Hawai'i Ocean Resources Management Plan




Hawaii CZM Program
Coastal Zone Management

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

HAWAIʻI OCEAN RESOURCES MANAGEMENT PLAN

DECEMBER 2006

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This Hawaiʻi Ocean Resources Management Plan (ORMP) was developed with assistance from Tetra Tech EM Inc. based on priorities identified through public consultation and the efforts of many individuals, agencies, and organizations including the following:

Government Agencies

Hawaiʻi State Department of Agriculture
- Aquaculture Development Program

Hawaiʻi State Department of Business, Economic Development and Tourism
- Science and Technology Branch
- Office of Planning

Hawaiʻi State Department of Hawaiian Homelands
Hawaiʻi State Department of Health
- Environmental Health Administration
- Office of Environmental Quality Control

Hawaiʻi State Department of Land and Natural Resources
- Office of the Chairperson
- Office of Conservation and Coastal Lands
- Aquatic Resources Division
- Division of Boating and Ocean Recreation
- Conservation and Resources Enforcement Division
- Forestry and Wildlife Division
- Land Division
- State Parks Division

Hawaiʻi State Department of Transportation
- Harbors Division

Hawaiʻi State Office of Hawaiian Affairs
- Native Rights, Land and Culture

University of Hawaiʻi
- Hawai'i Sea Grant
- Hawai'i Institute of Marine Biology
- School of Ocean and Earth Science and Technology

City and County of Honolulu
- Department of Permitting & Planning

County of Hawai`i
- Planning Department

County of Kaua`i
- Planning Department

County of Maui
- Department of Planning

National Oceanic and Atmospheric Administration
- National Marine Fisheries Service
- National Marine Sanctuary Program
- Pacific Services Center

Western Pacific Fishery Management Council
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Department of Agriculture
- Natural Resource Conservation Service

U.S. Environmental Protection Agency
U.S. Navy
U.S. Fish and Wildlife Service

Nongovernmental Organizations, Private Sector, and Advisory Groups

Ahupua`a Action Alliance
Association of Hawaiian Civic Clubs
Belt Collins Hawaiʻi Ltd.
Cates International
Community Conservation Network
Conservation Council for Hawaiʻi
Hawai`i Audubon Society
Hawai`i Ocean and Coastal Council
Hawaiʻi's Thousand Friends
Lahaina Divers, Inc.
Let's Surf Coalition
Life of the Land
Marine and Coastal Zone Advocacy Council (MACZAC)
Maui Dive Shop
Ocean Tourism Coalition
Oceanic Institute
Polynesian Voyaging Society
The Nature Conservancy of Hawaiʻi
VP Fair Wind Cruises
Yamanaka Enterprises Inc.

Hawaii CZM Program
Coastal Zone Management

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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Aloha,

Pius Mau Piailug, from the Micronesian island of Satawal in the state of Yap, was Hokule'a's first navigator. He guided the canoe on a 2,300-mile voyage to Tahiti in 1976, the first voyage in over 600 years navigated without instruments on this ancestral Polynesian sea route. A young man from Hawai'i, Nainoa Thompson, recognized the crew of Hokule'a needed a teacher, and had sought and found Mau. Nainoa was determined to learn all he could from the master navigator, and spent months at his side.

In November of 1979, Mau and Nainoa went to observe the sky at Lāna'i Lookout. They would leave for Tahiti soon. Nainoa was concerned and a bit afraid of the challenge of charting a new course using methods that were unfamiliar to him. Mau must have sensed the uncertainty. He asked Nainoa "Can you point to the direction of Tahiti?" Nainoa pointed. Then Mau asked, "Can you *see* the island?"

Nainoa remembers he was puzzled by the question. Of course he could not actually see the island; it was over 2,200 miles away. But the question was a serious one, and he considered it carefully. Finally, Nainoa realized what Mau was really asking, and replied "I cannot see the island but I can see an image of the island in my mind." Mau said, "Good. Don't ever lose that image or you will be lost."

This Ocean Resource Management Plan presents an entirely new course for Hawai'i. The ultimate destination is a healthy and thriving ocean, today and for future generations. The course we must navigate to reach our goal requires us to adopt an integrated approach to managing our ocean resources. We must recognize the inter-relationship between land and sea, and the need for community and all levels of government to work together collaboratively. We cannot continue to operate in separate sectors, independent of each other's jurisdictions. Instead it is we who must alter our way of operations in order to be responsible stewards of this precious gift, our ocean.

This change will not come easily, nor will it come quickly. Changing practices in multiple federal, state and county agencies, revisiting multiple laws, ordinances and regulations, and modifying habits of community-government interactions are very significant changes. However, if we all keep the image of our great-grandchildren playing in a thriving, healthy ocean, we will not get lost. We are capable of meeting this challenge. We must not be afraid of change or the hard work it will take to reach our goal. The reward is well worth the effort.

Laura H. Thielen
Director, State Office of Planning

Overview

For many generations, the people of Hawai'i depended on the ocean's resources for daily subsistence, and some of us continue to do so today. Many of Hawai'i's residents are culturally and spiritually connected to the sea. Hawai'i's coastal zone provides jobs and fuels a tourism-based economy marketed for its clean beaches and water, coral reefs, and fresh island seafood. After work, we are drawn to the ocean to fish, surf, paddle, and barbeque on the beach with family and friends. Even if we don't swim, we are rejuvenated by a walk on the beach, the feel of the trade winds, and the aesthetic beauty of our shores. The opportunity to enjoy the ocean's bounty, if not every day, at least once in a while, is essential to our health and well-being.

While a vibrant and healthy ocean environment is essential to the quality of life we value in Hawai'i, we face significant challenges in preserving the health of our ocean resources and the benefits they provide in our daily lives. Our use of the land is degrading coastal water quality and coral reef ecosystems. Intensified ocean recreational and commercial uses are creating resource use conflicts on public beaches and overexploitation of ocean resources. In addition, regional and global conditions beyond our direct control create new challenges, such as sea level rise, increased frequency and severity of storms, and marine debris.

The Hawai'i Ocean Resources Management Plan (ORMP) charts a new course of action that calls for a change in our approach to natural and cultural resources management. Our current sector-based approach is not adequate to address the complex challenges we face now and will face in the future, despite the ongoing and substantive efforts of government agencies, nongovernmental organizations, private sector, communities, and individuals. Existing plans and programs are developed and implemented primarily by state and local government to manage individual resources. Community goals for area development and resource use are difficult to incorporate. As a result, management efforts are fragmented, with gaps and overlaps in implementation.

Guiding Perspectives for Ocean Resources Management In Hawai'i

Perspective 1: Connecting Land and Sea

Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from sea.

Perspective 2: Preserving Our Ocean Heritage

A vibrant and healthy ocean environment is the foundation for the quality of life valued in Hawai'i and the well-being of its people, now and for generations to come.

Perspective 3: Promoting Collaboration and Stewardship

Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and sea.

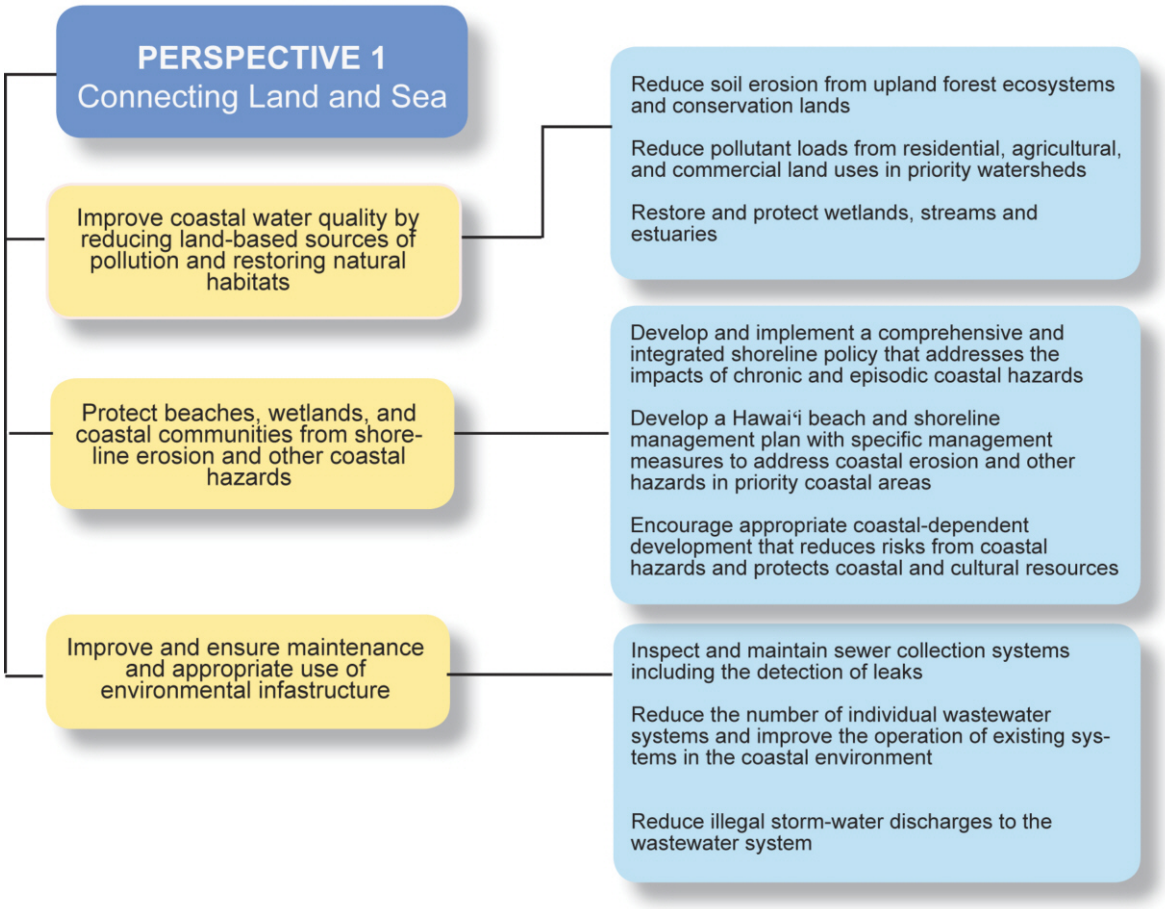
We need new perspectives on our relationship with the land, sea, and each other that will guide ocean resource management in Hawai'i. Building on traditional Hawaiian management principles and lessons from past efforts, we need to move toward integrated and area-based approaches to natural and cultural resources management that require greater collaboration among jurisdictional authorities and catalyze community involvement and stewardship. The need for these changes was echoed in meetings and consultations held across the state to develop this ORMP. However, these changes are substantive and will take significant time, effort, and considerable thought to realize. This ORMP establishes management priorities for the next 5 years to embark on this new course of action to achieve the primary goal: to improve and sustain the ecological, cultural, economic, and social benefits we derive from ocean resources today and for future generations.

Perspective 1
Connecting Land and Sea

Traditional Hawaiian *ahupua'a* management (management of the watershed and adjacent ocean area as a unit) adopted a holistic approach that recognized the interconnectedness of land and sea, the interactions among species, the rhythms of the seasons, and the impacts of overuse on resources. Today, our use of the land is resulting in substantive changes in the condition of the sea. The management goals and strategic actions described under this perspective address priority actions on land to improve the quality of coastal areas and the marine environment.

Existing efforts to reduce land-based sources of pollution from all land uses must be continued and strengthened with targeted assistance in priority watersheds. New measures must be developed to protect beaches and shoreline areas from coastal erosion, not only to preserve beaches but to protect human life and our economy. Urbanization and economic development should keep pace with environmental carrying capacities and thresholds to more effectively guide the improvement, expansion and maintenance of environmental infrastructure.

5-Year Management Goals and Strategic Actions

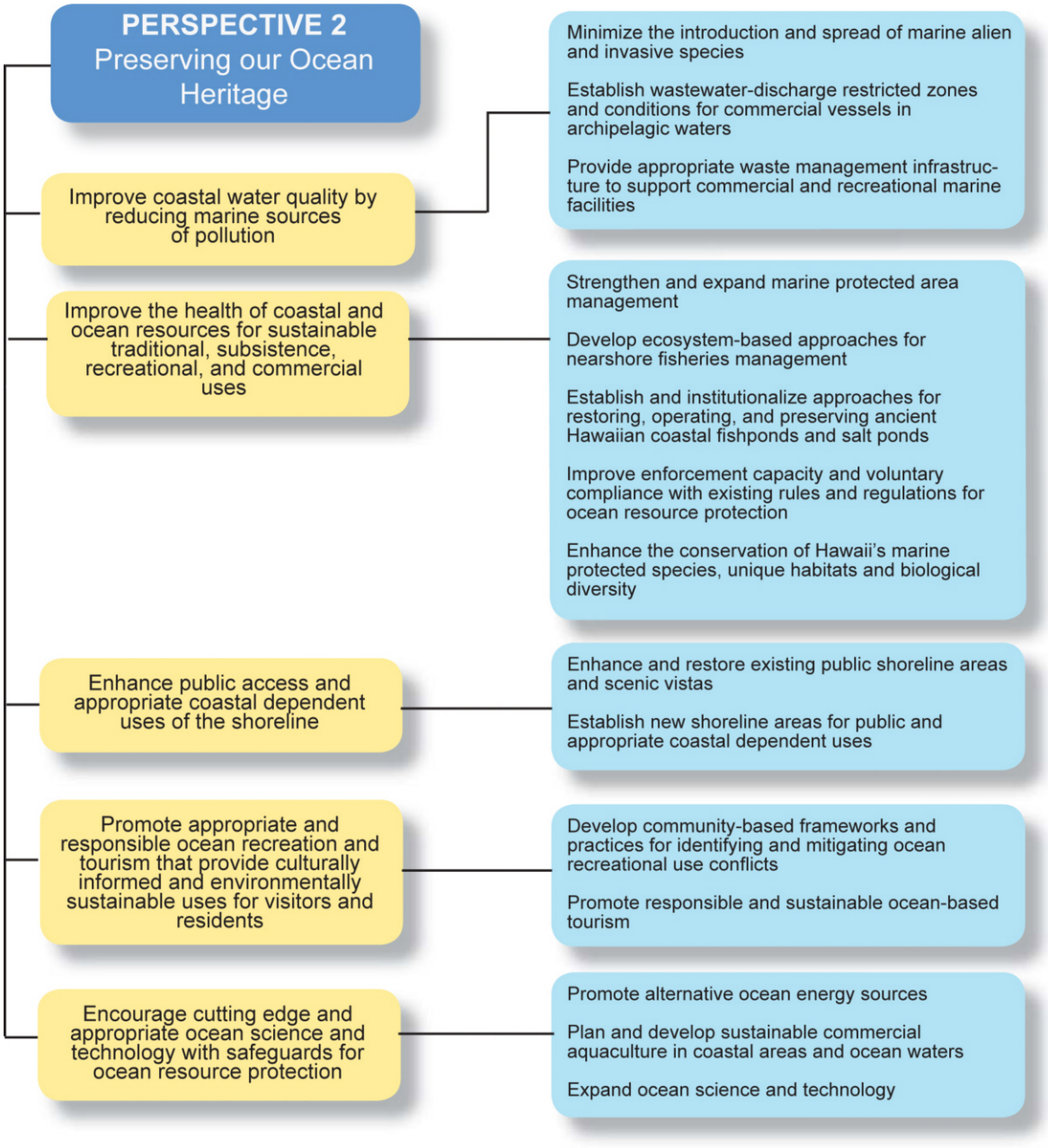


Perspective 2
Preserving Our Ocean Heritage

Traditional Hawaiian management of fisheries and coastal resources demonstrated a deep understanding of and care for the marine environment. A complex management system was adopted that considered the ecology, environmental conditions, and resource uses of a specific geographic area. Today, the condition of our coastal resources is being degraded by a variety of direct and indirect uses of the ocean. The management goals and strategic actions described under this perspective address priority actions at sea to improve the quality of the marine environment.

Existing efforts to reduce pollution from sea-based sources must be continued and strengthened, with added emphasis on stopping the introduction of marine alien species and discharges from commercial vessels in archipelagic waters. The status of coral reef ecosystems is dependent on the implementation of a multi-pronged approach: strengthening and expanding marine protected areas, employing new, ecosystem-based approaches for managing nearshore fisheries, and substantially increasing the capacity for enforcement and voluntary compliance with ocean resource rules and regulations. New approaches are needed to manage recreational and commercial uses of our beaches and coastal areas and develop responsible and sustainable ocean-based tourism. Ongoing efforts in ocean science and technology within the State need to be strengthened and expanded to diversify our economy while employing safeguards for ocean resource protection.

5-Year Management Goals and Strategic Actions

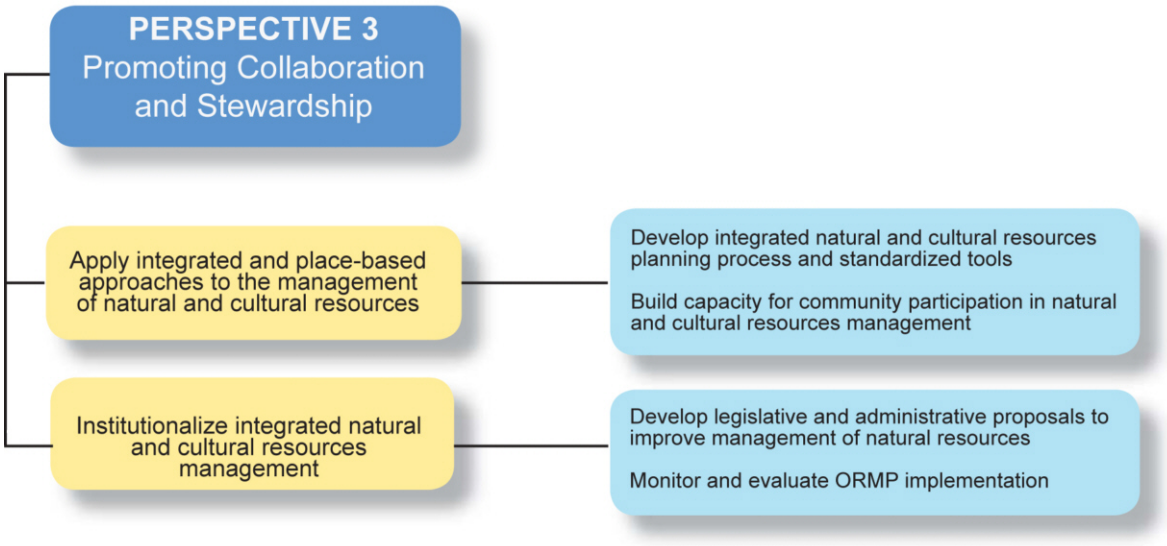


Perspective 3
Promoting Collaboration and Stewardship

Traditionally in Hawai'i, natural resources were managed at the *ahupua'a* and *moku* levels. *'Aha* Councils**,** composed of a diverse group of practitioners and acknowledged experts in agriculture, fishing, water resources, and cultural skills, lived within each *ahupua'a* and served together as the governing board. Today, in contrast, Hawai'i's legal and institutional framework for environmental and natural resources management largely perpetuates a sector-based approach where different government agencies have jurisdictional authority over specific resources. Increasing pressure on natural resources coupled with a greater understanding of environmental systems have brought to light the need for a more holistic approach to natural resource management. The management goals and strategic actions described under this perspective provide opportunities to demonstrate integrated natural resources management approaches, build capacity for community participation and stewardship, and develop legal and policy proposals to institutionalize integrated and collaborative management approaches.

