return from designated operating areas via the most direct route
- Require thrill craft operators to observe the slow-no-wake speed when within 300 feet of the shoreline
- Incorporate all provisions of *Ocean Users Code of Conduct* from Alternative 1 (except those related to commercial marine mammal watching tours) as rules within the ORMA

Impacts on Spinner Dolphins

This alternative provides numerous additional safeguards to limit impacts to spinner dolphins. Implementation of the permit system for all commercial ocean recreation vessels operating out of both state and private harbors provides a means to cap the number of commercial vessels at 2009 baseline levels. Although the potential impacts to spinner dolphins are difficult to quantify, Alternative 2 ensures that increased interactions from an expanding industry are avoided through this permit cap.

The ORMA would designate a recreational thrill craft zone directly off the town of Wai'anae at approximately 50 fathoms (300 feet, 91.4 meters) bottom depth. This location is situated slightly seaward of the 40-fathom transit zone for commercial dolphin tour operators and fishing vessels. Although no evidence is available that dolphins are currently being affected by thrill crafts, designating this location because of its distance from known dolphin resting areas will limit potentially unsafe human interactions, and possibly collisions, with the species. Anecdotal evidence suggests that the total number of thrill craft launched from the Wai'anae Boat Harbor is increasing, with many operating illegally within 500 feet of the shore. The designation of the recreational thrill craft zone within the ORMA approximately 1 mile off shore automatically designates a slow-no-wake speed (less than 5 mph) for all thrill craft in these nearshore waters and restricts their high-speed use to deeper and farther offshore waters.[1] Using the DLNR website and other mechanisms to conduct regular public education and outreach on ocean regulations, increasing the seaborne enforcement presence and establishing the Leeward Coast Advisory 'Ohana as a forum to address grievances would all serve to improve the

[1] HAR §13-256-17 Recreational thrill craft operations. (a) Access to and from designated recreational thrill craft operating areas shall be by the most direct route consistent with safety considerations. Thrill craft operators shall not exceed a speed of slow-no-wake when within three hundred feet of the shoreline. (b) In non-designated ocean recreation management areas, recreational thrill craft may operate only in state waters between five hundred feet from the shoreline or the outer edge of the fringing reef whichever is greater and two miles off the islands of Kauai, Oahu, Maui and Hawaii.

behavior of thrill craft users and would be expected to reduce potential impacts on spinner dolphins and other ocean resources.

Impacts on Akule

Alternative 2 addresses the primary concern regarding potential changes in the distribution of the akule schools. Designating an official transit lane through ORMA-specific regulations along the 40-fathom contour and a single public recreational thrill craft zone at 50 fathoms water depth and approximately 1 mile offshore from the Wai'anae Small Boat Harbor will reduce overall traffic within the general akule habitat (0 to 50 fathoms [Kazama 1977]). Requiring all vessels and thrill craft to take the most direct route to the transit corridor or other designated operating areas further limits traffic within akule habitat. Prohibiting commercial thrill craft and other controlled ocean sports from operating within the ORMA protects this area from the expanding presence of the tourism industry along the Wai'anae coast. Finally, regulations that require that thrill craft operators not to exceed slow-no-wake speed when within 300 feet of the shoreline may further reduce disturbance to the akule schools. All of these measures should minimize unnecessary traffic along the coast as well as limit excessive speeding in the shallow waters. Based on discussions with fishermen, these two impacts are the key factors that disrupt the natural distribution of the akule schools along the coast. Studies already proposed may show whether this hypothesis is correct, allowing for improved management based on new information.

Impacts on Coral Reefs

Although the ORMA does not designate zoning that affects SCUBA divers and snorkellers, the permitting system will place an initial cap on boat-based dive operations. This cap provides a safeguard against an increase in SCUBA divers from the expansion of tourist facilities at Ko Olina and the Hoakalei development. In addition, the Commercial Ocean Operator permits for SCUBA diving charters will include conditions requiring them to follow the tenets of the *Code of Conduct*. As such, the state could take action against dive charters that do not use official day moorings or follow other conditions of the permit. This action should reduce the bad habits of some tour operators and the negative effects of anchors on the benthic habitat, which is a critical concern at popular dive sites. In addition, the permit will require operators to participate in the annual orientation on the *Code of Conduct*, providing them with current information on regulations and eco-friendly guidance.

Thrill craft have the ability to operate in shallow waters at relatively high speeds. They also can move in and off shore, picking up passengers up and down the beach. This unconstrained movement can increase the risk of collision with the coral and imparts a high level of noise on all of the coral reef associated species, which may have less quantifiable, but still damaging, impacts. Although coral, such as the shallow water *Porites lobata* that occurs along the Wai'anae coast, can regenerate after physical

damage, it does so at less than 0.5 cm per year (Smith and others 2007). This rate may be too slow to counter repetitive impacts that could occur as the popularity of this activity increases. The designation of the recreational thrill craft zone in deeper waters and the slow-no-wake zone within 300 feet of shore will limit these impacts on the coral reef. Alternative 2 increases the protection of coral reefs from thrill craft by prohibiting commercial thrill craft operations within the ORMA. As such, Alternative 2 provides substantial safeguards for the protection of the coral reef ecosystem.

Alternative 3

Alternative 3 increases the protection of marine resources through the designation of an MLCD from Kepuhi Point to Ka'ena Point. MLCDs are created to protect the diversity and health of the marine ecosystem through area-specific restrictions on use. All commercial activities would be prohibited within the borders of the MLCD. All other management measures are carried over from Alternative 2.

Impacts on Spinner Dolphins

Tour vessels currently use the area from Kepuhi Point to Ka'ena Point to conduct marine mammal watching tours. Because of its distance from Ko Olina harbor, it is likely that the seven marine mammal tour vessels operating from the Wai'anae Small Boat Harbor are more likely to use this area than the four Ko Olina-based vessels. The prevailing research on dolphins indicates that the morning hours are critical for resting, regenerating, and group bonding, and that the presence of swimmers and vessels can cause the pod to leave the resting area prematurely (Danil and others 2005). The MLCD would provide a refuge for dolphins in a known resting area.

This restriction from the northern leeward coast would confine dolphin tour vessels to sites in the lower two-thirds of the coast. This limitation could increase the crowding of vessels on dolphin pods in unrestricted waters, potentially also increasing the overall stress or causing pods to leave known resting areas that experience excessive vessel traffic. The cap on new vessel entrants would limit overall negative impacts until research is completed to establish a sustainable level of commercial activity.

Impacts on Akule

As stated above, restricting dolphin tour vessels from one of their destination areas would likely cause tour vessels to visit other sites more frequently. Based on fishermen's accounts, akule schools currently avoid the waters off shore of the central coast (the general area north and south of Wai'anae town), with schools located along the northern and southern portions of the coast (C. Jellings, pers. comm.). The MLCD would likely increase the overall activity of dolphin tours south of the MLCD, potentially exacerbating the existing disturbance of the akule schools. Alternatively, the MLCD will provide refuge for akule and 'opelu in the spawning and nursery grounds of northern waters of the

leeward coast. Although, in general, protection of nursery grounds can benefit the health of fish populations, there is no evidence that additional restrictions on the akule and opelu fisheries are needed to protect the stocks. The MLCD will also provide consistent management across the land-sea interface, as the coastline north of Kepuhi point is designated as preservation land, prohibiting future development (City and County of Honolulu, Department of Planning and Permitting 2000).

Impacts on Coral Reefs

Alternative 3 provides the same protection for coral reefs as were described under Alternative 2.

9.3 Socioeconomic Effects

This section describes socioeconomic effects, including health and safety effects for each alternative compared with the No Action alternative. These impacts include those relating to commercial tour operators, akule fishers, recreational ocean users, and the leeward community in general. Balancing the need for economic development with the desire to maintain the culture, identity, values, and sense of place is a critical issue for the community and those who do business here.

No Action Alternative

Impacts on Commercial Tour Operators

Under the No Action alternative, permits for commercial tour operators will continue to be required only of those vessels operating from the Waiʻanae Small Boat Harbor. In the short term, there would be no impacts to the operations or the health of the industry on the Waiʻanae coast. In the long term, the continued development of Hoakalei and Ko Olina will provide an increase in potential customers. As has been shown over the past few years, increase in demand for dolphin tours is met with increased capacity, either with existing businesses purchasing additional vessels, or new businesses entering the market. This growing demand will increase job opportunities on the leeward coast, where the civilian unemployment rate of 14.9 percent is more than double the levels for Oʻahu (U.S. Census Bureau 2000). Until a carrying capacity study of the number and types of different vessels operating on a daily basis around the leeward coast dolphin pods is completed, customer satisfaction and its potential negative economic impact on the industry cannot be realistically assessed.

Although it was regarded as a success at its outset, the Gentlemen's Agreement is now considered ineffective given the current level of activity, changes in the active participants since the agreement was created, and the lack of a conflict resolution process, among other reasons (Townscape 2006). Continuing to rely on tour operators to faithfully carry out the tenets of this agreement will likely result in increased conflicts — both with fishermen as well as among dolphin tour operators. This

situation would most result in lower satisfaction from customers and could trigger increased animosity between tour operators and fishermen as well as among competing tour operators.

Impacts on Fishermen

Based on interviews with the commercial fishermen who operate in these waters, the increase in vessel traffic has disrupted the natural movement of the coastal pelagic species, so much so that a bill was put forth in the 2008 state legislature to study their distribution (SB 3137). Whether the cause for this phenomenon is from personal thrill craft, charter vessels, or other vessels operating along the coast is unknown. But of the two key businesses operating along the Wai‘anae coast — dolphin tours and commercial fishermen — dolphin tours make their money before they leave port, while fishermen make their money on their return. If a dolphin tour vessel is unlucky and does not find a dolphin pod, its expenses are still covered. If a commercial fisherman cannot find an akule school, his expenses are not covered. This key difference puts the commercial fishing industry at a substantial socioeconomic disadvantage compared with the dolphin tour industry as well as other charter vessel operations under the No Action alternative.

Impacts on Recreational Ocean Users

Canoe clubs and after-school paddling teams practice daily in the inshore waters. Entry and exit routes of the Ko Olina Marina-based tour boats cut directly through canoe paddling routes. Occasionally, tour boats and private boats drive at high speeds inside the reef, which has led to verbal confrontations between paddlers and boat drivers. Private boats also anchor in canoe paddling paths, causing additional user conflict and potential damage to reefs (Public comment, 9 January 2008 community meeting). The No Action alternative does not address the concerns of recreational ocean users because the gentlemen’s agreement pertains only to dolphin tour vessels and commercial fishermen.

Non-designated ORMA regulations require recreational thrill craft users to operate between 500 feet from the shore and 2 miles offshore. They are also required to transit at a slow-no-wake speed (generally accepted at 5 mph) within 300 feet from shoreline. There are no other restrictions for recreational thrill craft users within a non-designated ORMA. In recent years, the popularity of these vehicles has increased along the Wai‘anae coast. The lack of regulations, in conjunction with their ability to travel at high speeds in shallow waters, has created a new user conflict that is not addressed in the Gentlemen’s Agreement. Although the lack of restrictions is an initial benefit to the experience of the thrill craft users, it appears that these user conflicts will increase in rate and severity if nothing is done. The expansion of Hoakalei and Ko Olina will likely increase the need to address this issue.

The lack of a permitting system for charter vessels and the lack of checks on the growth of the industry would increase conflicts between recreational and commercial ocean users and could reduce

recreational user satisfaction if these vessels begin to overwhelm their ocean experience. Examples of the impacts from unchecked growth exists around Hawai'i, including the overuse and associated environmental damage of Molokini crater off the south shore of Maui and the degradation of the natural resources within Hanauma Bay. In both examples, a reduction in daily visitors (in addition to other management measures) was effective in protecting these sites.

Impacts on the Leeward O'ahu Community

The No Action alternative, or some variation of it, is the desire of the majority of Wai'anae community members who have participated in the process that began with development of the gentlemen's agreement. This sentiment was also expressed during individual interviews with community members and at two public meetings held on January 9 and March 5, 2008. The community is concerned that designating the coast as an ORMA opens the door for new commercial tourist activities. They feel this new commercial activity would impair the character of their community. In addition, the No Action alternative allows the community to address issues in its own style, instead of turning over the responsibility to a state agency.

Nevertheless, the increase in user conflicts that has already occurred, compounded by the inevitable increase in overall ocean activity from the expansion of Ko Olina and development of Hoakalei, has led many residents to realize that some sort of management is necessary. Although the No Action alternative continues the prohibition on commercial thrill craft off the Wai'anae coast, it ignores the major changes that will affect the rural character the community desires.

Alternative 1

Impacts on Commercial Tour Operators

The modification of the Gentlemen's Agreement to an *Ocean Use Code of Conduct* to include more vessel types as well as recreational users, and the establishment of the Leeward Coast Advisory 'Ohana to address ocean resource use conflicts are the primary differences between Alternative 1 and the No Action alternative. Because these actions are voluntary, impacts to commercial tour operators are not substantially different. Most of the voluntary measures are relatively easy to implement and are designed to reduce user conflicts without affecting operations. Two would pose little to no burden on commercial operators: flying a dolphin flag when at sea, and using the *Commercial Ocean Users Directory* to call fishermen on VHF or cell phone if unsure of their activity. Encouraging operators to take part in the annual orientation on the *Code of Conduct* (which includes federal guidelines for marine mammal watching) and participating in the Dolphin Smart program are intended to improve compliance and reduce user conflicts and impacts to the marine resources on a voluntary basis.

The advisory ‘ohana through the *Ocean Use Incident Report* would provide a formal system for registering user conflicts, safety incidents, and noncompliance with regulations. This system, in conjunction with increased enforcement and surveillance from DOCARE, USCG, and a Makai Watch network, should improve at-sea behavior in terms of the shortcomings of the Gentlemen’s Agreement discussed in the No Action alternative. As described for environmental effects, regular funding for these initiatives and continued support from partner agencies are critical for Alternative 1 to provide additional benefits over the No Action alternative.