As part of a holistic approach, collaborative governance mechanisms are needed to provide greater opportunities for integrated planning and public involvement. This emphasis on place-based collaboration recognizes that natural resource management cannot succeed without acceptance and commitment from community members. Community leaders and resource managers have realized that this approach can save significant time, money, and effort in developing sustainable, appropriate environmental management plans for their communities. An emphasis on increased collaboration requires us to look at ourselves and each other to change our approach to managing natural and cultural resources by working together, using integrated approaches.

5-Year Management Goals and Strategic Actions



ORMP Implementation and Progress Monitoring

There is an important role for everyone in the implementation of the ORMP. Many of the planned actions must be implemented by government agencies mandated by law to regulate or manage ocean resources and land-based activities that can degrade them. The ORMP is a State plan and therefore highlights actions to be carried out by State agencies. The role of federal and county government agencies, however, is inherent to the successful implementation of the ORMP. Nongovernmental organizations together with community groups play a vital role in catalyzing and implementing actions to improve ocean resources management and will serve as the frontline in providing local perspectives and knowledge for demonstrating place-based management. The private sector is instrumental in designing and implementing best management practices consistent with societal values. In order to institutionalize progress made, lessons learned, and new management approaches, the State legislature and county councils will be busy reviewing and refining laws and rules. Many strategic actions identified in the ORMP can and should be implemented without government, requiring only individuals and groups to take action.

Public comments strongly supported the new perspectives and vision for place-based approaches to natural and cultural resources management detailed in the ORMP. The State's ability to implement the ORMP, however, was highlighted as a major concern in all public meetings. While the Office of Planning (OP) is the lead government agency responsible for preparing and coordinating the development and implementation of the ORMP, success over the next 5 years will require the resources and staff of all relevant State government agencies as well as all other stakeholders to implement not only existing mandates but new actions to achieve the overall goals of the plan. A key focus of the ORMP's implementation over the next 5 years will be to develop and coordinate meaningful interagency and multi-sectoral engagement for plan implementation. Coordination tasks anticipated in the implementation and update of the ORMP, and the schedule, are provided below.

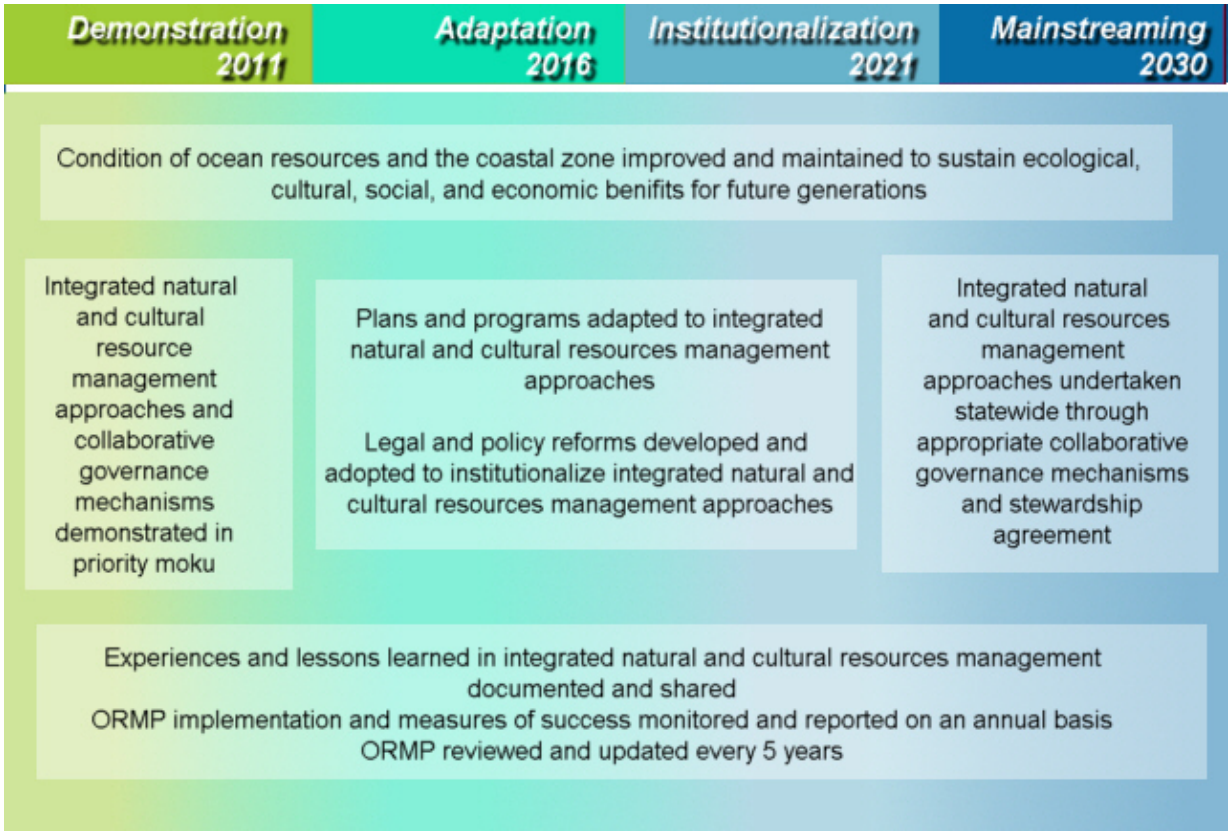
COORDINATION TASKS FOR ORMP IMPLEMENTATION AND UPDATE

Tasks	2007				2008				2009				2010				2011			
Develop/revise results indicators and targets																				
Prepare biennial agency work plans for ORMP implementation																				
Conduct biennial implementation status reviews																				
Conduct mid-term and 5-year evaluation and report on results																				
Conduct interagency planning for ORMP update																				
Gather public input for ORMP update																				
Prepare ORMP update																				

Expected Future Outcomes

This fundamental change in the way Hawai'i manages ocean resources cannot occur overnight. The ORMP lays out a phased approach, with experiences and lessons learned from each phase informing the next. The expected outcomes of each five-year phase are defined through the year 2030. During the first 5 years, management goals and strategic actions are designed to demonstrate integrated natural resources management and collaborative governance mechanisms in priority *moku*. Plans and programs will be aligned with integrated approaches over the second 5 years and expanded to *moku* around the state. Legal and policy reforms will be defined to institutionalize integrated natural and cultural resource management approaches, paving the way for mainstreaming integrated natural and cultural resource management statewide. The condition of ocean resources and the coastal zone is expected to improve over time, first in priority *moku* and then expanding over time to coastal areas throughout the State.

ORMP Phases and Expected Outcomes



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Introduction

A vibrant and healthy ocean environment is essential to the quality of life we enjoy in Hawai'i. Beaches, coral reefs, and other ocean and coastal resources throughout the Hawaiian archipelago (Figure 1) provide us with diverse and substantial benefits every day. To care for this treasure, however, we must greatly improve our management approach to address both chronic problems and new challenges that threaten the health of our ocean resources, and to effectively respond to new opportunities for ocean resource use. The Hawai'i Ocean Resources Management Plan (ORMP) charts a new course of action that will be essential to preserving the health of our ocean resources and the benefits they provide in our daily lives. This course of action calls on all stakeholders to work together to improve and maintain the condition of Hawai'i's ocean resources today and for future generations.

What is the ORMP?

The ORMP is a statewide plan mandated by Chapter 205A of the Hawai'i Revised Statutes. The Hawai'i Coastal Zone Management (CZM) Program in the State Office of Planning (OP), Department of Business, Economic Development and Tourism (DBEDT), is charged with reviewing and periodically updating the ORMP, as well as coordinating its overall implementation.

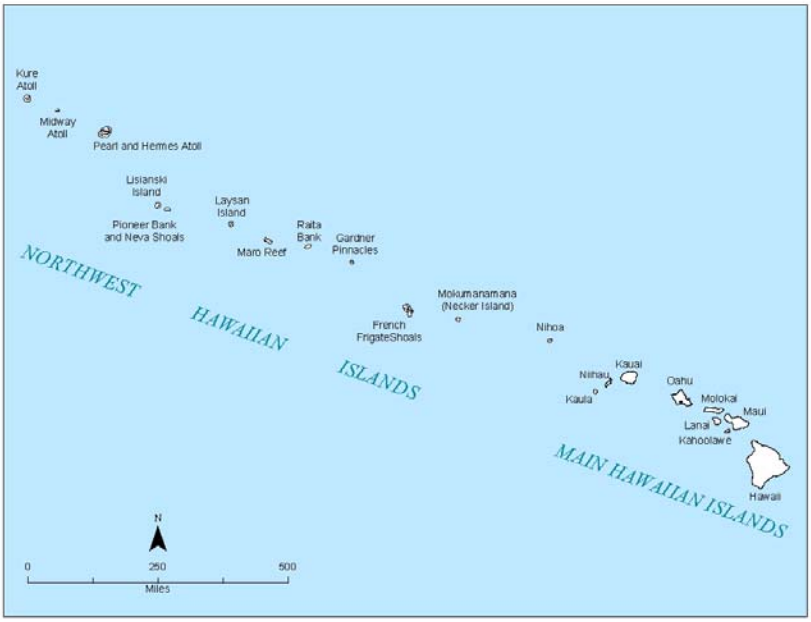


FIGURE 1: MAP OF THE HAWAIIAN ARCHIPELAGO

Developed in collaboration with government agencies, and with input from nongovernmental organizations, the private sector, community groups, and other stakeholders, this ORMP calls for substantive changes in our approach to natural and cultural resources management. It recommends an integrated approach to managing natural and cultural resources, building on traditional Hawaiian management principles, that considers the impacts of land-based activities on ocean resources and fosters collaboration and stewardship. These changes will take time to fully realize. As a result, this ORMP establishes 5-year management priorities to achieve a longer-term goal of improving the condition of ocean resources in the State. The ORMP outlines actions that will be carried out primarily by State agencies, as the plan can only direct State agencies to action. Implementation of short and long-term goals, however, will require the active involvement, support, and assistance of federal and county government agencies and communities across the State.

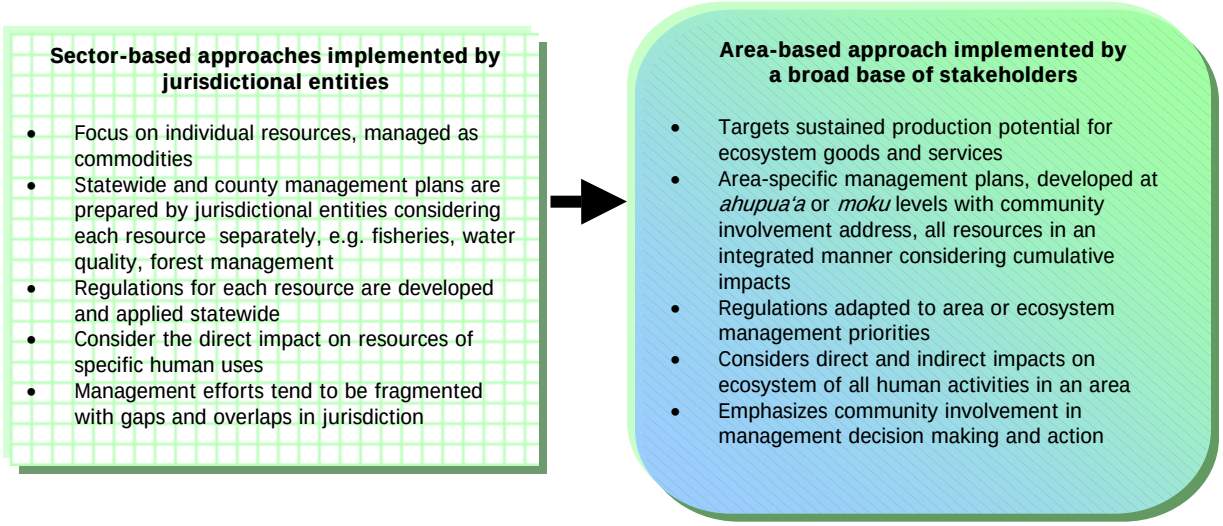
What Distinguishes this Plan from the Previous Efforts?

The ORMP charts a new course of action that calls for a change in our approach to natural and cultural resources management. Our current sector-based approach is not adequate to address the complex challenges we face now and will face in the future, despite the ongoing and substantive efforts of

government agencies, nongovernmental organizations, private sector, communities, and individuals. Existing plans and programs are developed and implemented primarily by state and local government to manage individual resources. Community goals for area development and resource use are difficult to incorporate. As a result, management efforts are fragmented, with gaps and overlaps in implementation.

We need new perspectives on our relationship with the land, sea, and each other that will guide ocean resource management in Hawai'i. Building on traditional Hawaiian management principles and lessons from past efforts, we need to move toward integrated and area-based approaches to natural and cultural resources management that will require greater collaboration among jurisdictional authorities and catalyze community involvement and stewardship. The need for these changes was echoed in meetings and consultations held across the state to develop this ORMP. However, these changes are substantive and will take significant time, effort, and considerable thought to realize. This ORMP establishes management priorities for the next 5 years to embark on this new course of action to achieve the primary goal: to improve and sustain the ecological, cultural, economic, and social benefits we derive from ocean resources today and for future generations.

Charting a New Course for Managing Hawaii's Ocean Resources



This ORMP incorporates significant revisions in approach and updates to the previous ORMP which was prepared in 1991. The 1991 ORMP, a landmark document in its time, became outdated without timely review and revision. After the ORMP was published in 1991, it took nearly 4 years to be adopted by the State Legislature (1994) and an additional year to be incorporated by legislation into the CZM Program (1995). The status of ORMP implementation was not reviewed until 1998. The review revealed that while most of the planned actions were accomplished, a revision to the plan was needed to address changing priorities and new concerns related to ocean resources management. Still, it took another 5 years (2003) to initiate the update process and begin gathering input from various stakeholders. The prolonged time between reviewing progress, learning from our efforts, and making strategic adjustments resulted in a plan that was out of date and inadequate to address current challenges.

This ORMP is distinguished from its predecessors in that it:

- Adopts an integrated approach rather than a sector-based perspective, as was common in previous planning documents

- Promotes an adaptive, learning approach with demonstration projects and phased implementation, coupled with opportunities to share experiences and lessons learned
- Relies on community and private sector initiatives as well as government actions
- Identifies responsibilities and a schedule for plan implementation that emphasize interagency collaboration and public-private sector partnerships

The ORMP provides for regular monitoring and evaluation to quantify progress through performance measures and to make strategic adjustments. Reporting progress to the public in implementing ORMP management priorities is integral to the plan. Documentation and sharing of experiences and lessons learned are also highlighted as an essential component to promote cooperation and a continuous improvement of efforts.

Why Does the ORMP Matter?

For many generations, the people of Hawai'i depended on the ocean's resources for daily subsistence, and some of us continue to do so today. Many of Hawai'i's residents are culturally and spiritually connected to the sea. Hawai'i's coastal zone provides jobs and fuels a tourism-based economy that markets Hawai'i's clean beaches and water, coral reefs and sea turtles, and island-fresh seafood. After work, we are drawn to the ocean to fish, surf, paddle, and barbeque on the beach with family and friends. Even if we don't swim, we are rejuvenated by a walk on the beach, the feel of the trade winds, and the aesthetic beauty of our shores. The opportunity to enjoy the ocean's bounty, if not every day, at least once in a while, is essential to our health and well-being.

While a vibrant and healthy ocean environment is essential to the quality of life we value in Hawai'i, we face significant challenges in preserving the health of our ocean resources and the benefits they provide in our daily lives. Our use of the land is degrading coastal water quality and coral reef ecosystems. Intensified ocean recreational and commercial uses are creating resource use conflicts on public beaches and overexploitation of ocean resources. In addition, regional and global conditions create new challenges, such as sea level rise, increased frequency and severity of storms, and marine debris.

We must greatly improve our management approach or risk losing the benefits we derive from the sea. The full implementation of this ORMP is essential to improving and maintaining the quality of life we value in Hawai'i.

Driving Forces for Change

Over the next 20 years, we will face significant challenges in sustaining the full range of ecological, cultural, economic, and social benefits we derive from ocean and coastal resources. The modest gains that have been made in Hawai'i to slow and reverse the degradation of our ocean and coastal resources have been continually eroded by the impacts of population growth, increased coastal resource use, and global threats from climate change and other manmade causes. We have the power, however, to define a sustainable path that provides opportunities and preserves our natural resources.

Urbanization

Future economic growth and population is expected to place great demands on Hawai'i's ocean and coastal resources as a result of increased urbanization, tourism, and recreational and commercial ocean uses. While economic growth is vital to Hawai'i, it must be properly managed to preserve our natural resources and reduce conflicts among resource users.

With Hawai'i's population increasing, demand for houses and vacation homes will be a strong driving force over the coming decade. As a result, Hawai'i's landscape is being transformed from working agricultural lands to rural and suburban sprawl. The population in Hawai'i is expected to increase 30 percent in the coming 25 years (from 1.26 million in 2004 to 1.63 million in 2030), putting increased pressure on marine and coastal resources, existing infrastructure, and water and land use.

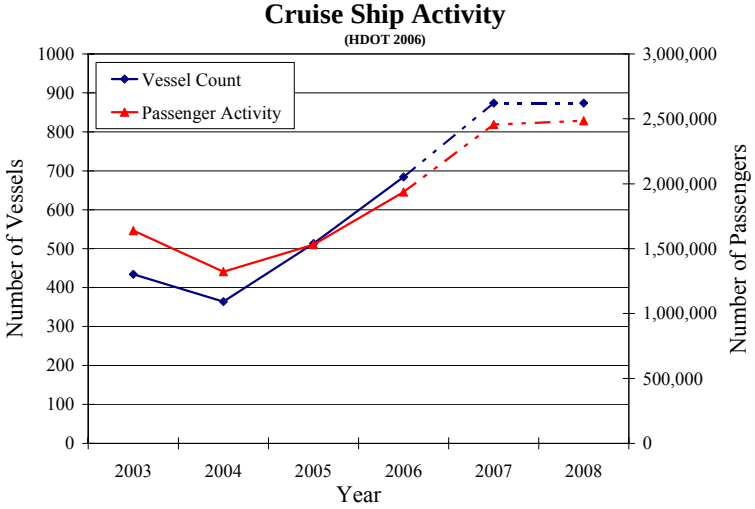
While land-based pollution from agricultural runoff may be declining, urban storm-water runoff from construction activities and increased impervious surface cover has taken its place. Polluted surface water runoff, combined with an aging sewage system incapable of handling system overloads, is threatening our coastal water quality. Furthermore, as population density increases along shoreline areas, landscape hardening to protect property has become a serious coastal issue. Channelized streambeds for floodwater control exacerbate water quality problems and contribute to stream and estuarine habitat loss. Seawalls and other hardened shoreline structures to protect coastal properties exacerbate coastal erosion and beach loss (Fletcher *et al*. 1997).