Impacts on Fishermen

Requirements for fishing vessels are not substantially different than under the No Action alternative. The transit lane, entering areas at right angles from the shore, and respecting the hierarchy system where first vessel governs access (including avoiding areas where commercial marine mammal and snorkeling tours are operating), are elements of the No Action alternative and for fishermen remain voluntary under the *Code of Conduct*. The Gentlemen’s Agreement is modified to require fishing vessels to display a fishing flag to alert others to their activity. When the original Gentlemen’s Agreement was developed, all commercial tour operators were familiar with the local fishermen and their vessels, which was a key factor in the agreement’s success. With the addition of new commercial tour operations and change in staff among original companies, many of the captain and crew on vessels operating in these waters do not know one another and are unaware of their usual activities on the water. Participation by commercial ocean operators in an annual orientation of the *Code of Conduct* and maintenance of an updated *Commercial Ocean Users Directory* should improve the understanding and communication between tour operators and fishermen. Encouraging fisherman to be knowledgeable of and comply with ocean regulations and the *Code of Conduct*, as well as encouraging them to participate in annual orientation, will promote all involved to respect one another and abide by the *Code of Conduct*.

In addition, both this alternative and SB 3137 recommend using smaller catch reporting grids along the Wai‘anae coast to better understand the distribution of coastal fish species. This grid would be an additional minor reporting burden to commercial fishermen, but could provide critical data on the impact of other ocean activities on their livelihood.

Impacts on Recreational Ocean Users

Recreational ocean users would remain unpermitted, making their participation in the *Code of Conduct* fully voluntary. Private vessels would be asked to adhere to its tenets, including using the transit corridor and entering and exiting at right angles. The tenets of the advisory ‘ohana, in conjunction with increased user awareness and shore-based and at-sea monitoring, should reduce violations of

existing regulations, particularly involving personal use of thrill craft within 500 feet of shore. The effects would otherwise be the same as were described under the No Action alternative.

Impacts on the Leeward O'ahu Community

The impacts on the leeward O'ahu community are the same as under the No Action alternative. Commercial ocean activities will be able to increase unchecked along the leeward coast, a primary concern of residents. This growth, while providing additional employment opportunities, could change the overall character of the community, as outlined in the Wai'anae Sustainable Communities Plan. Community members voiced concern that tourism could eclipse traditional activities, such as fishing and canoeing. The transient nature of tourism cannot bolster the community's values, which can further erode the sense of community. Ethics, passed down through generations, including sustainable use of ocean resources and treating one another with respect, are key characteristics of the Wai'anae district (Townscape 2006) and are difficult to foster in a tourism-dominated community.

The advisory 'ohana provides a potential mechanism for addressing some of these community concerns, but its primarily focus will remain resolution of user conflicts and recommendations to the DLNR on ocean use incidents and regulatory infractions. Alternative 1 does not specifically address impacts from the growth of tourism on leeward O'ahu.

Alternative 2

Impacts on Commercial Tour Operators

Alternative 2 implements a permit system for all commercial ocean recreation vessels operating out of both state and private harbors, providing a means to cap the number of commercial vessels at baseline levels. This permit is in addition to existing permits required of commercial vessels operating out of a state harbor or public boat launch and incorporates the voluntary aspects of the *Code of Conduct* as required conditions of individual permits. New conditions include requiring all passengers to embark and disembark only at the harbor or marina specified on the permit, thus prohibiting the common practice of beach pick-up and drop-off. All commercial tour permittees would also be required to participate in an annual orientation on the *Code of Conduct*. Other orientation topics may include a review of current marine mammal watching federal guidelines, NOAA's Dolphin Smart program, and voluntary marine mammal sighting data forms. Participation in the latter orientation topics and adherence to the guidelines would be voluntary because of a federal preemption in the regulation of marine mammal tours.

This new permit requirement and the associated conditions for existing commercial tour operators will be an initial burden on them. Monitoring permittee's compliance with these new requirements would

be undertaken by USCG, DOCARE, and a network of Makai Watch members trained in the *Code of Conduct*. Potential violations of state law and deviations from the *Code of Conduct* would then be reported to the Leeward Coast Advisory ‘Ohana, which would make recommendations to DLNR on an appropriate course of action, including the possibility of revoking an operator’s permit. This process, which is as yet undefined, could create conflict between commercial operators and Makai Watch/Leeward Coast Advisory ‘Ohana. The potential that a permit could be revoked or not renewed could produce a negative impact on these businesses, possibly inhibiting the ability to secure a loan or other business contracts.

This new permit system would be the most effective means to cap the number of commercial tour vessels, as the existing permit is specific to vessels operating from state harbors and public boat launches. The existing permit system does not apply to commercial vessels operating out of private harbors and marinas, including both the Ko Olina and Hoakalei marinas. Capping the number of permits to the baseline reference level is likely to improve the security of existing operators, as competition for customers would remain limited to those currently active. With the Ko Olina expansion, additional potential customers would increase the demand while supply is held constant. Holding supply constant as demand increases could allow the currently active tour companies to increase their cost per passenger or run more trips at full capacity, to the benefit of these businesses. Holding the total number of vessels in check could also improve the quality of the at-sea experience as fewer vessels would make for a more intimate and more natural encounter. Nevertheless, most companies strive to expand their businesses as demand rises, and this cap would ultimately limit the growth of the industry and individual companies.

Commercial boat-based dive and snorkel charters would also be required to obtain a commercial ocean operator permit. This action would cap the number of dive charters to baseline levels (currently seven vessels, with six operating out of the Wai‘anae Small Boat Harbor) and include Commercial SCUBA diving charters-specific conditions based on the *Code of Conduct*. Most of these requirements are not burdensome, including flying a dive flag, using official day moorings, not mooring or entering when high surf advisories are in effect for west shores, not altering any permanent moorings, and not feeding fish. As with dolphin tour operators, dive charter permittees would be required to obtain a permit, participate in an annual orientation on the *Code of Conduct*, all of which are considered minor burdens of this alternative.

The designated ORMA of Alternative 2 has two zoning features as well as a number of ORMA-specific regulations. The designation of a recreational thrill craft zone offshore from the Wai‘anae Small Boat Harbor seaward of the 40-fathom depth contour, together with regulations prohibiting development of commercial thrill craft operations throughout the ORMA, should reduce the overall disturbance on the

dolphin pods and provide for an enhanced experience for dolphin tour customers. Specifically, dolphin tour vessels will benefit by limiting user conflicts through a separation of these two ocean uses, improving the safety of dolphin tour groups that snorkel, swim, and kayak with the dolphins. These regulations will also minimize thrill craft disturbance of the dolphin pods.

Because of a federal preemption (through the MMPA) over state jurisdiction to regulate marine mammal tours, the state is prohibited from enforcing any of the measures within the *Code of Conduct*, either through permit conditions or through rulemaking, related to this activity. As such, provisions specific to marine mammal tour operations cannot be incorporated into regulations of the ORMA and remain a part of the voluntary *Code of Conduct*. The proposed ORMA will designate a transit zone along the 40-fathom contour and require all vessels to take the most direct route to the transit corridor or other designated operating areas. These measures are included under the voluntary Gentlemen's Agreement of the No Action alternative, as they relate primarily to improving ocean safety, minimizing user conflict, and limiting the disturbance of vessel noise on akule schools.