We can decide how to manage this projected population increase to minimize impacts to our coastal environment and protect our people from coastal hazards that will affect Hawai'i in the future.

Impacts from Tourism

Hawai'i's tourism industry is a mature market that must continue to develop new products to retain or grow revenues. New visitor destinations and activities that will continue to grow in the future include the cruise ship industry, coastal-dependent resort development, increased marketing of the neighbor islands, and ecotourism alternatives designed to explore Hawai'i's most sensitive and unique natural resources. For the benefit of our economy, our local residents, and the ecosystem, we can and must develop these new opportunities with long-term sustainability in mind.

The cruise ship industry has grown significantly over the past decade. As the industry matures, both vessel count and passenger activity[1] numbers are expected to stabilize starting in 2007. New resorts planned and constructed on undeveloped shorelines may reduce public access to ocean resources and degrade scenic vistas. Increased marine-related tourist attractions, including whale and dolphin watching, shark feeding, charter fishing, parasailing, jet skiing, swimming, snorkeling and diving, are likely to result in resource use conflicts and threaten the condition of ocean and coastal resources. How shorelines are developed and the way coastal water quality, beaches, and coral reefs are managed are fundamental to the growth and sustainability of our visitor economy.



In addition to generating jobs, income, and services for the tourism industry, many marine tourism companies incorporate both cultural and environmental education into their products, providing an enhanced experience for visitors to the islands, while hopefully increasing their awareness of the importance of these resources and developing a responsible behavior ethic to protect ocean resources both in the islands and at home.

[1] An activity count is defined as either egress or ingress of one passenger at each port of call.

Commercial and Recreational Ocean Uses

As the population of Hawai'i increases, our dependence on ocean transportation is expected to increase. About 80 percent of Hawai'i's food and merchandise is imported, of which 98 percent arrives by ship to commercial harbors around the State (Lee and Olive 1994). Some commercial port facilities would already be at capacity without ongoing adjustments to the shipping lines' operations and efforts to optimize land use by the Harbor Division of the Department of Transportation (DOT). Such adjustments will extend terminal capacities, but ultimately without the expansion of commercial harbors to accommodate the growing demand of imported goods, Hawai'i's residents may experience delays in the delivery of essential commodities as well as higher shipping costs.

In mid-2007, the Hawai'i Superferry is scheduled to begin ferry service between Oahu and the islands of Maui and Kaua'i, with daily service to the Island of Hawai'i scheduled to begin in 2009. Most of the harbors the Superferry will use were designed to accommodate freight, and the influx of up to 866 passengers and 282 cars will require DOT Harbors to reallocate space for this operation. The Harbors Division is updating its long-range master plans to address the robust growth and new marine operations that will challenge our commercial harbors system.

Hawai'i's coral reefs attract visitors from around the world and provide the economic foundation for over 1,000 ocean tourism companies, with annual gross revenues estimated at $700 million per year (Clark and Gulko 1999). Over 80 percent of Hawai'i's tourists participate in ocean recreational activities, generating almost $364 million each year in added value (Cesar and van Beukering 2004). Ocean resource use conflicts are increasing as commercial ocean recreational uses compete with public recreational uses and access to beaches and marine areas. Resource allocation issues, user conflicts, and stress on the marine ecosystem will become more prevalent without proactive management and the setting aside of significant and appropriate areas for conservation and public access.

Sea Level Rise and Other Coastal Hazards

Global warming is predicted to cause an increase in frequency and power of both storm surge and hurricanes. One study suggests that peak hurricane wind speeds will increase by 5 to 10 percent by the end of the 21st century. A 1-meter rise in sea level would enable a 15-year storm to flood areas that today are only flooded by a 100-year storm (IPCC 1998).

While the impacts of global climate change are largely beyond our control, proactive planning to mitigate their impacts is vital to our economy and the health and safety of our residents and visitors. The temperature of the Earth is predicted to increase between 2.0 to 6.3°F (1.1 to 3.5°C) by the end of the century (Meehl 2005), causing a wide range of increased threats to the coastal area and marine ecosystems. Global warming has also increased the ocean's temperature over the past few decades, which will likely increase the frequency and severity of coral bleaching events and cause sea level to rise (Barnett 2005). The Intergovernmental Panel on Climate Change (IPCC) predicts that worldwide sea level will rise 1.5 feet over the next 100 years, and has outlined numerous impacts from this rise on coastal communities:

- Beach erosion
- Inundation of land
- Increased flood and storm damage
- Saltwater intrusion into the freshwater lens aquifer
- Increased levels of land-based pollutants to coastal waters including sediments, nutrients and contaminants
- More frequent, longer, and more powerful El Niño and La Niña events

All of these impacts will contribute to a greater vulnerability of communities living in coastal areas, endangering life and property. Existing development and present coastal planning do not take this changing environment into account. Preventive or mitigative actions should not wait until a massive natural catastrophe (such as the Indian Ocean tsunami in 2004 or Hurricane Katrina in 2005) causes widespread destruction of the coastal zone.

Marine Debris

Marine debris washing up on our beaches can be a human health hazard, cause harm to seabirds and other wildlife, and lower the quality of life for residents and the satisfaction of visitors. While 80 percent of the marine debris is generated from land-based sources, including storm-water runoff, dumps and landfills, streams, sewer overflow, storm drains, and litter, marine-based sources such as trawl nets, gill nets, and other fishing gear lost or discarded by North Pacific fishing fleets cause significant damage to Hawai'i's coral reefs. The impacts of marine debris are particularly apparent here because atmospheric forces cause ocean surface currents to converge on Hawai'i, bringing the vast amount of debris floating throughout the North Pacific to the islands. An aerial survey conducted between February and May 2006 by the National Oceanic and Atmospheric Administration (NOAA) documented 711 individual debris sites across the main Hawaiian Islands (PIFSC 2006). Adding to this problem is the local issue of increased development along our coasts. More people, more paved area, and a growing demand for manufactured and packaged goods contribute to an increase in non-biodegradable solid wastes in our waterways (EPA 2006). Plastics are particularly harmful to seabirds as the birds retain swallowed pieces in their stomachs, which reduces the space for food, causing a slow starvation process.

Aquatic Invasive Species

The introduction and spread of invasive species in the marine environment can cause dramatic and irreversible harm to Hawai'i's biological diversity and is considered one of the top three drivers of environmental change globally (CEC 2003). With the exponential increase in global trade, travel, and transport in the twentieth century, Hawaiian ports have become vital to pan-Pacific commerce. Today vessels from all regions of the world make their way into Honolulu Harbor, each time increasing the risk of introducing a species new to Hawaiian waters. To date, 343 nonnative marine species have been identified in Hawai'i. Of the known or probable pathways of introduction, 91 percent were from vessels entering our harbors (Eldredge and Carlton 2002). Aquaculture and research activities and intentional aquarium releases contributed the remaining 9 percent.

Courtesy of Sam Kahng: Alien snowflake coral, also known as *Carijoa riisei*, threatening Hawai'i's populations of black coral

Hawai'i has developed an aggressive plan (DLNR 2003) to control the impacts of aquatic invasive species that must be implemented in full force in the future. Prevention and early detection are essential in the control of aquatic invasive species.

Lessons from the Past

Lessons from the past must be captured in order to chart a new course for ocean resources management in the future. These lessons come from traditional management approaches used by ancient Hawaiians to manage land and sea as well as recent efforts to move toward ecosystem-based approaches to ocean resources management.

Traditional Management of Natural Resources in Hawai'i

Ocean resources were managed by the ancient Hawaiians as an integral part of their *ahupua'a* system of managing natural resources. The ancient Hawaiians developed a special relationship with the land and sea. Their work directly in the soil and the seas provided them with sustenance and recreation, molded their cultural values and cultivated their deep sensitivity and respect for their environment. The Hawaiians' reliance on the land and sea for survival made them keenly aware and respectful of the interrelationship between the two. In recent years, natural resource agencies and stakeholders in Hawai'i have acknowledged the inherent flaws in our segmented central-government-based system of resource management, and have begun to rediscover this type of traditional, vertically integrated system, through the development of community groups and watershed councils (Derrickson *et al*. 2002).

The Hawaiians managed their land by various units, including *moku puni* (islands), *moku* (districts comprising two or more adjacent watersheds), and *ahupua'a* (the basic unit of land in Hawai'i, similar to a watershed). Many but not all *ahupua'a* extended from the sea to the mountaintops and incorporated a complex assemblage of land and marine resources needed for survival. *Ahupua'a* were originally governed by regional *'aha* councils, composed of experts in various cultural and livelihood-related skills, and later *konohiki*, leaders appointed by the *ali'i* (chiefs). *'Aha* councils or *konohiki* managed resources by setting *kapu*, forbidden actions, which were severely punished when broken. The Hawaiians dependence on the health of the land and sea infused a sense of responsibility and stewardship into their culture and morals. *Kuleana*, which interweaves honor and duty, best describes the Hawaiian resource management attitude, and best parallels the idea of resource stewardship as opposed to management. *Ahupua'a* and *moku* management reinforced an extensive set of social norms and cultural practices to protect the natural resources from overexploitation, pollution, and extinction.

Rapid Changes with Modern Times

The arrival of the Europeans in 1778 triggered rapid political, social, and economic changes in Hawai'i. Increased trade, the *Māhele* (or land division, allowing for some private land ownership) of 1848, the growth of the sugar and pineapple industries, and increasing privatization engendered significant changes in governance and management structures. As the people of Hawai'i worked less directly in the land and ocean, Hawai'i shifted away from the holistic *ahupua'a* approach to resource management, overlooking the myriad interconnections between and within our ocean and land activities. Ocean resources management became divided among various agencies with specific functions, often competing mandates, and often little coordination amongst each other.

While specific initiatives and resource management policies have tended to be fragmented, the State has conducted a number of collaborative and wide-ranging efforts in ocean resources management over the years. In 1969, the Governor's Task Force on Oceanography produced *Hawai'i and the Sea – A Plan for State Action*. Many initiatives from this plan, such as the University of Hawai'i Sea Grant program, are important forces in ocean management today. Hawai'i's Coastal Zone Management (CZM) Act of 1975 established the State's CZM Program, which is responsible for development and implementation of the Ocean Resources Management Plan. The first ORMP (1985) highlighted four resource areas that must be

managed for public benefit and six resource areas for economic development, but lacked sufficient political support and was never fully adopted or funded. The second ORMP (1991) developed policies and implementation actions primarily based on ten resource sectors. A review of the 1991 ORMP implementation conducted in 1998 (Lowry *et al.* 1998) noted an improved quality of debate on ocean and coastal issues, but cited seven limitations in implementation. The review listed numerous overarching recommendations to address deficiencies. Many were echoed in the 2005 Hawai'i Ocean Resources Management Plan Workshop (see Appendix 1 for details) and remain pertinent and important to ocean resources management today.

Sector-based Organization of Issues and Initiatives in the 1991 ORMP

- Research and Education
- Ocean Recreation
- Harbors
- Fisheries
- Marine Ecosystem Protection
- Beaches and Coastal Erosion
- Waste Management
- Aquaculture
- Energy
- Marine Minerals

Lack of connections between sectors failed to provide opportunities for managers to address cumulative impacts on ocean resources

Limitations of 1991 ORMP Identified from 1998 Review

- Lack of strategic planning
- Inadequate enforcement
- Lack of recognition of ecological and economic importance of ocean and coastal issues in Hawai`i
- Inadequate access to information about resource management activities
- Outdated management regimes for ocean and coastal management
- Inadequate management capabilities and lack of administrative efficiency
- Inadequate administrative flexibility for resource managers

Today, we need to adopt new perspectives that recognize the interconnected nature of our resources as well as changes occurring on a global scale that must be proactively incorporated into management. Coastal hazards and ecosystem degradation have increasingly high costs, and our resources must now be managed holistically, incorporating preventive and proactive measures. This approach must not ignore specific resource sectors, but needs to incorporate all of them under a new approach. We are faced with a major challenge, one in which government must recapture the integrated, collaborative approach that was derived from the close connection between the resources and the resource consumers.

Toward Integrated Management Approaches

Integrated natural and cultural resources management approaches are being demonstrated through several public-private partnerships around the State. The Hawaiian renaissance of the 1970s helped revive interest in traditional Hawaiian cultural traditions and resource management approaches. Similarly, ecosystem-based management approaches promote holistic, place-based alternatives to the largely fragmented and sector-based approaches to natural resources management that we employ today. Lessons learned from these efforts must be captured in developing and refining our approach to management.

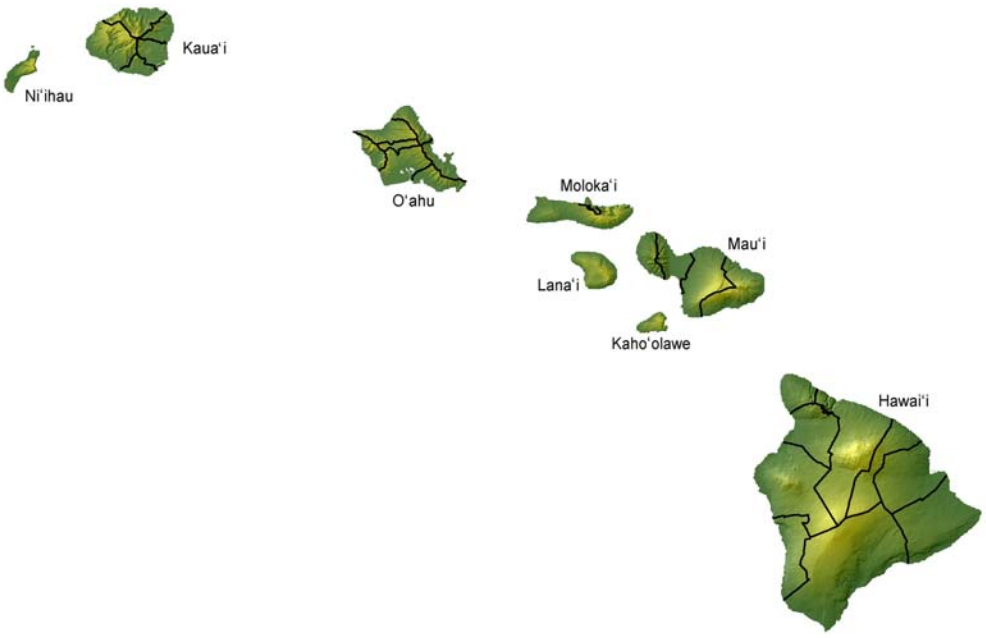
Modern *ahupua'a* management should focus on fostering stewardship of the land and sea and an understanding of the interconnectedness of the health of the environment and people. The *ahupua'a* concept provides the foundation for an integrated approach to natural resource management where communities assess the health and vulnerability of their surrounding environment and can formulate best management practices for sustainable, long-term land and natural resource management alternatives. It provides opportunities to complement agency management with community-based efforts, utilizing localized knowledge while including the community as an active part in decisions about the use of the *ahupua'a*.

Traditional Hawaiian Approaches that can be Applied in Integrated Natural Resources Management

- Management systems at multiple levels: *ahupua'a*, *moku*, and *moku puni*
- Integrated and place-based approaches that highlight linkages between land and sea and unique features of specific ecosystems
- Recognition that resource use is integrally linked with responsibility for and care of the environment
- *Ahupua'a* -based organization, such as '*aha* councils, that advise management decision-making employing traditional and local knowledge as well as science-based information and data
- *Kapu* system (prohibitions) and best management practices developed at appropriate scales of management and consistent with natural processes

Today, the *ahupua'a* as a management concept can represent a diversity of human, cultural, socioeconomic, environmental, and natural resource conditions. This diversity needs to be recognized such that institutional arrangements and processes for management are adapted to provide relevant modes of interaction and input by the community, together with government and nongovernmental organizations and the public. While *ahupua'a* were the traditional management unit, *moku* (district) level (Figure 2) management may play a larger role in addressing natural resource management problems today (Hawai'i CZM 2006). Solutions to natural resource management problems must be defined at the appropriate scale whether that be at the *ahupua'a*, *moku*, or *moku puni* (island) level.

FIGURE 2: MAP OF MAIN HAWAIIAN ISLANDS SHOWING MOKU BASED ON JUDICIAL LAND BOUNDARY DATA



Ecosystem-based management is an emerging approach that has many characteristics in common with the ancient Hawaiian *ahupua'a* management. Ecosystem-based management recognizes that economic activity and human well-being depend on the sustained production of ecosystem goods and services (Olsen *et al.* 2006). Common characteristics of these approaches include:

- Considers ecosystem function and structure in developing management actions
- Recognizes humans as an integral part of the ecosystem
- Employs integrated area-based planning and implementation
- Promotes collaborative governance mechanisms and environmental stewardship

Ecosystem-Based Management

- An integrated planning and management approach that considers the entire ecosystem, including humans
- Establishes as a management goal the sustained production of ecosystem goods and services
- Emphasizes an adaptive process to develop and refine management actions based on research, monitoring and evaluation, and implementation experience

The Western Pacific Fishery Management Council (WPFMC) is in the process of converting its fishery-specific management plans to place-based Fishery Ecosystem Plans (FEP), with a single plan being developed for the Hawaiian archipelago. The organizational structure of developing and implementing FEPs explicitly incorporates community input and local knowledge into the management process. Ultimately, protecting and restoring marine ecosystems and all of their services is the primary focus, above short-term economic or social goals, as only intact, healthy ecosystems can provide the complete range of benefits that humans need and want over long periods of time (McLeod et al. 2005).

Traditional Hawaiian Principles for Stakeholder Involvement and Cooperation

***Ho'okuleana* – Responsibility**

Kuleana places both responsibility and privilege and *ho'o* means "to give." Clear assignments of responsibility for management are needed, as well as performance measures and benchmarks to track progress, identify areas for improvement, and maintain accountability.

***Ho'oūlu* – Be proactive**

Preventive or mitigative actions should be taken before a crisis situation develops. The cost of prevention is minimal compared to the enormous expenses incurred in reactive or crisis management.

***Makemake* – Willingness**

A plan is just a document unless it asserts or creates a motivation to act. Politicians, legislators and community members are all crucial players in initiating change. Political will combined with active stakeholder involvement must be cultivated to provide the impetus for change.

***Kōkua* – Collaboration**

Collaboration between all stakeholders is needed to adopt more integrated and adaptive management approaches. Collaborative governance mechanisms must be developed to facilitate effective and efficient management of ocean resources.

***Ho'okō Kānāwai* – Compliance**

Enforcement of existing laws and regulations can improve the health of our ocean resources. While the primary responsibility for enforcement lies with government agencies, voluntary compliance with ocean regulations can be fostered with education and community involvement.

***Ho'oponopono and 'Aelike* – Dispute resolution and consensus building**

Conflict resolution and consensus building processes are needed to address growing resource use conflicts.

Defining Our Future: 2030

The ORMP is intended to set *us* –a broad base of stakeholders that includes federal, State, and county governments, State legislature, city and county councils, nongovernmental organizations, academic institutions, the private sector, community groups, and the public–on a new course of action. This course of action builds on lessons learned from the past and addresses the threats and forces that are likely to affect the future of our ocean and coastal resources through the year 2030.

To embark on this new course of action, we need to establish a destination, a desired future state of our ocean resources and their management in Hawai'i. The following perspectives and desired outcomes are intended to guide us in the process of making informed decisions about the use and management of our ocean and coastal resources. As we implement the ORMP, we will revisit this vision of the future every 5 years by transposing each outcome into a question, "Have we…?"

Future excerpt from the 2030 Ocean Address

...In the beginning, we took small, yet deliberate steps. We tested integrated natural resource management approaches and documented and shared experiences and lessons learned for application in other areas throughout the State. Building on existing initiatives, we strengthened support to the implementation of local strategies to address priority threats to ocean and coastal resources.

Through sustained efforts, we have improved coastal water quality by careful and appropriate use of the land and sea. With an effective network of marine protected areas, enforced regulations and ecosystem-based management approaches, the condition of our coral reefs and associated fisheries has noticeably improved. The ocean and coastal clearinghouse we developed is serving as a virtual learning center, consolidating and making readily available scientific, technical, and regulatory information and data on and funding opportunities for ocean and coastal resources management.

Now, we have institutionalized these accomplishments through substantive changes to our legal and institutional framework. We have learned that the process of ocean resources management must be driven by principles of integration and not fragmentation, must be reviewed and adjusted to address current realities and future threats, and must be constantly marketed to stimulate action and monitored for signs of progress. It is a lifelong commitment of the living to sustain a future for those who will come after….

Perspective 1: Connecting Land and Sea
Careful and appropriate use of the land is directly linked to the preservation of a diverse array of ecological, social, cultural, and economic benefits we derive from the sea.

Long-term desired outcomes for Perspective 1 include the following:

- *We have reduced land-based sources of pollution to all coastal water bodies throughout the State.*
- *We have dedicated substantial and suitable portions of our shoreline, beaches, coastal wetlands, and scenic coastal vistas as open space for public use and enjoyment, and to preserve the critical environmental functions they provide.*
- *We have managed coastal development to ensure quality of life by preserving open spaces and scenic vistas; adopted best practices for low-impact development in siting, design, construction, and maintenance; and minimized interference with natural processes.*
- *We have ensured that critical shoreline areas are preserved for activities that are dependent on the coastline (such as harbors and maritime industries)*

Perspective 2: Preserving Our Ocean Heritage
A vibrant and healthy ocean environment is the foundation for the quality of life in Hawai'i and the well-being of its people, now and for generations to come.

Long-term desired outcomes for Perspective 2 include the following:

- *We have established the most effective network of marine protected areas in the world, designed to reduce resource use conflicts, manage our renewable resources for abundance, and increase resiliency of coral reef ecosystems to manmade and natural stressors.*
- *We have minimized the impacts of marine pollution through investments in new technology and approaches for prevention, early detection, and control.*
- *We have provided a safe and healthy environment for the protected species to thrive.*
- *We have developed and improved ocean-related infrastructure (harbors, boat ramps, recreational facilities) to support environmentally sustainable social and economic development.*
- *We have ensured community access to ocean resources.*

Perspective 3: Promoting Collaboration and Stewardship
Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and sea.

Long-term desired outcomes for Perspective 3 include the following:

- *We have instilled in ourselves– government, citizens, and visitors– a deep awareness of the importance of caring for our ocean and coastal resources as well as the consequences of inaction.*
- *We are a broad and diverse base of engaged stakeholders who have worked collaboratively and shared our principles and approaches, methods and tools, and accomplishments and struggles in meaningful ways.*
- *We have made necessary, appropriate and sufficient investments in management and enforcement to sustain the significant benefits we derive daily from our ocean and coastal resources.*
- *We have brought together traditional, cultural and scientific knowledge in the development of the best management alternatives for the stewardship of our ocean and coastal resources..*
- *We have established an integrated data information sharing system that allows all agencies and stakeholders the ability to understand and assess the cumulative impacts from proposed activities.*

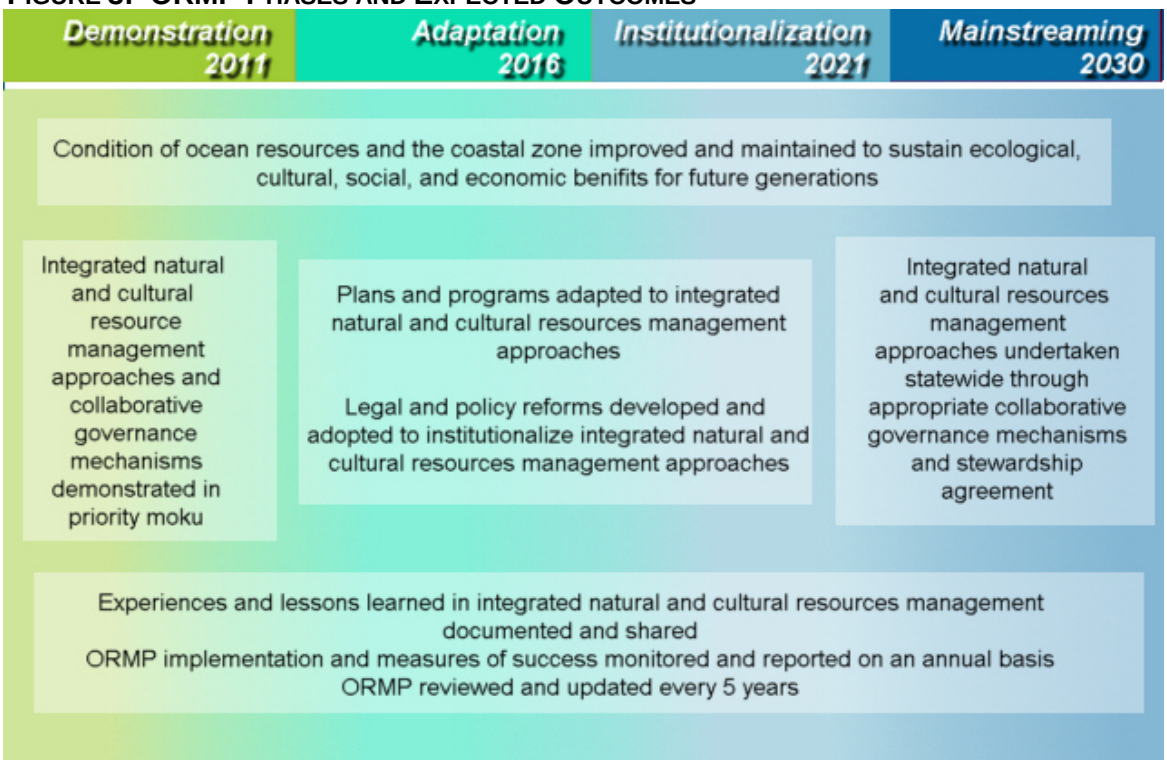
Five -Year Management Priorities

The long-term vision for ocean resources management in Hawai'i must be supported by small, measurable steps. The ORMP lays out a phased approach, with experiences and lessons learned from each phase informing the next, and with expected outcomes of each 5-year phase defined through the year 2030 (Figure 3).

During this first demonstration phase, through the year 2011, management priorities are designed to strengthen ongoing efforts to manage ocean resources and demonstrate new integrated management approaches. These management priorities are organized under three perspectives to provide a focused framework for action. Perspective 1, *Connecting Land and Sea*, addresses land-based activities that impact ocean resources (Table 1). Perspective 2, *Preserving Our Ocean Heritage,* highlights ocean-based and coastal resource use (Table 2). Finally, Perspective 3, *Promoting Collaborative Governance and Stewardship,* provides opportunities to demonstrate integrated approaches and improve collaboration between the public and private sectors (Table 3). Experiences and lessons learned will be documented and used to inform ongoing and future efforts and, together with monitoring, will be used to update the ORMP for the next phase of implementation.

During the second 5-year adaptation phase, plans and programs will be aligned with integrated approaches and adapted to *moku* around the State. In subsequent phases, legal and policy proposals will be defined to institutionalize integrated natural and cultural resource management approaches, paving the way for mainstreaming integrated natural and cultural resource management statewide. The condition of ocean resources and the coastal zone is expected to improve over time, first in priority *moku* and then expanding over time to coastal areas throughout the State.

FIGURE 3: ORMP PHASES AND EXPECTED OUTCOMES



Perspective 1: Connecting Land and Sea

Hawaiian *ahupua'a* management (management of the watershed and adjacent ocean area as a unit) adopted a holistic approach that recognized the interconnectedness of land and sea, the interactions among species, the rhythms of the seasons, and the impacts of overuse on resources. Today, our use of the land is resulting in substantive changes in the condition of the sea.

Existing efforts to reduce land-based sources of pollution from all land uses must be continued and strengthened, with targeted assistance in priority watersheds. New measures must be developed to protect beaches and shoreline areas from coastal erosion, not only to preserve beaches but to protect human life and our economy. Environmental infrastructure must be improved, expanded, and properly maintained to keep pace with urbanization and economic development.

The 5-year management priorities for this perspective are described below and detailed in Table 1. These management goals and strategic actions address priority actions on land to improve the quality of coastal areas and the marine environment.

Improve coastal water quality by reducing land-based sources of pollution and restoring natural habitats

Land-based sources of pollutants are considered priority threats to coral reef ecosystems in Hawai'i. Sediments, nutrients, and other pollutants are transported in surface water runoff and by groundwater seepage into coastal waters. As Hawai'i's population increases, land use is increasingly being converted from conservation and agriculture land to urban uses. Population growth and density alters the quantity and chemical composition of land-based pollutant runoff from impervious surfaces, farms, feedlots, golf courses, and other uses.

The health of our beaches, coastal waters, and coral reef ecosystems is closely tied to upland land practices. Improper control of runoff from agricultural lands and construction sites causes silt plumes that degrade water quality of coastal areas by diminishing light penetration on the reef and suffocating reef organisms. Fertilizers, pesticides, and other pollutants from farms, golf courses, resorts and urban development can lead to harmful algal blooms and accumulation of toxins in marine life, and limit safe and enjoyable ocean recreation. As nearly half of Hawai'i's land is within 5 miles of the coast, almost all activities occurring within our State could be considered to have a potential impact on our coastal resources.

Increased urbanization of our islands represents the primary threat to coastal water quality and must be effectively addressed. The implementation of integrated *ahupua'a*- based watershed and coastal zone management will be a key factor in our ability to protect the quality of coastal waters and resources. By considering the cumulative effects of all activities occurring within a watershed, we will be better able to determine a management strategy that imparts the greatest benefit to our economy, people, and environment. Our current piecemeal approach does not provide adequate safeguards to prevent the development of projects that may have cumulative and potentially irreversible environmental impacts, or to promote environmentally sustainable projects that provide economic and social benefits.

Reduce soil erosion from upland forest ecosystems and conservation lands: While most of Hawai'i's mountaintops are protected based on their designation as conservation lands, uprooting of plants by feral animals, the loss of native forest species, invasive weeds, and manmade factors result in soil erosion that ends up in streams and eventually in coastal waters. To address some of these threats, the State is involved with nine unique Watershed Partnerships, which are public-private initiatives for watershed and

native habitat conservation. These Watershed Partnerships are implementing best management practices to protect native ecosystems and island water supplies. Conservation work includes reducing soil erosion by controlling invasive species and fencing out of ungulates such as feral pigs, mouflon sheep, goats, deer, and cattle in over 1 million acres of critical upland forests. In addition to these Watershed Partnerships, the DLNR's Division of Forestry and Wildlife, which is the principal State partner for these partnerships, has developed best management practices for watershed protection under its forestry section's watershed protection and management program. State, federal, and private sector funding must be leveraged to implement these best management practices as well as to support similar public-private initiatives like the Watershed Partnerships.

Reduce pollutant loads from residential, agricultural, and commercial land uses in priority watersheds: All forms of land use by humans have the potential to create polluted surface water runoff. Construction activities expose soil that can be washed into streams and storm drains that lead to the ocean without proper sediment control. Agricultural practices include the use of herbicides and pesticides that can enter streams and the water table, and are also a major source of sediment pollution (DeCarlo and Dollar 1997). Increased urbanization results in more roads, buildings, and houses that create impervious surfaces that quickly convey storm water carrying suspended solids, nutrients, and other pollutants to storm sewers, drainage ditches, and ultimately the sea. With the channelization of many of Hawai'i's streams to control storm water, polluted surface-water runoff is concentrated and discharged directly to the ocean. DOH regulatory tools include National Pollutant Discharge Elimination System (NPDES) and stormwater permits and water quality certifications. Strict adherence to storm-water controls for construction activities and the widespread adoption of best management practices in existing and new developments is needed in all watersheds to reduce polluted surface water runoff. Sources of funding for reducing pollutant loads include the Natural Resource Conservation Service's Farm Bill, incentive programs for landowners and Clean Water Act Sec. 319 funding for watershed plans.

Numerous ongoing and cross-agency efforts have already focused on specific watersheds and areas of greatest need, and the ORMP should build on these existing efforts. The DOH has assessed water quality in streams and coastal waters across the State, and has included 70 streams and 174 coastal stations in its "2004 List of Impaired Waters" for those waterbodies that do not meet water quality standards. The DOH Environmental Planning Office has ranked these waterbodies and has completed pollution budgets, total maximum daily loads for several of these impaired waters to assess the amount of non-point source pollution entering these streams, with the intention of identifying activities that may help reduce pollutant loads from residential, agricultural, and commercial activities, in order to improve water quality in streams and coastal areas. The DOH has a Polluted Runoff Control Program that funds activities in areas with existing watershed implementation plans, and has provided funding support over the past several years for the development of 11 of these watershed plans on six of the main islands. Hawai'i's Local Action Strategy (LAS) to address land-based pollution threats to coral reefs has been working since 2003 with three priority watersheds to implement pollution controls, improve coastal water quality and coral reef ecosystem function and health. These watersheds are Hanalei, Kaua'i; Honolua, Maui; and Kawela to Kapualei, Moloka'i. Hawai'i's coral reef LASs address a range of threats to coral reefs and identify other key sites where coordinated management efforts are ongoing. The U.S. Environmental Protection Agency (EPA), NRCS, HACD/SWCD, DLNR, DOH, and CZM are developing a memorandum of understanding (MOU) that will focus conservation and polluted runoff control efforts in a specific watershed. These agencies are currently in the process of identifying specific watersheds where they can better integrate program responsibilities at the watershed level, and a draft list will be available in November 2006. The Hawai'i CZM Program prepared the report "Improving watershed protection in Hawai'i through strengthening programs and policies to preserve areas critical to water quality," (Hawai'i CZM 2002) which summarizes the status, threats, existing protection mechanisms, and gaps for the primary land-based ecosystem types within an *ahupua'a* and provides nine recommendations for improved watershed management, some of which are being developed.

Restore and protect wetlands, streams and estuaries: Hawai'i's wetlands and estuaries, and the natural streams that sustain their existence, have been under threat of development for many decades. Wetlands account for approximately 110,000 acres of Hawai'i's landscape (Hawai'i CZM 2002). Many coastal wetlands are small and isolated by topography and urban expansion. Most of these areas are closely associated with human communities. Over the past two centuries, about one-third of the coastal wetlands have been lost to development activities (Hawai`i CZM 2002), including most of Waikīkī, and Kaelepulu Pond (commonly called Enchanted Lake, on the windward side of Oahu). Today, many of Hawai'i's urban streams have been channelized for flood control, and no longer support the lush riparian vegetation that is the basis of wetlands and estuaries. Still, wetlands across the State are essential to our welfare. They serve as flood control, absorbing water from surrounding areas and preventing property destruction caused by raging storm waters. During times of heavy rain, sediment, fertilizers, chemicals and other pollution that emanates from upland sources travels via streams, runoff and underground pathways to the coastal areas. Runoff like this can kill offshore reefs, and pollute rivers and streams. Wetlands break down these pollutants and catch the sediment before it reaches the ocean. The abundance of nutrients, vegetation, and calm, shallow water makes wetlands one of the most productive environments. Estuaries, where the fresh and salt water mix together, serve as important habitat and spawning grounds to mullet, milkfish, shrimp, and the *nehu*, used as live bait in the pole-and-line skipjack tuna fishery (NOAA Fisheries 2006). These are also critical habitats for many native species and endangered birds such as the stilt, moorhen, coot, and *koloa* duck.

Wetland loss in Hawai'i can be attributed primarily to uncontrolled urbanization, and improperly managed agricultural activities. Most of the higher quality wetlands in Hawai'i are small and exist in the forest areas, where they are largely protected from development. There are relatively few in the coastal areas, where they would provide non-point source control functions (Hawai`i CZM 2002). Currently, the primary threats to Hawai'i's wetlands are from development-related activities, including filling for construction and the diversion of waters which would normally flow into the wetlands.

Protect beaches, wetlands, and coastal communities from shoreline erosion and other coastal hazards

The open spaces of Hawai'i's coastline are experiencing rapid development across all islands. Our coasts are a limited resource with unique aesthetic appeal and cultural importance. Counties generally permit beachfront structures without adequate set-backs to account for long-term shoreline change. This trend increases and expands the threat of coastal hazards across the State. Sea-level rise threatens to broaden and accelerate the pattern of coastal erosion in Hawai'i, which will further increase the risk to coastal structures from storms, hurricanes, and tsunamis. Development along the shoreline needs to address the increased intensity of coastal hazards attributable to global warming. Perhaps more than any other goal discussed in this plan, advancing and implementing the following strategies intended to protect private property, public land, and the environment from current and increasingly powerful threats is vital to the safety and quality of life of our people, and the health of the economy and environment.

Develop and implement a comprehensive and integrated shoreline policy that addresses the impacts of chronic and episodic coastal hazards: Our shorelines are under tremendous pressure of development, while the intensity of natural hazards impacting the coast is likely to increase. Responsibility for managing coastal development is hindered by a maze of jurisdictional authorities and complicated zoning designations. The Department of Land and Natural Resources is developing a comprehensive and integrated shoreline policy intended to addresses shoreline erosion, beach loss, and hazard mitigation. The development of a comprehensive shoreline policy provides a framework for implementing a coordinated approach among county, State, and federal agencies.