Impacts on Fishermen

The creation of the ORMA with the codified transit corridor, recreational thrill craft zone, and prohibition of commercial thrill craft operations, in addition to capping the number of commercial tour vessels to baseline levels, should reduce the overall vessel traffic in akule habitat. Whether these measures will return akule to a more natural distribution pattern, ultimately benefitting the fishermen, is unknown. This alternative includes recommendations from Alternative 1 to fund studies to research this issue, as well as to require fishermen to provide catch and effort data in smaller grids. These measures will help assess whether the reduction of vessel traffic and associated noise provides benefits to akule and the men who fish for them. Permit conditions for commercial ocean operators carried over from Alternative 1 provide the same benefits to fishermen as were described under that alternative.

Impacts on Recreational Ocean Users

With the creation of the ORMA and the establishment of a single thrill craft zone off shore from the Wai'anae Small Boat Harbor, Alternative 2 imparts a significant impact on recreational thrill craft users. The ORMA will require all thrill craft operators to launch from the Wai'anae Small Boat Harbor, drive directly to the recreational thrill craft zone approximately 1 mile offshore, and observe the slow-no-wake zone within 300 feet of the shoreline. These requirements limit the allowable area of this activity, which may reduce the user's overall enjoyment. Requiring all thrill craft users to use waters 1 mile from shore will likely decrease the likelihood of collisions with swimmers, divers, and snorkelers, as well as potential user conflict with kayakers and paddlers. Limiting thrill craft use to a confined

area may also provide a safety back-up system when other participants will be in close proximity if one user requires assistance for an emergency.

In the short term, increased satisfaction may be imparted to recreational users because commercial ocean users would be permitted and required to follow the *Code of Conduct*. In the long term, the cap on commercial activities would be a lasting benefit to recreational users.

Impacts on the Leeward O'ahu Community

A restriction on the expansion of commercial ocean activities through a cap on commercial ocean operator permits could have both positive and negative impacts on the community. Community members have expressed the need for a balance between commercial tourism and local values and lifestyles (Townscape 2006). Some have noted that an increasing lack of respect and care for the ocean has led to declines in ocean health and a sense of community. Others community members make a living from commercial ocean activities and results in an important contribution to the local economy. They do not want unnecessary restrictions. Achieving this balance should be a key aspect of the preferred alternative.

The leeward O'ahu community has not supported the designation of an ORMA along the coast. The primary reason is that it opens the door to zone for commercial thrill craft activities, even though this alternative will prohibit them at the outset. Future rulemaking could reverse this prohibition. In addition, Alternative 2 would incorporate all provisions of the *Ocean Users Code of Conduct* from Alternative 1, except those related to commercial marine mammal watching tours, as rules within the ORMA. Alternative 2 places the overall management of the area in the hands of the state, whereas it currently resides as a non-binding agreement among the various interested parties. Many residents have stressed that "overall government rules will be inflexible and it will be better for the community to self-regulate" (Townscape 2006).

The designation of a recreational thrill craft zone will likely be seen as a positive management action for the community members who use the ocean to swim, surf, scuba, snorkel, sail, fish, or kayak, and as an imposition to owners of jet skis and wave runners.

Alternative 3

Impacts on Commercial Tour Operators

In addition to the ORMA and its sub-zones, Alternative 3 creates a MLCD along the coast north of Makaha from Kepuhi Point to Ka'ena Point. Tour vessels, most likely those operating out of the Wai'anae Small Boat Harbor, use this area for their dolphin tours. The regulations of the MLCD would prohibit these tour boats from operating within the boundaries of the MLCD. This prohibition will restrict the locations where the vessels will be allowed to operate, potentially increasing the number of vessels gathering around a given dolphin pod. As research has reported that dolphin pods have abandoned traditional resting places because of anthropogenic disturbance, the reverse action is possible. Over time, dolphins could adapt to the new management measures, resting more frequently in the undisturbed waters of the MLCD, effectively separating themselves from the industry.

Impacts on Fishermen

The designation of the MLCD north of Makaha would also restrict fishermen from their activities. Fishermen have indicated that the increased vessel traffic in the central part of the coast has pushed the akule schools to the north and south. The designation of the MLCD will limit the fishermen from operating in the nearshore waters to the north. Although the total area within the MLCD may be small, the impact to fishermen could be substantial. First, reports now indicate that the akule schools cannot be found in the central part of the coast. Restricting access to the north leaves approximately only one-third of the viable fishing area. Second, it is possible that a transferred effect may cause an increase in dolphin tour boats outside of the MLCD, increasing conflicts with fishermen and further dispersing the akule schools in the accessible waters. Third, akule naturally migrate up and down the coast, and fishermen tend to follow. As discussed under the environmental effect analysis, this area is a spawning and nursery ground for commercially important coastal species, and protection of this area could provide long-term benefit to the stock, securing a healthy fishery for years to come. Nevertheless, restricting where fishermen can fish alters their entire fishing methodology. The fishermen could argue that the designation of the MLCD will impart only adverse impacts to the fishery, while providing little to no beneficial impact to the fish, because akule stocks are currently considered healthy, and the method has minimal impact on habitat.

Impacts on Recreational Ocean Users

The MLCD would not restrict recreational activity. The limitation of tour vessels within the MLCD would provide an aesthetic benefit to recreational users, including divers, kayakers, and swimmers, as they would not have to compete with large commercial tour vessels.

Impacts on the Leeward O'ahu Community

The Wai'anae Sustainable Communities Plan includes a general policy that no commercial land development should occur north of Kepuhi Point and north of Makaha Valley. There is a strong consensus among the community and responsible state and city agencies to preserve and protect these lands for open space, public access, and public recreation (City and County of Honolulu, Department of Planning and Permitting 2000). As such, a complementary MLCD that limits commercial activity can provide a unified management scheme across the land-sea interface. Nevertheless, the history of MLCD designation in Hawai'i often involves a rift within the local community between those who want additional protection of marine resources and those who feel the restrictions take away individual access rights to an area. Although the proposed MLCD is structured to restrict only commercial activities, additional restrictions could be imposed in the future. For this reason, Alternative 3 could meet with both support and opposition from the community.

9.4 Management and Enforcement Requirements

This section describes management and enforcement requirements for each alternative compared with the No Action alternative. This section also discusses the relationship between land use plans with specific attention to conflicts between land use policy and the alternatives.

No Action Alternative

Management

Although the No Action alternative requires no additional management measures and is the simplest regime to implement, increased user conflicts over the past few years were the driving force for Act 6, which requires the state to consider new management options. In addition to ongoing conflicts, the No Action alternative does not address the impact of the growing population of west O'ahu and the visitor industry on traditional uses of the area or the cumulative economic, environmental, social, and cultural effects on many communities along the coast. In addition, agencies, including USCG, harbor masters, and Ko Olina representatives, were not included under the Gentlemen's Agreement framework, although they are key players whose expertise and authority could improve the current situation.

Enforcement

The current level of enforcement would remain the same under the No Action alternative and the rules of the Gentlemen's Agreement would remain voluntary and self-policed. This arrangement is regarded as ineffective, as an apparent lack of compliance occurs when no one is watching (Townscape 2006).

Cost

The cost of the No Action alternative is the lowest of all of the alternatives and would impart no increase in cost.

Alternative 1

Management

Alternative 1 includes a variety of management measures that would require additional resources to implement. Some of these measures are not fully developed and would need collaboration among various government and non-government entities to identify proper authority, chain of command and other processes, and other issues discussed below.

The voluntary Dolphin SMART program, which NOAA would like to implement in Hawai'i, will need additional resources to provide recognition to "good actors" as well as to check whether operators are actually complying with the program requirements. Similarly, proposed education and outreach efforts to inform the public and commercial operations on the *Code of Conduct* would require additional resources to be effective. Although the DLNR website would provide a common method to distribute information, other mechanisms would likely be necessary to achieve wider public awareness and compliance.

Although the Leeward Coast Advisory 'Ohana was recommended under the current Gentlemen's Agreement, it has yet to be established. The creation of the advisory 'ohana recommended under this alternative will provide an active mechanism to address emerging issues and a consistent and transparent manner to address user conflicts. It would also include roles for key players not included in the original Gentlemen's Agreement, including USCG, Wai'anae and Ko Olina harbor masters, other Ko Olina representatives, and NOAA's Protected Species Division. The advisory 'ohana and DLNR would need to develop protocols and requirements for a legal and just process.

New fishing reporting grids and marine mammal reports will provide improved information for future management, but will also require additional resources. The *ocean incident report* is untested, and its effectiveness cannot be evaluated at this time.

These new measures and additional agency involvement should improve management over the No Action alternative. Still, Alternative 1 will have similar lack of success in meeting existing and emerging ocean resource and user conflict issues faced under the No Action alternative if funding is not appropriated on a regular basis for these new management measures, or partner federal agencies regard these efforts as low priority.

Enforcement

This alternative proposes additional sea (USCG, DOCARE) and land (Makai Watch) enforcement presence, which will help to improve compliance, protect ocean resources, and minimize ocean conflicts. Alternative 1 does not include new regulations, and the *Code of Conduct* remains voluntary for all ocean users. As such, monitoring and submittal of the *Ocean Use Incident Report* described for this alternative are not for enforcement purposes, per se. Instead, their value will be to improve compliance with guidelines and best practices.

Cost

All new management measures and enforcement presence affect the cost. These costs have not been evaluated, as the exact manner for implementation of each new measure has not been established. Maintaining the advisory ‘ohana, establishing and maintaining an updated Commercial Ocean Users Directory for the Leeward Coast, funding recommended impact studies, developing the incident report, and providing orientation training on its proper use, and the additional enforcement by USCG, DOBOR, and Makai Watch, will all require new funding.

Alternative 2

Alternative 2 incorporates substantial management changes: development of an ORMA and implementation of a permit system. ORMAs serve as an important management tool for DLNR in that they delineate use zones that separate incompatible ocean recreation uses, with the effect of minimizing user conflicts. ORMA rules also call for the establishment of an advisory body to DOBOR on ORMA-related issues. The permit system will allow the state to control the number of commercial users for each activity type that are operating within the ORMA. Permits also allow the state to attach activity-specific conditions that can be enforced similar to regulations.

Management

The new Commercial Ocean Operator Permit system will require additional management resources. An existing permit requirement (HAR 13-256-3) applies only to commercial tour vessels operating out of a state harbor or boat launch. The proposed permit would apply to all commercial tour operators operating within the ORMA, regardless of from where they launch (public or private facility) and includes the *Code of Conduct* as permit conditions for the specific service (such as charter fishing and marine mammal watching) each permit holders can provide. A potential obstacle to issuing permits to commercial dolphin tours in the permit system is the federal preemption on the regulation of marine mammal tours through the Marine Mammal Protection Act, as noted by USCG in a 9th Circuit Court case in Kaua‘i. This issue would need to be satisfactorily resolved before the proposed permit system could

be initiated.[2] This alternative would also encourage all commercial tour operators to submit weekly marine mammal activity logs to NOAA for compilation and analysis as part of NOAA's Dolphin Smart Program. In addition, DLNR would need to establish a legal and just method of permit revocation, including the roles of Makai Watch, the advisory 'ohana, and partner agencies.

This alternative will designate an ORMA from Ka'ena Point to just north of Kalaeloa Point and will require development of rules under HAR 13-256 (Ocean Recreation Management Area Rules and Areas). These rules will be based on the Ocean Users Code of Conduct (modified Gentlemen's Agreement). Zoning within the ORMA, including a recreational thrill craft zone, a no-wake zone, and an offshore transit corridor, will be codified within these rules, as will a penalty schedule for violations. These new management measures will require continuous public education to increase compliance. In contrast, by designating these waters as an ORMA, existing regulations are made available to address specific management goals. Specifically, HAR 13-256-15 prohibits commercial permit operators from picking up or dropping off passengers in any location not designated on the permit. This prohibition addresses the concerns raised over beach drop-offs. Existing rules also define "slow-no-wake" to mean "as slow as possible without losing steerage way and so as to make the least possible wake." This definition would almost always mean speeds of less than 5 miles an hour (HAR 13-250-5)." Each ORMA is required to establish a "Recreation Advisory Committee" to review and make recommendations on commercial operator permits to DLNR. The Leeward Coast Advisory 'Ohana, described in Alternative 1 and carried through to the remaining alternatives, would become part of this existing management framework. Although the creation of an ORMA along O'ahu's leeward coast will require additional state resources, the concern over existing and potentially expanding user conflicts appear to be well addressed with this management tool.

Enforcement

Restricting the pick-up and drop-off of passengers to harbors, instead of allowing commercial tour vessels to do so along the beach, will make enforcement easier by limiting the number of entry and exit points if DOCARE and partner agencies decide to monitor activity.

This alternative clarifies, through rulemaking, many of the behavioral guidelines originally developed through the *Code of Conduct*. As such, enforcement officers have a specific directive to follow, including an established penalty schedule, clarifying their response to infractions. As with Alternative 1, this alternative calls for an increased seaborne enforcement presence by the USCG and DOCARE along the Wai'anae coast. To ensure users conduct the activities stipulated in this alternative, especially zoning requirements, this increased seaborne enforcement presence will be necessary.

[2] HRS 200-4(a)(5) and HRS 200-22 grant DOBOR authority to regulate all vessels in state waters, while HAR 13-256-3 allows permitting of commercial vessels in state waters regardless of the marina of origin.

Cost

In addition to the costs for of enforcement and management described under Alternative 1, developing and implementing the permitting system and developing the framework for the ORMA will require new funding. The more complicated management measures associate with Alternative 2 will likely require additional management and enforcement resources to achieve maximum effectiveness, including an increase in education and outreach efforts as well as increased seaborne and dockside enforcement presence to improve overall compliance.

Alternative 3

Management

Alternative 3 includes all of the management requirements discussed in Alternative 2 and involves development of an MLCD. This alternative will require extensive community outreach, including numerous public meetings and responding to public comments. Goals for the MLCD and a plan to achieve those goals will also need to be developed.

Enforcement

Alternative 3 regulations provide the same benefits described for Alternative 2. There is an additional burden for enforcement with designation of the MLCD, although allocation of resources to provide monitoring is not mandatory.

Cost

There are no mandatory costs above those discussed under Alternative 2. Additional costs should be allocated to effectively monitoring the MLCD and achieve its specific goals. Estimated costs beyond the initial public meetings and necessary documentation are difficult to quantify, as the funds will be discretionary and based on agency prioritization.

9.5 Irreversible and Cumulative Impacts

This section discusses the management resources necessary to implement each alternative and the irreversible or cumulative impacts to the natural resources of the area.