Develop a Hawai'i beach and shoreline management plan with specific management measures to address coastal erosion and hazards in priority coastal areas: Coastal erosion not only threatens buildings and private property, it also diminishes the quality of life for entire communities. While cyclical beach erosion and accretion is a natural occurrence, engineering studies in Waikīkī, on Maui, and across the State have repeatedly shown that seawalls and other structures that harden our coastline only temporarily protect private property, but cause accelerated and permanent erosion of our public beaches. A beach asset study must be conducted statewide to rank priority beaches based on level of degradation, increased vulnerability, potential for remediation, and economic and community value. Site-specific beach management techniques can then be developed for priority beaches that will allow for natural erosion and accretion processes to occur while minimizing economic impacts and coastal hazards to life and property. In some instances beach nourishment may be appropriate, while land acquisition or redevelopment could be long-term solutions in other areas. The development of a Hawai'i Beach Management Plan that will address some of these issues is a priority for the DLNR's Office of Conservation and Coastal Lands.

Encourage appropriate coastal-dependent development that reduces risks from coastal hazards and protects coastal and cultural resources: Tragedy struck in Hilo in 1946 in the form of a disastrous tsunami. As a result, Hilo has adopted land-use planning to minimize tsunami damage, including forest buffer zones between the coast and major urban buildings. Structures within the tsunami zone, like the Nihon Restaurant and the Hilo Hawaiian Hotel, are constructed so that tsunami surge can pass through the ground floor in ways that minimize structural damage. Throughout the state, our coastline is likely to experience more intense storms, a higher likelihood of flooding, and faster rates of erosion from natural processes associated with global climate change. A long-range collaborative approach is needed to reduce risks from coastal hazards, including a review of governmental policies that promote or encourage inappropriate coastal development.

To mitigate future damage, State and county agencies, or a proposing applicant, should be required to plan for these coastal hazards at the earliest stages of development when land is zoned, general and community plans are made, land is subdivided, or new structures are proposed. This would require coastal hazard assessment that includes a coastal erosion analysis, accounting for long-term erosion rates, a statewide consistency plan, and the lifetime of a structure. Additional strategies may include public acquisition of specific sites, increased shoreline setbacks, and incorporation of hazard risk assessment procedures in the siting of shoreline structures. The *Hawai'i Coastal Hazard Mitigation Guidebook* (Hwang 2005) is an example of an action taken by private citizens motivated by a public issue. It was developed for use by individuals (planners, architects, homeowners) as well as government agencies. The guidebook discusses the relative geographic risk from erosion, wave inundation, flooding, wind damage, hurricanes, tsunamis, and other natural hazards; and identifies appropriate mitigation measures, including land use planning and siting, based on scientific, legal, economic and fairness factors. Proper planning to incorporate future uncertainties associated with coastal hazards will require extensive community education and strong support from County, State and federal agencies to generate a new, environmentally and socially responsible vision for coastal development. This strategy is a key example where the cost of prevention is undoubtedly much less than the cost of emergency response and reconstruction after a damaging event.

Improve and ensure maintenance and appropriate use of environmental infrastructure

With 1.26 million people currently living in the islands, 7 million tourists visiting every year, and the population expected to increase to 1.63 million over the next 25 years, Hawai'i relies excessively on aging infrastructure to support the needs of its resident and visitor population. We need to continually invest in improving and maintaining our waste management infrastructure to support a growing population and economy. Without these investments, we will continue to be plagued by the release of

raw sewage to coastal waters, endangering human lives and degrading the quality of the environment on which our economy depends. Many of the action items within Table 1 for infrastructure improvements can use federally subsidized loan funds from the DOH's Water Pollution Control Revolving Fund (WPCRF). The WPCRF is primarily financed by EPA's largest source of water program support for the states, the Clean Water State Revolving Fund. These low interest loans are available for construction and repair of wastewater infrastructure, pump-out facilities, and replacement of large capacity cesspools.

Inspect and maintain sewer collection systems including the detection of leaks: Ruptures and cracks in sewers result in wastewater leaking out into the environment during dry conditions and in storm water infiltrating the system during flood conditions. The infiltration of storm water into the sewage system during heavy rain events results in overloads to the sewage treatment facilities. The upgrade and maintenance of the sewage system is a priority action to minimize impacts during flood conditions. Regular inspections, maintenance, and the detection of leaks are required under all EPA NPDES wastewater permits that are issued to every county. The City and County of Honolulu's Department of Environmental Services (DES) carries the biggest responsibility, with over 1,900 miles of sewer lines processing over 41 billion gallons of wastewater each year. While other counties may require creative solutions as their populations outgrow current infrastructure, impacts from wastewater and storm water on the ocean environment are of greatest concern on O'ahu because over 70 percent of Hawai'i's population resides here. While the DES spends 1 out of every 4 dollars allocated for the City's Construction Improvement Projects and has increased its inspections of the sewer lines to better plan rehabilitation projects outlined in its 20-year wastewater rehabilitation plan, problems associated with aging and undersized infrastructure continue to occur. Increases in sewer fees can help ensure the necessary funding to improve aging pipes where they are most needed.

Reduce the number of individual wastewater systems and improve the operation of existing systems in the coastal environment: In many parts of the United States, including Hawai`i, individual systems are the only practical option for properly treating wastewater. For areas where hookups to centralized wastewater collection systems are not practical, threats can be minimized by using more advanced treatment and improving operation and maintenance of individual systems. Individual wastewater systems are designed to receive and dispose of no more than 1,000 gallons per day of domestic wastewater (HRS Title 11, Chapter 62). In coastal areas, nutrients and other pollutants from cesspools, the oldest type of individual wastewater system, can leach into the nearshore environment. While EPA regulations required all large-capacity cesspools (LCC) to be closed by April 5, 2005, and replaced with an alternative wastewater system, individual residential properties and commercial properties serving fewer than 20 people are not bound by this requirement, and are regulated by the State. Because cesspools are more widely used in Hawai'i than in any other state in the country, the number of LCCs and smaller cesspools are both very high. An inventory of individual wastewater systems in coastal areas is needed to characterize the universe of these systems in operation. This should be followed by generating a priority list by watershed and developing best practices and incentives for private upgrading. Steps should be taken to ensure that the prohibition on the establishment of new LCCs is enforced, and that allowed alternatives, such as leach fields, do not adversely impact coastal waters.

Reduce illegal storm-water discharges to the sewage system: During heavy rains, much of the volume of water flowing through our sewer lines is generated by illegal residential hookups intended to protect personal property from the damages of flooding. These hookups flow directly into county sewer lines, multiplying the volume of waste that treatment plants have to process during heavy rains, and are a primary factor in sewage spills. The City and County of Honolulu Department of Environmental Services employs a computer-based island-wide control system for its wastewater systems, with weather stations installed at the nine major treatment plants to provide additional information in preventing sewage spills. Every homeowner can make an enormous contribution at these critical times to improve coastal water quality by both understanding the cumulative impact of their actions and following the rules. As a result,

a public education campaign is the first step in addressing this issue, followed by warnings and establishing increased penalties for noncompliance.

TABLE 1: PERSPECTIVE 1: CONNECTING LAND AND SEA: ***Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.***		
Management Goals and Strategic Actions	**Lead[1]**	**Status[2]**
Improve coastal water quality by reducing land-based sources of pollution and restoring natural habitats		
Reduce soil erosion from upland forest ecosystems and conservation lands		
• Implement and monitor best management practices to reduce upland soil erosion caused by feral animals, loss of native forest species, and other anthropogenic factors	DLNR	Ongoing
• Expand watershed partnerships and similar public-private partnerships to improve management of upland forest ecosystems and conservation lands	DLNR, Landowners	Ongoing
• Leverage State, federal, and private sector funding to implement best management practices	DLNR	Ongoing
Reduce pollutant loads from residential, agricultural, and commercial land uses in priority watersheds		
• Identify priority watersheds, major land covers, land uses, and polluting activities	DOH	Expansion
• Characterize pollutant loads from surface runoff, point sources, and groundwater discharge	DOH	Expansion
• Implement watershed implementation plans, total maximum daily load implementation plans, and local action strategies to address land-based pollution threats	DOH	Expansion
• Implement best practices to reduce pollutant loads	Landowners	Expansion
• Increase water quality monitoring in identified areas of concern	DOH	Expansion
Restore and protect wetlands, streams and estuaries		
• Develop an education program for land owners, land managers, farmers, and others on the importance of incorporating best management practices to preserve riparian and wetland habitats	OP, DOH	New
• Improve interagency coordination, effectiveness and efficiency in wetlands management through the creation of a watershed coordinating committee to ensure ecological function is maintained to the greatest extent practicable	OP, DOH, Counties	New
• Identify channelized streams in priority watersheds for restoration and revitalization of wetland and estuarine habitats	TBD	New
Protect beaches, wetlands, and coastal communities from shoreline erosion and other coastal hazards		
Develop and implement a comprehensive and integrated shoreline policy that addresses the impacts of chronic and episodic coastal hazards		
• Establish a consensus on issues, management strategies and remedial actions to address shoreline erosion and other coastal hazards	DLNR, OP, UniversitiesCounties	Ongoing
• Develop comprehensive policies adopted through interagency agreements that treat shoreline management as a single integrated administrative unit and provide agencies with practical tools and skills necessary to improve management, minimize shoreline erosion and protect communities from coastal hazards	DLNR, OP, Counties	Ongoing

TABLE 1: PERSPECTIVE 1: CONNECTING LAND AND SEA: ***Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.***		
Management Goals and Strategic Actions	**Lead[1]**	**Status[2]**
• Encourage permitting authorities to analyze coastal hazards and risks prior to any zoning changes, Special Management Area/Shoreline setback variance permits or building permits	OP	Ongoing
• Conduct training programs utilizing practical tools to build capacity of government agencies and private sector to plan for and implement integrated shoreline management	DLNR, OP, Counties, Universities	Ongoing
Develop a Hawai'i beach and shoreline management plan with specific management measures to address coastal erosion and other hazards in priority coastal areas		
• Conduct statewide beach and shoreline assessment to identify priority areas based on risk of coastal erosion and hazards, vulnerability of coastal communities, and presence of coastal resources and recreational areas	Universities, DLNR, Counties	Ongoing
• Develop and implement coastal erosion and hazard mitigation management measures in priority areas	DLNR, OP Counties	Ongoing
• Identify and implement innovative mechanisms for coastal land acquisition and funding as an effective measure to preserve beaches and other coastal assets	DLNR, Counties	New
Encourage appropriate coastal-dependent development that reduces risks from coastal hazards and protects coastal and cultural resources		
• Conduct coastal hazard and resource assessment and risk analysis for any proposed coastal development	Universities Counties	Ongoing
• Require all new coastal development projects and plans as part of permit process to identify specific measures to mitigate risks associated with coastal hazards, protect sensitive coastal and cultural resources, and ensure public access	OP, DLNR, Counties	Ongoing
• Develop an on-line statewide shoreline information management system on coastal hazards and risks in coastal areas	DLNR, UH	Ongoing
• CCCCTTResearch, develop and institutionalize a methodology for assessing what proportion of a region's surface water runoff and erosion impacts are generated by any given development project	OP	New
Improve and ensure maintenance and appropriate use of environmental infrastructure		
Inspect and maintain sewer collection systems including the detection of leaks		
• Repair leaking sewers in priority watersheds	Counties	Ongoing
• Develop appropriate incentive system to ensure funding for sewer upgrades are prioritized in County budgets	Counties	Ongoing
• Develop long-term infrastructure plan to ensure complete hookup to and adequate capacity and maintenance of wastewater systems	Counties	Ongoing

TABLE 1: PERSPECTIVE 1: CONNECTING LAND AND SEA: ***Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.***

Management Goals and Strategic Actions	Lead[1]	Status[2]
Reduce the number of individual wastewater systems and improve the operation of existing systems in the coastal environment		
• Conduct an inventory of individual wastewater disposal systems in coastal areas	DOH, Counties	Ongoing
• Encourage the elimination of cesspools by providing incentives for private upgrades	DOH	Ongoing
• Develop appropriately scaled wastewater treatment systems in coastal areas with planned growth	Counties	New
Reduce illegal storm-water discharges to the wastewater system		
• Conduct public education campaign explaining the impacts of illegal storm-water discharges to public sewers on coastal water quality	TBD	New
• Conduct neighborhood reconnaissance to remind and warn residents about impacts of illegal storm-water hookups	TBD	New
• Develop new rules establishing penalties for noncompliance	TBD	New

Notes: The implementation of strategic actions under each management goal will require different funding scenarios including maintaining existing funds, obtaining new federal and state funds, and redeploying existing funds. Cost details will be further developed as the scope of these actions is detailed in specific priority watersheds and demonstration projects.

1. Lead: Agency/organization responsible for implementing and coordinating strategic actions; assumes other agencies and organizations will be involved.
2. Status: Classifies strategic action as ongoing initiative, expansion of ongoing initiative, or new initiative.

Perspective 2: Preserving Our Ocean Heritage

Traditional Hawaiian management of fisheries and coastal resources demonstrated a deep understanding of and care for the marine environment. A complex system of place-based management measures were informed by the ecology of the area to provide a sustainable supply of fish from the sea. Today, the condition of our coastal resources is being degraded by a variety of direct and indirect uses of the ocean. The management goals and strategic actions described under this perspective address priority actions at sea to improve the quality of the marine environment.

Existing efforts to reduce pollution from marine sources must be continued and strengthened with added emphasis on stopping the introduction of marine alien species and discharges from commercial vessels in archipelagic waters. Additionally, alteration of nearshore habitats by harbors and oceanfront development must be kept at a minimum as much of the shallow nearshore waters serve as nursery grounds for juvenile stages of native reef fish. The status of coral reef ecosystems is dependent on the implementation of a multi-pronged approach: strengthening and expanding marine protected areas, employing new, ecosystem-based approaches for managing nearshore fisheries, and substantially increasing the capacity for enforcement and voluntary compliance with ocean resource rules and regulations. New approaches must be employed to manage recreational and commercial uses of our beaches and coastal areas and develop responsible and sustainable ocean-based tourism. State and counties must balance ocean access for both the tourism industry with our local population, many of whom depend on the food they derive from the ocean. Ongoing efforts in ocean science and technology within the State need to be strengthened and expanded while employing safeguards for ocean resource protection.

The 5-year management priorities for this perspective are described below and detailed in Table 2. These management goals and strategic actions provide opportunities to improve the status of ocean resources to provide for appropriate and sustainable uses.

Improve coastal water quality by reducing marine sources of pollution

Hawai'i depends on commercial ships to provide 80 percent of the food and basic goods we need to survive. These ships, together with cruise ships, recreational boats, and military vessels are the primary sea-based sources of marine pollution. Accidental and sometimes deliberate releases of oily and hazardous waste may occur in coastal waters. In addition, marine debris, including fishing nets from distant fishing fleets and plastic debris from more local sources, accumulates in nearshore areas along the length of the Hawaiian archipelago, brought in by ocean currents. Aquatic invasive species, which have been introduced into our environment primarily through global vessel traffic, are generally considered a form of biological pollution with often devastating impacts to our coral reef ecosystem.

Minimize the introduction and spread of marine alien and invasive species into and throughout archipelagic waters: The introduction and spread of alien invasive species (AIS) harms or threatens to harm biological diversity in the marine environment and may result in significant economic costs to remediate or control. This threat is considered one of the top three drivers of environmental change (CEC 2003). The globalization of trade, travel, and transport has increased the rate and diversity of species movement. The Hawaiian Islands' ecosystems evolved in isolation, which has resulted in extremely high levels of native and endemic species. With the exponential increase in global trade in the twentieth century, vessels from all regions of the world make their way into Honolulu Harbor, threatening our unique biodiversity with the risk of introducing species new to Hawaiian waters. To date, 343 nonnative species have been identified in waters of the main Hawaiian Islands (Coles and Eldredge 2002). A number of invasive organisms, including numerous species of algae and a soft coral, have already altered

the environment and increased stress on many native species. As eradication of established, problem species has proven to be ineffective and costly, preventative measures and early detection for high risk species in target areas, performed by both volunteers and inter-agency professionals, may provide the most cost-effective and highest levels of success (DLNR 2003). In addition, ensuring a healthier coastal environment (e.g., reduce nutrients, siltation and other pollutants from entering the water) allows the native ecosystem to function properly, so that it can better withstand the negative impacts of AIS. DLNR's Division of Aquatic Resources, in conjunction with numerous Federal, State, industry, and nongovernmental organizations, developed the State of Hawai'i Aquatic Invasive Species Management Plan, a broad-based plan with seven strategies, each with specific tasks, to address the environmental and socio-economic impacts of AIS. Partner agencies, including the Department of Transportation (DOT) – Harbors Division, the U.S. Coast Guard, and NOAA, among others, will be vital in controlling the impacts from this external threat.

Establish wastewater-discharge restricted zones and conditions for commercial vessels in archipelagic waters: Regulated discharge of wastewater and deliberate and accidental release of oily and hazardous materials are other forms of marine pollution. While commercial vessels are prohibited from discharging untreated wastewater within 3 nautical miles from the shoreline and treated wastewater within 1 nautical mile, these limits may be inadequate because Hawai'i's complex system of ocean eddies could transport these pollutants back into coastal waters. Addressing these threats will require analysis of oceanographic conditions and evaluation of risks to coastal water quality of existing wastewater discharge requirements. The EPA provides a legal mechanism to establish No-Discharge Zones in state waters under the Clean Water Act (CWA). This process is initiated upon a request from the Governor. The State should consider this approach if vessel wastewater discharge continues to be a concern even after adequate land-based vessel waste pump-out facilities have been provided (as discussed below). Alternatively, federal regulations regulating discharge can be established by NOAA within the Hawaiian Islands Humpback Whale National Marine Sanctuary. While there is currently no information suggesting that sanctuary resources are being adversely impacted by vessel wastewater discharge, the State might consider working with NOAA on this option if such impacts are demonstrated in the future. Relevant State agencies should support this public concern and work with the EPA, National Marine Sanctuary Program (NMSP) and other federal mechanisms to protect these waters from avoidable hazards and environmental degradation. Areas and vessels of greatest threat need to be prioritized, and appropriate education, safeguards, monitoring, and enforcement plans must be developed to limit the impacts from this threat to our water quality and ecosystem health.

Provide appropriate physical infrastructure to support commercial and recreational marine facilities: Due to a high number of recreational and small commercial vessels in the State, the amount of waste that is released in ocean waters makes these small vessels a priority issue in protecting the ocean's water quality. The development of more pump-out facilities was considered the most important need during extensive scoping sessions in the fall of 2005. Although pump-out facilities are available on every island, they are not available in every harbor. As a result, many boat owners find the process of utilizing these available facilities, or contracting with private companies for pumping at their harbor, both costly and time consuming. Because of this, many boat owners dump their waste at sea. The DLNR was recently awarded a federal grant to fund the design and construction of pump-out improvements at Kaua'i's Port Allen and Maui's Mā`alaea Small Boat Harbors, with a portion of these funds used to educate boaters on the importance of proper waste disposal and the impacts of improper disposal. Maui county has led an effort to provide funding for mobile pump trucks to haul sewage from vessels at Mā`alaea Harbor to a land-based treatment plant. The State government has provided funds for the design of a permanent pump-out station. The State needs to continue to explore funding mechanisms, including federal grants and increased user fees, to build this and other pump-out facilities and education programs at more harbors and increase overall boater compliance to meet expected future needs.