Commitment of Financial and Human Resources

The alternatives developed for this baseline study proposed management measures that primarily address user conflicts, with the No Action alternative and Alternative 1 employing a relatively simpler management regime, and Alternatives 2 and 3 incorporating additional and more complex management measures. The No Action alternative, by definition, is the current management structure and imparts

no additional expenditure of funds or human resources in its implementation. Alternative 1, with the establishment of both the Leeward Coast Advisory ‘Ohana and a Makai Watch program, will require the commitment of both funds and agency personnel on an ongoing basis. Funds will be required for the salary of the advisory ‘ohana coordinator, annual grants for the Makai Watch program, and development and implementation of an education and outreach program, including an annual orientation on the *Code of Conduct* and associated programs. An additional commitment of human resources from DLNR and partner agencies will be required to attend regular advisory ‘ohana meetings, address issues raised either at these meetings or through the *Ocean Use Incident Report*, the development of the *Commercial Ocean Users Directory*, and increased at-sea enforcement presence by USCG and DOCARE. DAR personnel will need to revise the commercial fish catch reports and associated analysis to accommodate the subdivision of reporting grids 402, 403, 422, and 423. NOAA will also require additional commitment of human resources to implement the Dolphin Smart program and outreach for the Marine Mammal Viewing Guidance.

In addition to all of the costs described for Alternative 1, Alternative 2 includes costs to develop and maintain the ORMA as well as to implement a new permitting system. The permitting system could be structured to recover some operational costs through fees and possibly to cover the cost of the required annual orientation on the *Code of Conduct*. The permitting system will primarily require additional human resources over direct expenditures. Costs of the ORMA will primarily relate to development of the management regime, regulations, and initial outreach material and community meetings. Ongoing costs and additional human resources will primarily relate to enforcement, monitoring, and education. Alternative 3 adds the expense of developing the ORMA, which will require public meetings and development of the management goals and objectives. Ongoing costs will again relate to enforcement, monitoring, and education.

Unavoidable Effects on Non-renewable Resources

The management measures proposed generally do not affect non-renewable resources because the alternatives developed for this study primarily address user conflict issues. Although the No Action alternative has not been effective in addressing user conflicts, it does not preclude future management action to address emerging threats. Similarly, Alternatives 1, 2, and 3 are not static regimes. The creation of the advisory ‘ohana, a facet of all three alternatives, provides a mechanism well suited to anticipate emerging threats and provide appropriate recommendations to DLNR.

One issue brought up during community meetings involves effects on non-renewable resources. Private boats operating at high speeds in the shallow waters and anchoring on coral reefs instead of using mooring buoys could cause irreversible damage to the coral reefs and associated community. Maintenance of day moorings and developing incentives to achieve compliance are part of the *Code of*

Conduct. The state and federal partners should investigate the scope of this problem and allocate appropriate resources to address it before resources are irreversible lost.

The ongoing development at both Ko Olina and Barber's Point could cause irreversible impacts to both the natural resources of the area and the character of the leeward O'ahu communities. Ko Olina resort continues to expand, with condominium development continuing through 2011. The Walt Disney Company is also planning to develop tourist facilities at this site. The Hoakalei development, just east of Kalaeloa Point, is building a 600- to 800-slip marina, a nearly two-fold increase in the number of slips currently on O'ahu's leeward side. Without appropriate management measures to address these developments, irreversible effects could befall the natural resources of the area. Expanded vessel traffic could further disrupt the distribution of the akule schools. New charter vessels businesses, arising from increased tourist demand on the leeward coast, could overwhelm dolphin pods and stress coral reef communities. Although all of these threats are possible, even imminent, none of the alternatives, including the No Action alternative, precludes the state from taking appropriate action to address these and other emerging issues.

Environmental Accidents Associated with ORMA Designation and Maintenance

Although the ORMA designates two specific zoning features — the transit corridor and the recreational thrill craft zone — they have been designed to minimize inconvenience to users as well as limit their overall risks. The transit corridor was developed in consultation with fishermen and dolphin tour operators. The corridor should be used at all times, except when sea conditions warrant transit closer to shore. The transit corridor is in relatively deep waters, intended to minimize noise impact to marine life, and far enough from land (approximately 1 mile offshore) to minimize danger to swimmers, divers, surfers, kayakers, and paddlers. A similar rationale was use to designate the recreational thrill craft zone. This site is seaward of the transit corridor, minimizing disturbance to marine life and danger to non-motorized activities. It is also directly offshore of the Wai'anae Small Boat Harbor, making transit to and from the site relatively short for most participants. The slow-no-wake zone, required of all motorized vessels, will also minimize the risks to the marine environment and recreational users. In short, there appears to be no inherent risk of environmental accidents associated with ORMA designation and maintenance.

10.0 RECOMMENDATIONS AND UNRESOLVED ISSUES

This section provides recommendations for resolving conflicts in ocean use along the Wai‘anae coast based on the effects analysis and input from stakeholders. In addition, unresolved issues and compatibility with existing land use plans are described.

10.1 Recommendations

Using the existing regulatory rules and tools, establishment of an ORMA as described in Alternative 2 would provide an enforceable management regime to limit the number of commercial ocean tour operations and minimize conflicts in ocean use. The ORMA would require the following zoning and regulatory characteristics to effectively address resource use conflicts and community concerns:

- Establishment and sustained funding for a Leeward Coast Advisory ‘Ohana with capacity to recommend revocation of permits to DLNR
- Prohibition of all commercial thrill craft in the ORMA
- Establishment of a recreational thrill craft zone seaward of the transit corridor
- Establishment of a transit corridor at the 40-fathom depth contour

Existing regulations need to be clarified to allow DLNR to require commercial ocean tour operators state-wide to obtain a permit to operate in state waters. Because DOBOR regulates ocean users through access to state waters (entry and exit at state harbors and boat ramps), it does not regulate commercial ocean tourism from private harbors. With the ongoing development of private harbors, the state currently has no regulatory tool to limit the number of commercial ocean tourism activities. All commercial ocean tour operators, regardless of point of origin, should be required to obtain a permit to operate in state waters. DOBOR is currently working on amendments to its regulations, which may address this issue and expand the permitting structure to include private marinas and harbors. This permit should include conditions that can be used as a basis for permit revocation. Permits conditions should specify:

- Type of activity
- Location of activity
- Vessel size and capacity
- Requirements that all permit holders and associated vessel operators must attend annual *Code of Conduct* training (permit fees could cover training costs)

With this permit system, DLNR would have a mechanisms to limit the number of permits issued and cap the number of permits operating along leeward O‘ahu to baseline study levels.

Regardless of the alternative selected, the state should provide funding and other necessary resources to establish and maintain an advisory ‘ohana with the following characteristics:

- Include representation from USCG, NOAA, state and private harbor masters, and police and DLNR, in addition to members from the community and individual user groups
- Provide a means to report violations, review reports, and provide formal recommendations on the course of action to DLNR
- Focus on education and outreach for specific audiences

In addition, increased involvement and collaboration among key agencies, such as USCG, NOAA, harbor masters (from state and private facilities) are essential to addressing emerging issues, including ongoing development of private harbors and increasing ocean uses.

The state should continue to work with NOAA to develop a Hawai‘i Dolphin Smart program that can be adopted along the leeward coast of O‘ahu. The state should request NOAA’s assistance in conducting site-specific studies on the impacts of ocean tourism and recreation on mammals along the Wai‘anae coast. In the future, changes in the MMPA may provide the opportunity for the state to directly manage marine mammals in state waters.

10.2 Unresolved Issues

A number of ocean use issues remain unresolved by the management regimes described in the alternatives considered. These issues are as follows:

- Research studies and monitoring the impacts of ocean use activities on marine mammals, especially spinner dolphins, along the Wai‘anae coast are insufficient to estimate disturbance levels and the number of commercial tour operators that would minimize disturbance to the spinner dolphin and other marine mammals.
- The status of the akule and ‘opelu fisheries are not fully characterized. Although long-term catch data exists, rigorous analyses of these data have not been undertaken. In addition, the large reporting grids for fish catch provide no information on the impacts of commercial ocean tourism on the status and distribution of fish along the leeward coast. Smaller reporting grids are needed to decipher changes in these fisheries and fishery-independent studies are needed to evaluate the status of the fisheries.
- Commercial ocean recreational activities conducted from county beach parks could become a major source of additional activity that is not addressed by this study. Land-based commercial ocean recreational activities, such as surf schools, kayaking tours, snorkeling, and kayaking equipment rental do not exist along the Wai‘anae coast but could become prominent in the future. These land-based commercial activities are resulting in conflicts with public recreational use in many beach parks throughout the state.

- Management of ocean resources and ocean use conflicts require a comprehensive approach that considers sea- and land-based stressors. The development and implementation of a comprehensive plan is needed for the Wai‘anae coast that incorporates place-based, culture-based, and community-based strategies and activities as an integral part of the Wai‘anae Sustainable Communities initiative.
- With the development of Hoakalei and the expansion of Ko Olina, commercial and recreational thrill craft use will remain an issue. This report did not include in its alternatives a zone for either commercial or recreational thrill craft use along the southern coast. This omission was conscious, as the Ko Olina resort management indicated that they were not considering offering or promoting thrill craft use from the facility, as it did not conform to their ocean use philosophy. Nevertheless, others may feel differently, and the only currently proposed thrill craft use location (from Alternatives 2 and 3) is prohibitively far from Hoakalei.

10.3 Compatibility with Land Use Plans and Policies

Ocean recreation management alternatives are generally compatible with land use plans and policies. The proposed cap on the number of permits allowed for commercial tour operators in the area is compatible with Wai‘anae boat harbor and Ko Olina Marina operational plans. Commercial tours currently operating out of other harbor facilities or proposed new marinas would not be eligible to apply for permits to operate along the leeward coast. Alternative 3 proposes additional limitations on commercial activity in waters between Kepuhi Point and Kaena Point in line with the goals of the Wai‘anae Sustainable Communities Plan to prohibit all commercial land-based activity in this area of the coast.

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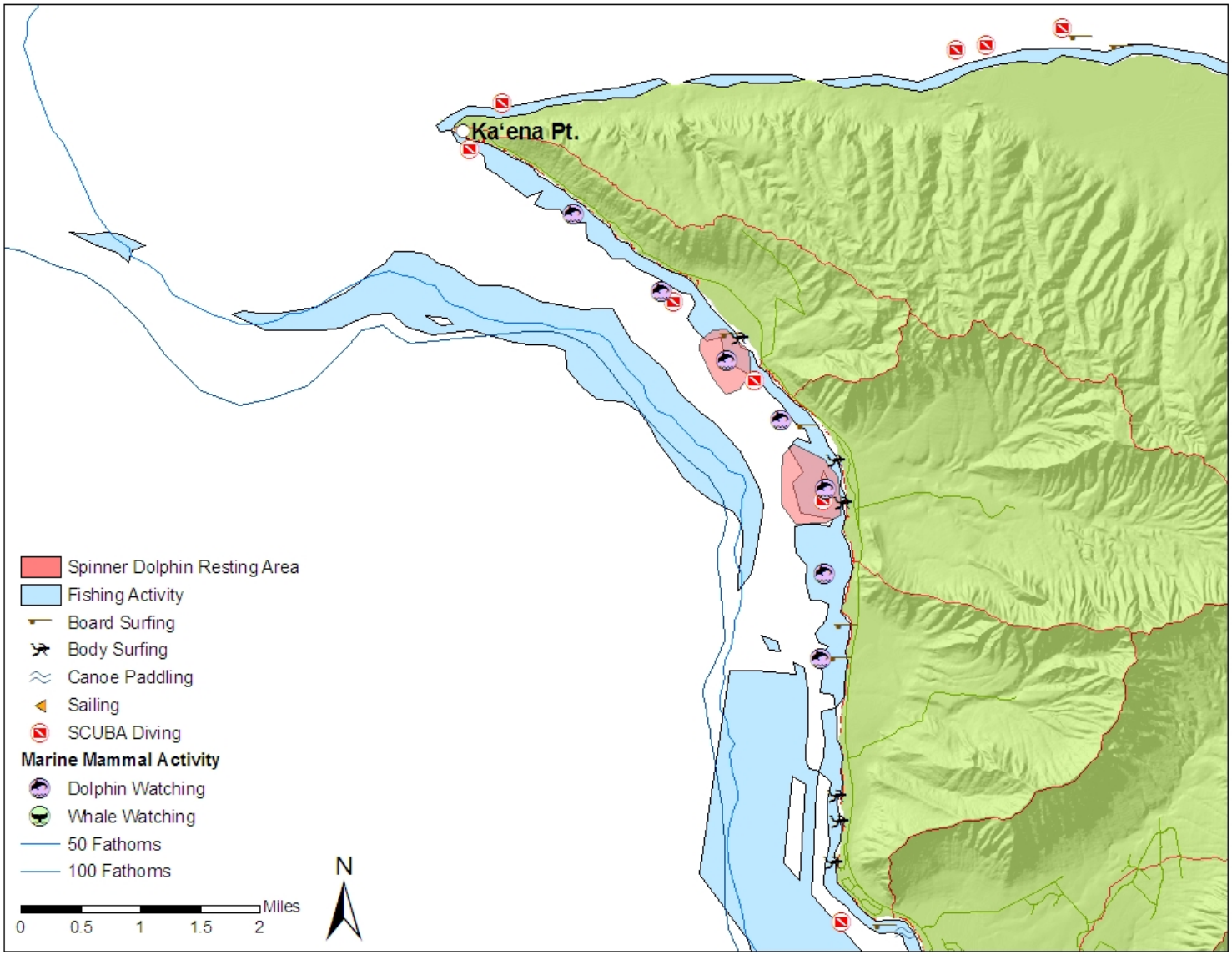
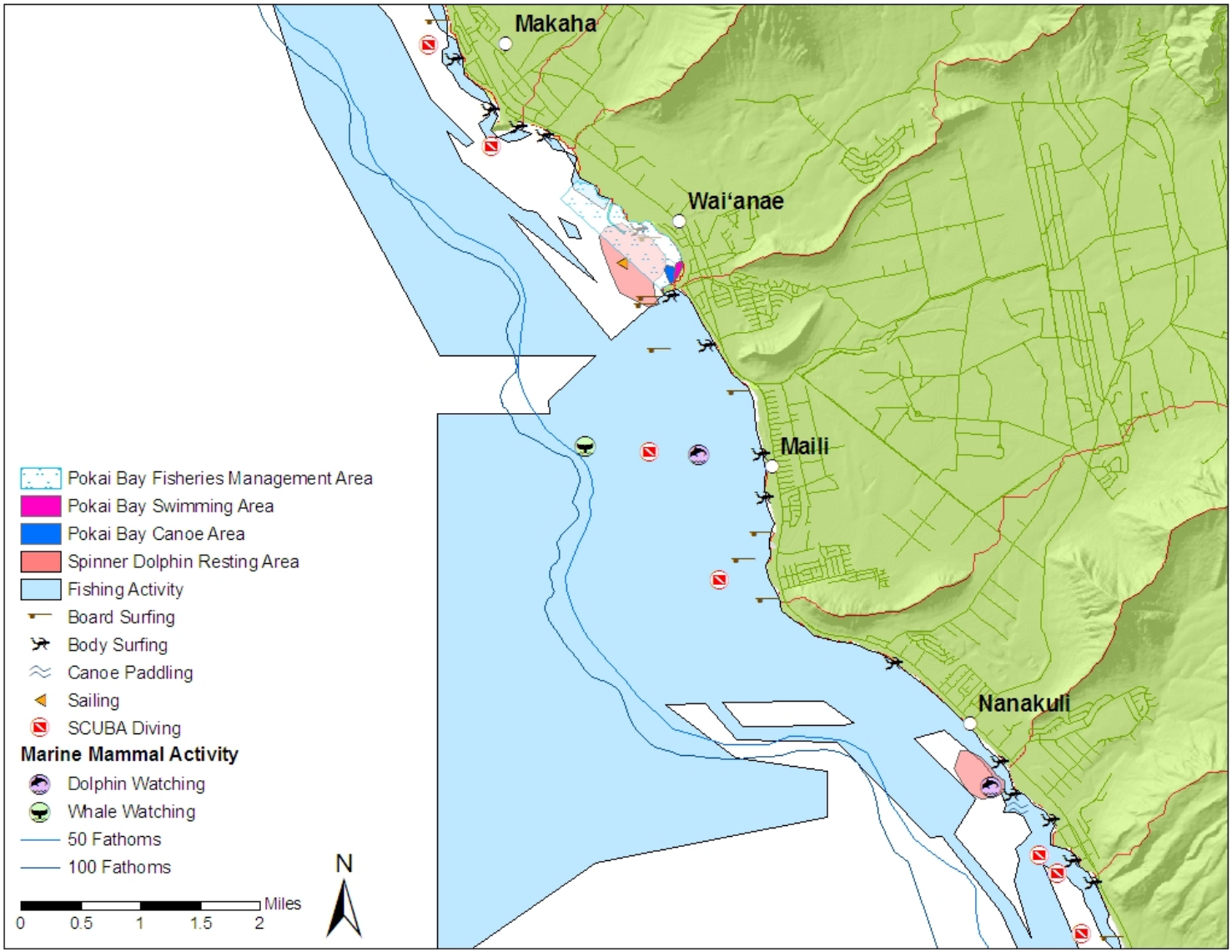
ATTACHMENT