Improve the health of coastal and ocean resources to preserve traditional, subsistence, recreational, and commercial uses

Fishing, limu gathering, and subsistence use of other ocean resources have been a way of life for Hawai'i's people for centuries, providing the primary source of protein in the Hawaiian diet. The strict enforcement of the traditional *kapu* system was an effective control to prevent over-harvesting of these vital resources. While most of us today do not rely on harvesting ocean resources for survival, fishing and consumption of local fish and shellfish help maintain strong cultural ties to the past and keep us connected to the sea. A steadily increasing population, destruction or disturbance of nearshore habitat, and the introduction of more efficient and sometimes destructive fishing techniques have substantially degraded our marine resources, despite management efforts. Today, overfishing is cited as the primary issue affecting the health of coral reefs in the main Hawaiian Islands (Friedlander *et al*. 2005). A comprehensive set of management measures is required to reverse this trend. These management measures include reassessing Hawai'i's marine zoning scheme to support a long-term multi-use management strategy, developing new requirements for commercial and recreational fishing, improving compliance mechanisms, and promoting stock enhancement of important reef and ocean species through hatcheries and ocean aquaculture.

Strengthen and expand marine protected area management: The establishment of marine protected areas is an important area-based approach to managing ocean resource use. The Hawaiian Islands Humpback Whale National Marine Sanctuary and the Northwestern Hawaiian Islands Marine National Monument were designated under federal laws to protect sensitive marine animals and ecosystems. The State has used marine zoning to manage marine areas since the first Marine Life Conservation District was created at Hanauma Bay in 1967. Today, the State has at least 12 categories of managed waters to address a variety of issues.

In order to realize the traditional management concepts described within this plan, managers need to begin designing land-to-sea conservation zones that provide protection from harmful ocean and land-based practices to allow for recovery of and long-term protection for the coastal and nearshore ecosystem. The DLNR's Division of Aquatic Resources has begun a process to reclassify some of these areas to provide a more systematic approach that will become a part of the Comprehensive Coastal Policy. This policy is an attempt to develop a shared vision of natural resource management between the responsible agencies and with stakeholders and the public. Communities have been involved from the outset of this process and are crucial in establishing and maintaining support for this strategic action, as is research and monitoring that provide the information to determine both social and biological impacts and benefits.

Develop ecosystem-based approaches for nearshore fisheries management: Marine zoning is critical for addressing user conflicts, but is only one of many tools in developing ecosystem-based approaches for nearshore fisheries management. Establishing designated areas solely for tag and release, expanding stock enhancement programs, and strictly limiting non-selective and habitat-destroying gear and techniques are a few of the options that must be explored and employed in suitable habitats at appropriate levels. Non-selective gear and fishing practices that catch and kill juvenile target species, unwanted species and endangered animals should be phased out as quickly as feasible. Furthermore, quality ecosystem management requires improved data collection and analysis, including indicators of fish abundance and ecosystem health, to allow for a continuous assessment that the management regime is moving toward and attaining established goals. The ongoing *ulua* tagging project is one example that must be continued and expanded to other important food and sport fish in order to better understand life history characteristics.

While the Northwestern Hawaiian Islands (NWHI) exhibit numerous differences in oceanographic and geological conditions from the main Hawaiian Islands (MHI), as well as vastly different levels and types

of fisheries exploitation, they provide a first-class data set and serve as a benchmark for fish abundance and diversity for the MHI. As the marine ecosystems of the NWHI currently experience little fishing pressure or human disturbance, they represent the recovery to a more natural condition of the archipelago's coral reefs, providing valuable information for managers to determine the limits of acceptable change and the value of a fully functioning ecosystem for a given reef in the MHI.

The level of fishing pressure that a system can absorb will be specific for a given area and will depend on natural forces, the level of degradation from human influences, and whether stock enhancement is undertaken. While the suite of existing statewide fishing regulations are vital for the overall management regime, and provide a uniform foundation for resource protection, additional measures based on specific needs must be developed to allow our marine resources to recover. This is a substantial change from how fisheries are currently managed, although community-driven, area-based examples are ongoing across the MHI, including the West Hawai'i Aquarium Project on the Big Island and the *Mo'omomi* fisheries management program on the northwest coast of Moloka'i (Friedlander *et al*. 2000). We must begin to address ecosystem management for priority areas, incorporating people into the ecosystem picture.

Establish and institutionalize approaches for restoring, operating, and preserving ancient Hawaiian coastal fishponds and salt ponds for the benefit of coastal communities around the State: Ancient Hawaiian coastal fishponds across the State and the ancient salt ponds of Hanapēpē are valuable cultural resources whose restoration and protection would provide multiple benefits. The salt ponds continue to be utilized for the production of Hawaiian sea salt by Hawaiian families. Benefits from the restoration and utilization of fish ponds across the State include food production, propagation of traditional cultural practices, and hands-on education about the history of the Hawaiian people, the art of sustainable fish farming, and the importance of *ahupua'a* management to maintain the health of coastal waters. Efforts to restore ponds have been carried out on Moloka'i, O'ahu, Kaua'i and Hawai'i, with several ponds being utilized for education purposes and cultural practices. Project *Kahea Loko* brings together the State Department of Education, teachers, cultural and technical experts, and community members to develop scientific and cultural curriculum of Hawaiian fishponds (*Loko i'a)* for grades K-12. Teacher workshops have already been conducted and the curriculum is being implemented at the *Waikalua Loko* fishpond. While this important project is integral in developing a broad awareness of these important cultural resources, a complex permitting process and lack of resources is preventing individuals and communities from restoring more of them. DLNR has in place a Master Conservation District Use Permit and Master Environmental Assessment for 29 restorable fishponds on Moloka'i which could provide a foundation for similar community initiatives. However, one study, Project *Loko i'a* (funded by EPA), estimated that the restoration of a fishpond could require 17 permits and processing costs of $50,000 to $80,000, and take several years to complete. The project final report includes a model streamlined permitting process, but admits that much work remains to provide a mechanism in which a community effort to restore these sites can succeed (Pacific American Foundation 2005). In addition to this work, DLNR's Division of Aquatic Resources provides individuals and communities with ideas, examples and resources on how to get involved in its 2006 guidebook *Getting Involved in Caring for Hawai'i's Coastal Resources: A Community Guidebook*, although streamlined permitting processes and access to financial support are needed to assist individuals and communities desiring to restore these ancient fishponds. Lessons from ongoing restoration efforts need to be documented and disseminated to improve the effectiveness of restoration activities, improve community involvement, and develop appropriate educational curriculum.

The preservation salt ponds in Hawai`i, as exemplified with the Hanapēpē salt ponds, is being threatened by pollution, paving roads -- which restricts natural tidal flow necessary for salt production -- and development. Difficulties in holistically managing the coastal zone due to the division of the jurisdictional authority (as is discussed in Perspective 3) may lead to negative impact on this unique cultural and natural resource. Communities have expressed a desire to better work with agencies in a coordinated effort and seek solutions to these kinds of user conflicts.

Improve enforcement capacity and compliance for existing rules and regulations: While on-the-ground enforcement presence and the threat of prosecution provide the most basic mechanism of protection of our natural resources, additional methods must be fostered to improve voluntary compliance and enhance a citizen ethic. Public education and outreach are necessary to improve voluntary compliance with existing rules and regulations on the use of ocean resources. Improved public awareness of the underlying rationale for these rules and regulations is one step toward improving voluntary compliance. Surveillance and enforcement are required to deal with those not willing to comply voluntarily. Our current enforcement capacity is not sufficient to cover Hawai'i's extensive shoreline and vast ocean area or respond to the many reports of violations. Furthermore, many natural resource violations are dismissed by a judicial system that has prioritized other types of crimes. The expansion of education and outreach opportunities such as DLNR's *Mauka-Makai* Watch Program are needed to improve voluntary compliance and foster citizen stewardship. Increased presence of natural resource enforcement officers should match the value we ascribe to these resources. An increase in the number of regular patrols across the islands is needed, and can be achieved through increased funding. These patrols could interact with users to increase educational opportunities, deter infractions, and improve overall compliance. When voluntary compliance cannot be achieved, maximum penalties need to be applied to violators through an informed judicial and administrative system and the results made public in newspapers and other public media. A series of judicial and administrative workshops on natural resource and environmental issues could serve to improve awareness on the importance of our laws and regulations designed to preserve the benefits of ocean resources for the present generation and future generations to come.

Enhance the recovery and conservation of Hawai'i's marine protected species, unique habitats and biological diversity: Hawai'i has more endangered species per square mile than any other place on the planet and is known as the endangered species capital of the world. Of the marine species, the Humpback whale, Hawaiian monk seal, and Hawaiian green sea turtle are the best known. The islands are the calving grounds for the Humpback whale and the permanent home to the monk seal and green turtle. The Hawaiian stock of spinner and bottlenose dolphins and the hawksbill turtle are other well known marine species that also depend on a healthy island ecosystem and waters safe from increased vessel traffic, recreational fishing gear, marine debris, vessel pollution and disturbance from curious humans both on the water and at "haul-out" locations. Hawai'i is also special for its unique biodiversity, with 25 to 30 percent of all marine species found only here (DeMartini and Friedlander 2004). While these animals are protected under various State and federal laws, ever increasing pressure on their habitat as well as direct and indirect human interactions calls for a reevaluation of the state of these species and the laws and management policies that protect them. To address the take of Hawaiian monk seals and sea turtles in lay gill nets and other state-managed fishing gear, DLNR should continue its effort to obtain and administer an Incidental Take Permit (ITP) pursuant to Section 10 of the Endangered Species Act (ESA) in close coordination with NOAA's National Marine Fisheries Service (NMFS). In addition, the DLNR has initiated a Comprehensive Wildlife Conservation Strategy (CWCS) for long-term conservation of all terrestrial and aquatic species and their habitats. The ORMP proposes the following actions to assist in this effort for the marine environment.

As the shoreline of the islands becomes increasingly developed, undisturbed haul-out areas for monk seals and sea turtles become limited. While the increase in both the sea turtle and monk seal populations in the main Hawaiian Islands provides reason for optimism, it also creates additional conflicts between people and these State and federally-protected wildlife. This concern is compounded by new attractions developed by the visitor industry to provide unforgettable and up-close experiences with these same animals. Much research has already been conducted that can provide guidance on detrimental versus benign human interactions with these species. This knowledge must be summarized in a useful handbook for tour operators, local volunteers and relevant state agencies. Gaps in knowledge need to be identified and addressed.

Existing and potential negative impacts of tour vessels and the imminent arrival of the Hawaiian Superferry have raised concerns among the public as to the well-being of whales, dolphins, sea turtles and other marine life within our waters. These concerns include excessive speed, which can cause unnecessary and possibly fatal collisions with these protected species. The National Marine Sanctuary Program (NMSP), which includes State and other stakeholder involvement, provides a vehicle in which to develop appropriate regulations (e.g., mandatory speed limits, issuing incidental take permits, and reporting protected species strikes) within sanctuary waters. NOAA's National Marine Fisheries Service (NMFS) is another federal partner agency with which the State should enhance coordination on marine protected species conservation. This can be accomplished in part via implementation of a DLNR-NOAA cooperative agreement under Section 6 of the Endangered Species Act, and other federal-state partnership mechanisms. Relevant State agencies should support this public concern and work with the NMSP, NMFS, and other federal and State mechanisms to better protect these waters and shorelines from avoidable hazards and environmental degradation. Marine protected species habitat outside the boundaries of HIHWNMS should be better protected with federal support from NMFS and/or via enhanced State fishing, boating and other ocean use regulations and policies.

Anchialine or *'opae* (shrimp) ponds are unique ecosystems that harbor 20 Species of Greatest Conservation Need (SGCN)(DAR 2006). While a number of ponds are known across the islands, many have been discovered during coastline development surveys, and have occasionally been destroyed during the subsequent development. These ponds should be protected under the requirements of a special management area (SMA) permit, but due to the lack of knowledge of their existence they remain vulnerable. Surveys for these ponds can be conducted concurrently, and the expense shared with a variety of proposed or ongoing shoreline efforts (e.g., marine debris surveys, shoreline erosion mapping).

Enhance public and appropriate coastal-dependent uses of the shoreline

Hawai'i's coasts provide the foundation of our social, economic, recreational, and environmental prosperity. Public access to the coastline and beach is assured in our State Constitution, and the beaches are held in public trust by the State for the benefit of the people. This access is increasingly under threat, with large commercial and residential development and illegal shoreline armoring. The loss of our beaches, the reduction of open shoreline areas and scenic vistas, and the degradation of the natural resources and public infrastructure at existing beach parks lowers the quality of life in our communities and reduces visitor satisfaction, which could eventually impact our economic prosperity. Proactive strategies to identify shoreline areas with high scenic, recreational, and cultural values, *prior to the imminent sale and/or threat of development*, are needed in order to establish new public open spaces and restore existing public shoreline areas to ensure our quality of life.

Enhance and restore existing public shoreline areas and scenic vistas: Across the State, beach parks are in poor shape. Beaches are littered with garbage, public facilities are run down and in disrepair, and general maintenance is lacking. Many of these are beautiful, popular spots, perhaps used too much for the level of maintenance counties can provide. Restoration and enhancement plans should be developed, and funding priorities determined to reverse this unfortunate trend. Plans should incorporate community initiatives and utilize interagency agreements and public-private partnerships to effectively and efficiently implement restoration and enhancement plans.

Establish new shoreline areas for public and appropriate coastal-dependent uses: Recent grassroots battles across the State have focused on the importance of public open spaces in our coastal zone to local communities. Proposed development of the Kaka'ako beachfront, the expansion of Mā'alaea Harbor, and other projects across the State are natural results of a healthy economy and are often vital to our State's prosperity. Nevertheless, these protests illustrate the need to develop a statewide plan that identifies

priority beaches and scenic vistas for preservation and restoration and to create mechanisms to acquire and preserve these lands through interagency agreements, public-private partnerships, or regulatory changes. Currently, we have undeveloped shoreline areas throughout the State that need to be protected and preserved as open space so that inappropriate development does not degrade the quality of ecological, social, cultural, and economic benefits.

In addition to preserving shoreline as open space, appropriate development of our coastline is needed to ensure that critical shoreline areas are preserved for coastal-dependent uses. Open spaces and redevelopment sites should be mapped and inventoried, while a new county regulatory process or review of the SMAs ensures that these areas are used wisely. State and County agencies must work together to ensure our limited natural resources and quality of life are not negatively impacted by shoreline development.

Promote appropriate and responsible ocean recreation and tourism that provide culturally informed and environmentally sustainable uses for visitors and residents

Ocean recreation and ocean-based tourism continue to expand throughout the State. Recreational overuse is considered a priority threat to coral reef ecosystems in Hawai'i. With the increasing volume of recreational use, mechanisms are needed to address recreational use conflicts and minimize impacts to coastal and cultural resources in order to promote responsible and sustainable ocean-based tourism that considers and does not marginalize residents' use.

Develop community-based frameworks and practices for identifying and mitigating ocean recreational use conflicts: The ocean is Hawai'i's vast playground, providing a countless variety of recreational activities. With new activities being developed by the tourism industry and individuals all the time, ocean users often compete for space, especially at popular sites. Unresolved user conflicts can cause hostility, leading to lower satisfaction with recreational experiences from residents and visitors. Site-specific solutions developed with active participation of stakeholder groups are needed to address recreational use conflicts and environmental and cultural concerns.

Promote responsible and sustainable ocean-based tourism: As the tourism industry continues to reinvent itself to attract new and repeat visitors, best management practices and performance standards need to be developed to assess the quality of experience and impacts on the environment and other local residents. In ensuring that resource management goals are met, a monitoring program in conjunction with determining standards such as carrying capacity, limits of acceptable change, and measures of success should be incorporated in an adaptive management strategy. The State DBEDT office recently published the comprehensive report *Planning for Sustainable Tourism*, which includes computer models that suggest limits on resources and is intended to provide a basis for future policy discussions. The study also includes sociocultural, Native Hawaiian, public infrastructure, and natural resource assessments. Education on a broad scale is also vital to foster care of the ocean and cooperation for visitors and residents alike.

In addition to protecting our ocean environment from potential overuse, the State should make room available and invest in drydock facilities in harbors on Maui and Kaua'i. The lack of drydock facilities on these islands forces larger commercial vessels to travel every 18 months to the Big Island or O'ahu to perform mandatory USCG inspections. These voyages compromise the safety of the vessels, captains and crew of these small businesses and can impart a heavy cost, especially when inspection appointments made months in advance must be rescheduled due to hazardous ocean conditions. Maui, which accommodates the largest charter fleet in the islands, has the greatest need for these facilities.

Encourage cutting edge, appropriate ocean science and technology with emphasis on safeguards for ocean resource protection

Hawai'i is a recognized leader in ocean science and technology with state-of-the-art programs and facilities in aquaculture, biotechnology, oceanography, ocean safety, hazard management, ocean energy, marine geophysics, and other fields. Hawai'i serves as an educational resource in the Pacific and globally with methods to restore fish stocks, ocean science programs for improved management-decision making, and economically viable and environmentally sound ocean industries. We need to continue to promote and expand ocean science and technology to both address many of our pressing problems and to remain a recognized leader in ocean science and technology.

Promote alternative ocean energy sources: Potential alternative energy sources from the ocean include thermal energy from the sun that is stored in the surface layers of the ocean, and mechanical energy that is available from the tides and waves. Hawai'i is heavily dependent on imported oil as its primary energy source, with only 5 percent of our total energy use coming from renewable energy sources. While this situation is unlikely to change quickly, we must find means to become less dependent on imported fuel and goods and develop new opportunities for our economy. The State legislature has standards, requiring electrical utility companies to meet a renewable portfolio standard of 15 percent for 2015, with a goal of 20 percent by 2020. The feasibility of the many types of ocean energy technologies must be evaluated and further demonstrated in Hawai'i to identify viable alternatives.

Plan and develop sustainable commercial aquaculture in coastal areas and ocean waters to diversify and expand Hawai'i's economy and provide locally produced sources of seafood: In order to meet our growing food production needs, Hawai'i has been in the forefront of innovative ocean aquaculture. We have developed a broad-based infrastructure, including an experienced Aquaculture Development Program in the State's Department of Agriculture to assist new and existing aquaculture business, a world-class cadre of aquaculture researchers and facilities at the University of Hawai'i, numerous private-sector entities focused on both research and production, and the first commercial open-ocean leasing program in the United States. Aquaculture development requires continuous product and technology improvement, and Hawai'i receives significant federal funding for aquaculture research every year. Successful development of new businesses requires continued assistance from the State, including research grants, site identification, permit acquisition, marketing, financing, technical assistance, and disease management. In order to stay at the forefront of aquaculture technology and to provide the local source of seafood the people of Hawai'i demand, the State will need to provide a supportive business and cost environment for aquaculture, such as through establishing aquaculture parks (similar in concept to the State Agriculture parks and the Natural Energy Laboratory of Hawai'i Authority). The State must assess the need for new State commercial parks specifically dedicated to commercial aquaculture. Nevertheless, all aquaculture development must consider the protection and sustainable use of coastal and marine ecosystems, and develop guidelines and appropriate safeguards for siting and conducting sustainable operations to be included in the permitting process as well as managing the overall growth of this industry, to ensure that the cumulative impacts of these enterprises on our marine resources are minimized.

Expand ocean science and technology: Hawai'i is world-renowned for its broad spectrum of ocean science and technology. The wide variety of research subjects makes up an important part of our economic diversity and technical expertise. Marine biotechnology research is conducted in various departments of the University of Hawai'i and private-sector companies located on O'ahu and Hawai'i. World-class marine mammal research is conducted at UH, by nonprofit organizations, and by federal agencies across the islands. Local, State, federal and nonprofit agencies are targeting the global problem of marine debris and derelict fishing gear and studying new and more efficient technologies to reduce and collect it before it reaches the shores. Act 221, which provides tax incentives for high technology

businesses, has been beneficial to the development of these industries, and continued support is needed. The State needs to provide incentives for these industries and the academic research that support their development and growth. In doing so, the State will promote and sustain Hawai'i's position as a learning destination for ocean science and technology in the Pacific and globally.

TABLE 2: PERSPECTIVE 2: PRESERVING OUR OCEAN HERITAGE: ***A vibrant and healthy ocean environment is the foundation for the quality of life in Hawai'i and the well-being of its people, now and for generations to come.***		
Management Goal and Strategic Actions	**Lead[1]**	**Status[2]**
Improve coastal water quality by reducing marine sources of pollution		
Minimize the introduction and spread of marine alien and invasive species (AIS) into and throughout archipelagic waters		
• Develop a risk-based approach to identify species and areas with the highest potential for introduction and spread of marine AIS and ecological and economic damage	DLNR, Universities	Ongoing
• Organize technical, financial, and management resources for effective prevention; monitoring and early detection; and response, eradication, and control for high-risk species and areas	DLNR, DOA, Universities	Ongoing
• Organize and train local action teams for the monitoring and control of marine AIS	DLNR, USCG	Ongoing
• Review existing State laws and regulations to increase effectiveness of marine AIS prevention and control	DLNR	New
Establish wastewater-discharge restricted zones and conditions for commercial vessels in archipelagic waters		
• Establish a technical committee to redefine wastewater-discharge restricted zones for commercial vessels in archipelagic waters based on currents, depths, and weather conditions	Universities	New
• Enforce existing federal and State regulations on wastewater-discharge restricted zones in archipelagic waters with a monitoring and enforcement plan	USCG	Ongoing
Provide appropriate waste management infrastructure to support commercial and recreational marine facilities		
• Provide temporary pump-out facilities, such as pump trucks and encourage boaters to use them while permanent pump-out facilities are constructed for recreational boat and commercial harbors	DLNR, DOT, HCDA	Ongoing
• Provide adequate solid waste management facilities for recreational boat harbors	DLNR	Ongoing
• Increase the frequency of inspection of marine sanitation devices for commercial and recreational vessels	USCG	Ongoing
• Increase user fees for recreational marine facilities to pay for environmental management systems	DLNR	New
• Increase user fees for infrastructure improvements and maintenance	DOT	New
• Ensure the State's commercial harbor system meets existing and future needs for maritime commerce in an environmentally and economically sustainable manner	DOT	Ongoing

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Management Goal and Strategic Actions	Lead[1]	Status[2]
Improve the health of coastal and ocean resources for sustainable traditional, subsistence, recreational, and commercial uses		
Strengthen and expand marine protected area management		
• Develop and implement a marine protected area policy framework that allows for management by agencies, communities, and appropriate nonprofit organizations	DLNR	Ongoing
• Conduct a public process, including public meetings, to seek additional input into the marine protected area management framework, with significant stakeholder participation	DLNR	Ongoing
• Conduct carrying-capacity analyses for priority marine protected areas and identify limits of acceptable change with local stakeholder involvement	DLNR	New
• Develop place-based marine protected area plans for priority areas	DLNR	New
Develop ecosystem-based approaches for nearshore fisheries management		
• Identify and implement priority management measures to minimize recreational and commercial overfishing and habitat destruction, including restriction on harmful fishing gear and practices	DLNR	Ongoing
• Identify, protect, and restore essential fish habitat for nearshore fish stocks, including marine and estuarine habitats	DLNR	New
• Develop and promote public- and private-sector hatchery culture and release programs to increase standing stock biomass of economically important reef and ocean species	DOA, DLNR	Ongoing
• Develop and implement a strategic research and monitoring agenda to improve management decision-making	DLNR	Ongoing
Establish and institutionalize approaches for restoring, operating, and preserving ancient Hawaiian coastal fishponds and salt ponds for the benefit of coastal communities around the State		
• Develop a streamlined permitting process that allows individuals and coastal communities the opportunity to restore and operate ancient Hawaiian coastal fishponds	DLNR, DOA, OHA, DOH, Universities, NGOs	Ongoing
• Develop and implement a cultural education curriculum constructed around the ancient Hawaiian fishponds and respect for traditional practices	Universities, DOE, OHA, NGOs	Ongoing
• Provide support and incentives for individuals and communities to facilitate restoration and operation of ancient Hawaiian coastal fishponds and salt ponds	OHA, DLNR	Ongoing
Improve enforcement capacity and voluntary compliance with existing rules and regulations for ocean resource protection		
• Conduct education and outreach campaigns on underlying rationale for existing rules and regulations related to ocean resource use	DLNR	Ongoing

TABLE 2: PERSPECTIVE 2: PRESERVING OUR OCEAN HERITAGE: ***A vibrant and healthy ocean environment is the foundation for the quality of life in Hawai'i and the well-being of its people, now and for generations to come.***

Management Goal and Strategic Actions	Lead[1]	Status[2]
• Conduct workshops for judges on environmental and natural resource management issues	DLNR	New
• Increase the presence of conservation and resources enforcement officers and natural resource rangers to increase educational opportunities, deter infractions, and improve compliance	DLNR	Ongoing
• Employ community-based partnership programs, including the Mauka-Makai Watch Program	DLNR, Community Volunteers	Ongoing
• Improve enforcement capabilities through the use of administrative and civil penalties	DLNR	New
Enhance the conservation of Hawai'i's marine protected species, unique habitats and biological diversity		
• Develop public outreach, education materials and interpreter training for appropriate interaction with protected species	DLNR	Ongoing
• Develop recreational management areas for waters with high tour vessel activity to limit overall impacts to protected species	DLNR	Ongoing
• Support efforts to improve the protection of marine waters from vessel traffic and other human interactions, including designating speed limits, issuing incidental take permits, and reporting protected species strikes for specific waters, through rulemaking and educational initiatives of the Hawaiian Islands Humpback Whale National Marine Sanctuary and the Northwestern Hawaiian Islands National Monument	DLNR	Ongoing
• Conduct a statewide survey of anchialine ponds	DLNR	New
• Incorporate information on location of anchialine ponds into parcel information and integrate protection measures into SMA permits.	DLNR	New
Enhance public access and appropriate coastal dependent uses of the shoreline		
Enhance and restore existing public shoreline areas and scenic vistas		
• Develop enhancement and restoration plans to increase public access and restore priority beaches and scenic vistas	DLNR, Counties	Ongoing
• Establish funding priorities for priority beach restoration projects.	DLNR, Counties	Ongoing
• Develop interagency agreements and public-private partnerships to implement enhancement plans	DLNR, Counties	New
• Implement shoreline enhancement and restoration plans in priority areas	DLNR, Counties, Landowners	New
• Develop public education programs to build stewardship ethic toward the coastline and ocean	DLNR, OP	New
• Identify and implement innovative mechanisms for coastal land acquisition and funding as an effective measure to preserve beaches	DLNR, Counties	New

TABLE 2: PERSPECTIVE 2: PRESERVING OUR OCEAN HERITAGE: ***A vibrant and healthy ocean environment is the foundation for the quality of life in Hawai'i and the well-being of its people, now and for generations to come.***

Management Goal and Strategic Actions	Lead[1]	Status[2]
Establish new shoreline areas for public and appropriate coastal dependent uses		
• Conduct an inventory of beaches, shoreline areas and scenic vistas requiring protection as open space	DLNR, Counties	Ongoing
• Develop interagency agreements and public-private partnerships to acquire, preserve, and restore priority areas	DLNR, Counties	New
• Establish criteria for identifying priority coastal areas for public acquisition and appropriate coastal dependent uses	DLNR, Counties	New
• Establish new beach and shoreline areas, and scenic vistas as open space for public access	DLNR, Counties	Expansion
Promote appropriate and responsible ocean recreation 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		
• Conduct a baseline study of ocean recreation and tourism, building on existing information and data, that focuses on user conflict and potential impacts from threats to the ocean environment	DLNR, OP, Industry, Community	New
• Work with existing groups or form new advisory groups to develop tools for resource protection and conflict management	DLNR, Community	Ongoing
• Work with active stakeholder involvement in targeted areas to mitigate cultural, environmental, and resource use conflict	DLNR, Community	New
• Encourage community-based, culturally informed environmental education and outreach programs promoting responsible ocean recreation	DLNR, Community	New
• Develop and amend Ocean Recreation Management Area rules as tools to avoid and/or mitigate ocean recreation user conflicts and to address capacity issues	DLNR	Ongoing
Promote responsible and sustainable ocean-based tourism		
• Establish performance standards to ensure responsible commercial ocean-based tourism	DLNR, DBEDT, Industry	New
• Establish and enforce ecotourism-related permit systems to protect the resources and visitor experience	DLNR, DBEDT	New
• Encourage the integration of best management practices and cultural values and experiences into commercial ocean-based tourism business plans	DLNR, Industry	New
• Establish an appropriate growth policy on ocean tourism considering the carrying capacity and levels of acceptable change of the resource, quality of the experience, and visitor satisfaction, and ensuring access to the marine environment by residents is not compromised	DLNR, DBEDT, Industry	New
• Use concession agreements as a management tool to mitigate ocean recreation user conflicts on priority issues such as surf instruction, kayaking, snorkel and diving, and related operations in areas where conflicts are occurring or could occur	DLNR	Ongoing

TABLE 2: PERSPECTIVE 2: PRESERVING OUR OCEAN HERITAGE: ***A vibrant and healthy ocean environment is the foundation for the quality of life in Hawai'i and the well-being of its people, now and for generations to come.***

Management Goal and Strategic Actions	Lead[1]	Status[2]
Encourage cutting edge and appropriate ocean science and technology with safeguards for ocean resource protection		
Promote alternative ocean energy sources		
• Conduct a feasibility study for demonstration and scale-up of appropriate ocean energy technologies for Hawai'i	DBEDT, Universities, Industry	Ongoing
• Conduct analyses of the impacts of ocean and non-ocean-related energy alternatives on ocean health	DBEDT, UH, Industry	Ongoing
Plan and develop sustainable commercial aquaculture in coastal areas and ocean waters to diversify and expand Hawai'i's economy and provide locally produced sources of seafood		
• Develop a streamlined, one-stop approach to permitting coastal and ocean aquaculture projects that includes guidelines for sustainable operations that ensures the conservation of ocean and coastal ecosystems	DBEDT, DOA, DLNR	New
• Establish a Geographic Information System (GIS)-based site identification database to locate coastal and ocean aquaculture projects in environmentally suitable sites	DBEDT, DOA, DLNR	New
• Provide State financial incentives to landowners and investors to encourage their participation in commercial aquaculture development	DBEDT, DOA	New
• Provide opportunities to obtain space at State commercial harbors for support activities and infrastructure needed by ocean aquaculture companies	DBEDT, DOA, DOT	New
• Provide a supportive business and cost environment for sustainable commercial aquaculture through the establishment of public and private-public land-based and ocean aquaculture parks	DLNR, DOA, DBEDT	New
Expand ocean science and technology		
• Facilitate appropriate research and innovation in energy, ocean leasing, and other marine technologies and ocean uses	DBEDT, Universities	Ongoing
• Develop and promote Hawai'i as a learning destination for ocean science, technology, and management applications in the Pacific and globally	DBEDT, Universities	Ongoing

Notes: The implementation of strategic actions under each management goal will require different funding scenarios including maintaining existing funds, obtaining new federal and state funds, and redeploying existing funds. Cost details will be further developed as the scope of these actions is detailed in specific priority watersheds and demonstration projects.

1. Lead: Agency/organization responsible for implementing and coordinating strategic actions; assumes other agencies and organizations will be involved.
2. Status: Classifies strategic action as ongoing initiative, expansion of ongoing initiative, or new initiative.

Perspective 3: Promoting Collaboration and Stewardship

Traditionally in Hawai'i, natural resources were managed at *ahupua'a* and *moku* levels. *'Aha* Councils**,** composed of a diverse group of practitioners and acknowledged experts in agriculture, fishing, water resources, and cultural skills that lived within each *ahupua'a*, served as the governing board. Today, Hawai'i's legal and institutional framework for environmental and natural resources management largely perpetuates a sector-based approach in which specific Federal, State, and county government agencies have jurisdictional authority over particular resources in defined geographic areas of the terrestrial and marine environment. Increasing pressure on natural resources coupled with a greater understanding of environmental systems have encouraged a more holistic approach to natural resource management.

As part of a holistic approach, new governance mechanisms need to be developed and applied to provide greater opportunities for collaboration among stakeholders in natural and cultural resources management. This emphasis on collaboration between governmental, nongovernmental, and private entities recognizes that natural resource management cannot succeed without acceptance and commitment from community members. Community leaders and resource managers have realized that this approach can save significant time, money, and effort in developing sustainable, appropriate environmental management plans for their communities. An emphasis on increased collaboration requires us to look at ourselves and each other to change our approach to managing natural and cultural resources by working together using integrated approaches.

The 5-year management priorities for this perspective are described below and detailed in Table 3. These management goals and strategic actions provide opportunities to demonstrate integrated natural resource management approaches, build capacity for community participation in natural and cultural resource management, and develop changes in our legal and administrative system that will work toward institutionalizing integrated and collaborative management approaches.

Apply integrated and place-based approaches to the management of natural and cultural resources

Integrated and place-based approaches to natural resources management are being developed in Hawai'i and in other U.S. states as well as globally. In order to address complex environmental and natural resource management problems, government agencies, communities, and the private sector are forming partnerships and cooperative agreements to solve problems that cross multiple jurisdictional and geographic boundaries. By combining traditional *ahupua'a* management principles and evolving watershed and ecosystem-based fisheries management approaches, we can begin to create more integrated strategies to address the complex and interrelated problems in managing our natural and cultural resources.

Develop integrated natural and cultural resources planning process and standardized tools: A number of government-led and community-led initiatives are under way throughout the State to plan and manage natural and cultural resources. While these initiatives consider a comprehensive range of natural resource management issues, they usually have an overriding focus on the particular natural resources that fall under the jurisdiction of the agency conducting the planning, or on several priority issues of greatest concern to the community. Sharing and documenting the experiences and lessons learned from these initiatives will serve as vital stepping stones as we learn how to work collaboratively and effectively. Ideally, all government agencies would be required to work with each other and with communities to develop a holistic, place-based natural and cultural resources management plan for each land-sea unit, whether it be a single watershed (*ahupua'a)* or interconnected network of watersheds (*moku)*. To move in

that direction, an integrated planning process and standardized set of tools must be developed to guide integrated natural and cultural resources planning, to promote greater collaboration between government and stakeholders. An integrated planning process should be applied and refined in a demonstration *moku* in the State, together with collaborative governance mechanisms that could provide technical assistance, training, and financial support for community-level initiatives.

Build capacity for community participation in natural and cultural resource management: Community-based initiatives are serving as powerful forces for changing the way we manage natural resources. A number of community-level, *ahupua'a*-based initiatives are ongoing throughout the State. These have grown out of various causes and for different reasons. Building the capacity for community participation through training, education and outreach, technical assistance, and access to information are critical to sustaining and expanding mechanisms for integrated management of our natural and cultural resources. Increasing the management capacity and responsiveness within agencies to accommodate increased community participation is a critical component to this entire plan. DLNR's Mauka-Makai Watch Program enlists the support of the local community to observe and report violations of natural resource regulations; however, training and capacity-building support are needed to maximize the community stewardship potential. In addition, streamlined permitting processes for small, community-based environmental restoration efforts are needed to promote mangrove removal, beach nourishment, and other activities to rehabilitate natural resources.

Institutionalize integrated natural and cultural resources management

Many changes are needed in Hawai'i's legal and institutional framework to institutionalize an integrated approach to natural resources management. A legal and administrative reform agenda is needed to guide the short-term and long-term changes. The reforms must build on experiences gained and lessons learned through ORMP implementation and other resource management experience, and be informed by scientific data and traditional knowledge.

Develop legislative and administrative proposals to improve management of natural resources: Legal and administrative changes will be needed in order to institutionalize integrated approaches to natural resources management and collaborative governance mechanisms. These changes may include requirements for area-based integrated natural resource management plans and institutional arrangements for stakeholder involvement and must be developed based on experiences and lessons learned from demonstration projects within various *moku*. Legislative and administrative proposals are needed to consolidate and prioritize short-term and long-term changes in the legal framework and institutional arrangements that will continue to support integrated management of natural resources.

Monitor and evaluate Ocean Resource Management Plan implementation: The Office of Planning is the lead government agency responsible for planning and coordinating implementation of the ORMP. The successful implementation of the ORMP is dependent on establishing effective interagency collaboration as well as multisectoral involvement throughout the 5-year implementation and update process.