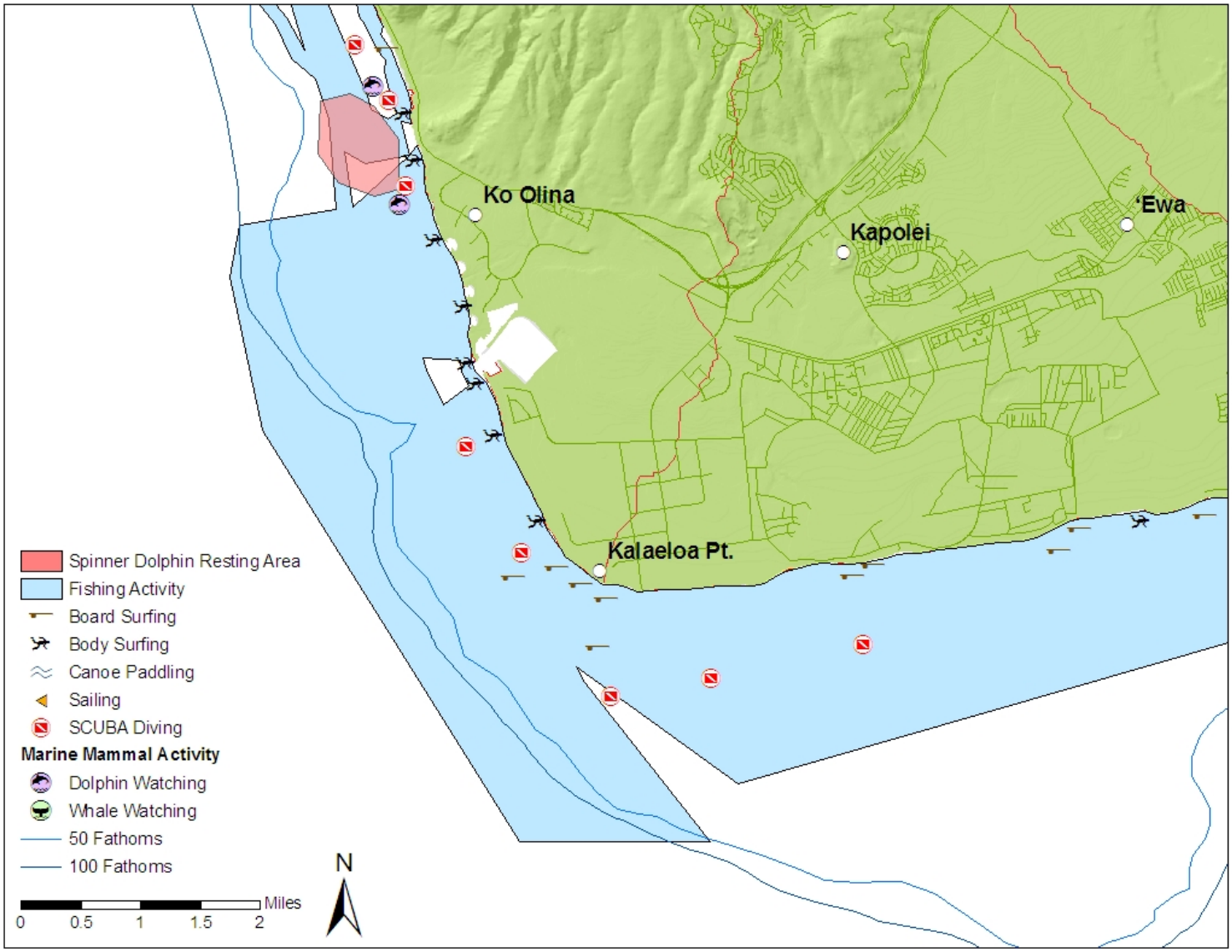
Large Scale Map of the Wai‘anae Coast Showing Location of Commercial and Public Ocean Uses



Locations of key ocean uses in the Ka‘ena Point area



Locations of key ocean uses in the Wai'anae Harbor area



Locations of key ocean uses in the Ko Olina Marina area