TABLE 3: PERSPECTIVE 3: PROMOTING COLLABORATIVE GOVERNANCE AND STEWARDSHIP: *Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and sea.*

Management Goals and Strategic Actions	Lead[1]	Status[2]
Apply integrated and place-based approaches to the management of natural and cultural resources		
Develop integrated natural and cultural resources planning process and standardized tools		
• Facilitate integrated natural resource management in demonstration *ahupua'a* and *moku* with collaborative governance and financing mechanisms for plan implementation	OP	New
• Establish a *moku* support network to increase community dialogue, develop a framework for education, and build partnerships among various stakeholders	OP, DLNR, DOH	New
• Develop an integrated geographic information system for priority watersheds and coastal areas	OP	Ongoing
• Investigate how Limits of Acceptable Change (LAC) model can be used in resource management	DLNR	Ongoing
Build capacity for community participation in natural and cultural resources management		
• Develop education and outreach programs through interagency agreements and in partnership with community groups and relevant nonprofit organizations to educate residents and visitors on natural and cultural resource values, regulations, and best practices	OP, DLNR	New
• Identify existing networks, community groups and organizations to work with to establish responsible management entities for each *ahupua'a* and *moku* to implement the ORMP	OP, Counties, Community Groups	New
• Develop mechanisms and streamlined permitting processes to support community-based natural resource restoration and other activities designed to benefit *ahupua'a* management	TBD	New
• Undertake and coordinate outreach and educational efforts, with community input, to raise awareness of program efforts to develop integrated planning approach in each *ahupua'a* or *moku*	OP	New
• Expand the Mauka-Makai Watch program and provide standardized training programs and guidelines for participating community volunteers and organizations	DLNR	Ongoing
Institutionalize integrated natural and cultural resources management		
Develop legislative and administrative proposals to improve management of natural resources		
• Develop the principles for an *ahupua'a /moku* management framework for the further development and implementation of the ORMP	OP	New
• Propose legislation for statutory changes to the Hawai'i CZM program network, including SMA permits and possibly other regulatory programs	OP	New
• Advocate for changes to State statutes, State and county rules, or administrative policies that will equip the CZM program entities to incorporate *ahupua'a* and *moku* concept into policies	OP	New
Monitor and evaluate Ocean Resource Management Plan implementation		
• Establish multisectoral ORMP implementation and monitoring group	OP	New
• Establish public advisory group to help assess and monitor *ahupua'a* or *moku* issues and maintain a dialogue at the community level to learn about each *ahupua'a* or *moku*	OP	New

TABLE 3: PERSPECTIVE 3: PROMOTING COLLABORATIVE GOVERNANCE AND STEWARDSHIP: *Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and sea.*

Management Goals and Strategic Actions	Lead[1]	Status[2]
• Convene workshop to continue discussion of the integrated planning approach	OP	New
• Conduct ORMP monitoring and evaluation by multisectoral implementation and monitoring group	OP	New
• Adjust strategic actions as needed based on monitoring and evaluation	OP	New
• Conduct biennial ORMP conference	OP	New
• Conduct 5-year review and update of the ORMP	OP	New
• Incorporate experiences and lessons learned into legal and administrative reforms	OP	New

Notes: The implementation of strategic actions under each management goal will require different funding scenarios including maintaining existing funds, obtaining new federal and state funds, and redeploying existing funds. Cost details will be further developed as the scope of these actions is detailed in specific priority watersheds and demonstration projects.

1. Lead: Agency/organization responsible for implementing and coordinating strategic actions; assumes other agencies and organizations will be involved
2. Status: Classifies strategic action as ongoing initiative, expansion of ongoing initiative, or new initiative.

ORMP Implementation and Progress Monitoring

There is an important role for everyone in the implementation of the ORMP. Many of the planned actions must be implemented by government agencies mandated by law to regulate or manage ocean resources and land-based activities that can degrade them. The ORMP is a State plan and therefore highlights actions to be carried out by State agencies. The role of federal and county government agencies, however, is inherent to the successful implementation of the ORMP. Nongovernmental organizations together with community groups play a vital role in catalyzing and implementing actions to improve ocean resources management and will serve as the frontline in providing local perspectives and knowledge for demonstrating place-based management. The private sector is instrumental in designing and implementing best management practices consistent with societal values. In order to institutionalize progress made, lessons learned, and new management approaches, the State legislature and county councils will be busy reviewing and refining laws and rules. Many strategic actions identified in the ORMP can and should be implemented without government, requiring only individuals and groups to take action.

Public comments strongly supported the new perspectives and vision for place-based approaches to natural and cultural resources management detailed in the ORMP. The State's ability to implement the ORMP, however, was highlighted as a major concern in all public meetings. While the Office of Planning (OP) is the lead government agency responsible for preparing and coordinating the development and implementation of the ORMP, success over the next 5 years will require the resources and staff of all relevant State government agencies as well as all other stakeholders to implement not only existing mandates but new actions to achieve the overall goals of the plan. A key focus of the ORMP's implementation over the next 5 years will be to develop and coordinate meaningful interagency and multisectoral engagement for plan implementation. Coordination tasks anticipated in the implementation and update of the ORMP, and the schedule, are provided in Table 4.

TABLE 4: COORDINATION TASKS FOR ORMP IMPLEMENTATION AND UPDATE

Tasks	2007				2008				2009				2010				2011			
Develop/revise results indicators and targets																				
Prepare biennial agency work plans for ORMP implementation																				
Conduct biennial implementation status reviews																				
Conduct mid-term and 5-year evaluation and report on results																				
Conduct interagency planning for ORMP update																				
Gather public input for ORMP update																				
Prepare ORMP update																				

The OP will establish a multisectoral ORMP Implementation Group to coordinate and oversee implementation of the ORMP. The ORMP Implementation Group will be responsible for the successful implementation of the plan over the next 5 years. The ORMP Implementation Group will meet to review the implementation status of key plan initiatives and provide a forum for coordination and collaboration

on implementation issues. Through the work plan development process, OP together with State government agencies will analyze and resolve conflicts between agency work plans and prioritize actions consistent with ORMP priorities.

Biennial agency work plans will be developed to achieve a common set of indicators and targets and to reflect an integrated approach to address management priorities highlighted in the ORMP. These work plans will be reviewed by the ORMP Implementation Group.

Illustrative results indicators for each management goal are provided in Tables 5, 6, and 7. A potential framework for evaluating the outcome of ORMP implementation is based on the four orders of outcomes described by Olsen *et al.* 2006, as follows:

- First order outcomes - Enabling conditions
  - Government commitment, authority, and funding
  - Institutional capacity to implement
  - Unambiguous goals
  - Broad base of constituencies to support change
- Second order outcomes – Changes in behavior
  - Changes in behavior of institutions and stakeholder groups
  - Changes in behavior directly affecting resources of concern
  - Changes in investment strategies
- Third order outcomes - Attainment of goals
  - Desired social and or environmental qualities maintained, restored, or improved
- Fourth order outcomes - Sustainable ecosystem conditions
  - Desirable and dynamic balance between environmental, cultural, and social conditions is sustained

The ORMP Implementation Group will review and identify annual priorities, develop legislative initiatives to implement specific actions in the plan, coordinate budget requests, and review biennial agency work plans for consistency with the vision and management goals articulated in the ORMP. Agency work plans will be revised on a biennial basis to be coordinated with the budget process, and will integrate documented experiences and lessons learned as a result of implementation status reviews.

The State received substantial input into the ORMP during the public review process. Many issues and recommendations identified by the public were incorporated into the revised plan; however, some issues are complex and required additional time to examine. Over the course of implementation, the ORMP Implementation Group will further examine the following issues that were commonly identified in public comments:

- ORMP's 30-year planning horizon is too long, and Hawai'i's ocean resources need urgent attention
- Enforcement capacity is a primary limiting factor to natural resource protection statewide
- Impacts of the visitor industry on ocean resources and ways in which the visitor industry can assist in alleviating impacts should be addressed
- Actions to address management of streams and estuarine environments is an important component of ocean ecosystem health

Finally, a number of activities will be conducted to update the ORMP. Monitoring and evaluation of ORMP implementation will be conducted at both the mid-term and in year 5 of implementation, led by the ORMP Implementation Group and collaborating partners throughout the state.

TABLE 5: ILLUSTRATIVE RESULTS INDICATORS FOR MANAGEMENT GOALS AND STRATEGIC ACTIONS UNDER PERSPECTIVE 1

Management Goals and Strategic Actions	Illustrative Results Indicators
Improve coastal water quality by reducing land-based sources of pollution • Reduce soil erosion from upland forest ecosystems and conservation lands • Reduce pollutant loads from residential, agricultural, and commercial uses in priority watersheds	• Number (and %) of priority watersheds with demonstrated improvement in stream and coastal water quality • Number (and %) of impaired streams • Acres (and %) of watershed actively managed under public-private sector partnerships • Acres (and %) of land designated for conservation use in selected watersheds • Number of best management practices designed, implemented, and demonstrated to reduce pollutant loads in priority watersheds
Protect beaches, wetlands, and coastal communities from shoreline erosion and other coastal hazards • Develop and implement a comprehensive and integrated shoreline policy that addresses the impacts of chronic and episodic coastal hazards • Develop a Hawai'i beach and shoreline management plan with specific management measures to address coastal erosion and other hazards in priority coastal areas • Encourage appropriate coastal-dependent development that reduces risks from coastal hazards and protects coastal and cultural resources	• Comprehensive and integrated shoreline policy developed and adopted statewide • Percent of total miles of shoreline with risk-based evaluation of coastal hazards completed • Percent of total miles of shoreline with beach erosion and hazard management measures in place • Number of best management practices designed and implemented in new coastal development
Improve and ensure maintenance and appropriate use of environmental infrastructure • Repair leaking sewers in priority watersheds • Reduce the number of individual wastewater disposal systems in the coastal environment • Reduce unpermitted storm-water discharges to the sewers in priority watersheds • Provide appropriate waste management infrastructure to support commercial and recreational marine facilities	• Number of days beaches posted by DOH as unsafe due to pollution • Number of priority watersheds with improved environmental infrastructure and use • Number (and %) of illegal storm-water hookups eliminated • Number (and %) of cesspools and other private disposal facilities eliminated in designated watersheds • Number of existing and new commercial and recreational marine facilities with pump-out facilities

TABLE 6: ILLUSTRATIVE RESULTS INDICATORS FOR MANAGEMENT GOALS AND STRATEGIC ACTIONS UNDER PERSPECTIVE 2

Management Goals and Strategic Actions	Illustrative Results Indicators
Improve coastal water quality by reducing marine sources of pollution • Minimize the introduction and spread of marine alien and invasive species into and throughout archipelagic waters • Establish wastewater-discharge restricted zones and conditions for commercial vessels in archipelagic waters	• Risk-based approach to marine alien and invasive species developed and applied for high risk species and in high risk areas • Perceived effectiveness of invasive species interdiction systems by recognized experts • Wastewater from commercial vessels discharged in areas that will not impact coastal water quality
Improve the health of coral reef resources for sustainable traditional, subsistence, recreational, and commercial uses • Strengthen and expand marine protected area management • Develop ecosystem-based approaches for nearshore fisheries management • Establish and institutionalize approaches for restoring, operating, and preserving ancient Hawaiian coastal fishponds for the benefit of coastal communities around the State • Improve enforcement capacity and voluntary compliance with existing rules and regulations for ocean resource protection	• Number of hectares of marine protected areas • Annual % changes in area of marine protected areas • Changes in marine biomass inside and outside marine protected areas • Main Hawaiian Islands bottomfish (five species) spawning potential ratio • Number of Hawaiian fishponds restored • Increased enforcement presence for natural resources management on all islands • Improved compliance with ocean-related regulations
Enhance public access and appropriate coastal-dependent uses of the shoreline • Enhance and restore existing public shoreline areas and scenic vistas • Establish new shoreline areas for public and appropriate coastal-dependent uses	• Percent of acres in coastal zone open for public use • Percent of total miles of beach in coastal zone open for public use • Number of new sites that provide public access to the coast • Number (and %) of existing public access sites that have been enhanced • Percent of shoreline where criteria for coastal-dependent uses applied
Promote appropriate and responsible ocean recreation 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 • Develop responsible and sustainable ocean-based tourism	• Number (and %) of stakeholder involvement in successfully mitigated cultural, environmental and resource use conflict • Number (and %) of community-based management efforts still in effective operation after 5 years • Number of ocean tourism entities implementing best management practices for cultural and coastal resources
Encourage cutting edge and appropriate ocean science and technology with safeguards for ocean resource protection • Promote alternative ocean energy sources • Plan and develop sustainable commercial aquaculture in coastal areas and ocean waters to diversify and expand Hawai'i's economy and provide locally produced sources of seafood • Expand ocean science and technology	• Percent of energy from renewable ocean sources • Number of commercial aquaculture operations • Percent of State revenues from ocean science and technology

TABLE 7: ILLUSTRATIVE RESULTS INDICATORS FOR MANAGEMENT GOALS AND STRATEGIC ACTIONS UNDER PERSPECTIVE 3

Management Goals and Strategic Actions	Illustrative Results Indicators
Apply integrated and place-based approaches to the management of natural and cultural resources • Develop integrated natural and cultural resources planning process and standardized tools • Build capacity for community participation in natural and cultural resources management	• Number of integrated natural and cultural resources plans developed • Number of community-based restoration activities permitted under streamlined permitting processes • Number of community-based capacity building efforts led by leaders in existing community-level efforts • Number of participants in educational activities and training opportunities offered through multisectoral agreements and support
Improve the existing legal, regulatory, and institutional framework for integrated natural resources management based on scientific data, traditional knowledge, and field experience • Establish a legislative and administrative reform agenda to improve management of natural resources • Develop integrated information management system for priority watersheds and coastal areas • Document and share experiences and lessons learned in Hawai'i and globally to promote natural and cultural resource policy reforms and adoption • Monitor and evaluate ORMP implementation	• Number of legislative and administrative proposals developed and adopted promoting integrated natural resources management • Number of interagency and multisectoral agreements developed and implemented for integrated natural resources management • Percentage of State budget allocated to environmental protection programs • Organization of evaluation and reflective practice sessions to generate "lessons" from the planning and implementation of the ORMP

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Appendix A

Planning and Public Involvement in the Development of the ORMP

Introduction

The ORMP update process consisted of gathering input from various groups over several months, including a workshop to develop strategies to be part of an ocean management framework; multiple revisions of the plan to incorporate recommendations from various stakeholders; and public review meetings on each major island.

In 2005, OP sought input from a variety of groups regarding the issues, priorities and recommended actions that should be included in the updated ORMP. Hawai'i Ocean and Coastal Council (HOCC), Marine and Coastal Zone Advisory Council (MACZAC), Office of Hawaiian Affairs (OHA), AOHCC, various community groups, ocean users, environmental non-profits and members of the general public were asked to identify uses and threats with the most negative impact on ocean resources in the next 20 years, prioritize concerns to be addressed, recommend specific actions to address concerns and suggest framework ideas for the 2006 ORMP.

HOCC

HOCC held monthly facilitated meetings between May and October 2005 and produced long-term goals and prioritized tiers of short- to mid-range goals, organized into three themes:

- Protection of natural and cultural resources;
- Coastal development and recognition and balance between resources
- Resource users and the conflicts that arise

MACZAC

The MACZAC ORMP working group produced position papers which proposed recommended changes in the law; changes in administrative rules and/or changes in policy. Many of the issues raised by the MACZAC ORMP working group mirrored HOCC's recommendations. These included:

- Enforcement
- Public shoreline access
- Support of a sustainable ocean tourism industry
- Streamlined permitting
- Small boat harbor issues
- Management of unencumbered State lands, including ceded lands
- Inadequate wastewater treatment in coastal areas
- Marine reserves
- Commercial harbors
- Coastal erosion

OHA "Community Conversations"

In September and October of 2004, OHA held "Community Conversations" on each island to allow the Hawaiian community a chance to share their concerns and knowledge about ocean and coastal issues, which are often individual to each island, and sometimes individual to various parts of each island. Meetings were held between September and October 2004 in:

- West Kaua'i /Ni'ihau – Kekaha
- East Kaua'i – Kapa'a

- East Hawai'i – Hilo
- West Hawai'i – Kona
- Maui – Kahului
- Moloka'i – Kaunakakai
- Lāna`i – Lāna`i City
- Windward O'ahu – Kāne'ohe
- South O'ahu – Papakōlea
- Leeward O'ahu – Wai'anae
- North O'ahu – Hale'iwa

Common themes arose from these meetings:

- The importance of *ahupua'a* and *konohiki* styles of resource management, including regional rules, management and enforcement
- The woven integration of cultural and natural resources
- The need to educate people who live and work in Hawai'i, resource managers and tourists
- The inadequacy of enforcement of existing rules and laws
- Environmental impacts from current mismanagement and misunderstanding of the resources
- The need for access to ocean and coastal resources

AOHCC

Between May and November 2005, AOHCC gave approximately 17 presentations to a variety of groups, such as the Community Conservation Network, Hawai'i State and county agencies, Belt Collins, Inc., and the National Oceanic and Atmospheric Administration. These presentations included discussion of the *ahupua'a* concept, the need for ecosystem-based management, the negative impacts of overlapping jurisdictions, and the need to include community members in the planning process.

OP Meetings

OP held four meetings from June through September of 2005 to solicit input from representatives of a variety of nonprofit organizations and ocean businesses around the islands. The nonprofit groups expressed appreciation for the opportunity to participate in identifying priorities and a framework for the ORMP. The ocean business group raised concerns about the need for an education component, with commercial operators disseminating information on resource protection; the need for a formal definition of "ocean resources"; and a concern questioning the assumption that public ocean users will protect the resources more than commercial ocean users, as commercial users have a greater vested interest in sustaining the resources.

Hawai'i ORMP Workshop

In partnership with OHA and DLNR, OP held a Hawai'i ORMP Workshop on October 26, 2005. Attendees included a wide base of stakeholders, including government agencies, nonprofit organizations, community groups, small and large business representatives, and community members. Participants developed and compared recommendations, identified areas of consensus, and worked toward a framework for the 2006 ORMP. Break-out groups were divided into 12 categories and identified resource opportunities and threats and strategies to address them:

1. Ocean Resource Extraction
2. Ocean Resource Protection
3. Invasive Species

4. Aquaculture
5. Education/Outreach
6. Cruise Ships
7. Water Quality
8. Coastal Public Access
9. Sustainable Coastal Development
10. Enforcement Alternatives
11. Ocean Recreation User Conflicts
12. Boating Facilities and Infrastructure.

As a follow-up to the workshop, OP prepared and sent out evaluation forms summarizing the main topics discussed in each category. Participants were asked to assess the cost-effectiveness, complexity and priority levels of each issue as "high," "medium," or "low."

A total of 38 evaluations were counted; 46 total evaluations were received, but 8 evaluations were not filled out according to the instructions for the survey. However, comments from all evaluations received are represented. Issues were ranked using two methods: (1) by point totals across all categories and (2) by point totals in only the priority category. In assigning points to each issue, the following simple point system was used:

Categories	High	Medium	Low	Blank
Cost-Effectiveness	3 points	2 points	1 point	0 points
Complexity	1 point	2 points	3 points	0 points
Priority	3 points	2 points	1 point	0 points

A comparison among the recommendations and priorities submitted by HOCC, MACZAC, the various community groups, environmental groups, the public and ORMP Workshop evaluations reveals several issues and actions as consensus priorities among the groups.

The following general categories exhibit the highest combinations of priority and feasibility:

- Boating infrastructure and facilities
- Permitting
- Sustainable coastal development
- Invasive species
- Public access
- Ocean resource protection
- Enforcement

The top recommended actions include the following:

- Increases in or better allocation of funding, personnel, resources and equipment
- Greater community involvement and input in the management of ocean resources
- More collaborative governmental efforts and procedures, including the permitting process
- Establishment of additional marine protected areas
- More education and integration of *ahupua'a* and/or place-based management concepts and resource protection measures

CZM Website

OP/CZM has dedicated a section on its web site for the ORMP update process at www.hawaii.gov/dbedt/czm/czm_initiatives/orm.html. This page was created to provide access to information on the ongoing update process. The web page contains documents for review, including the HOCC and MACZAC meeting agendas and minutes, as well as the 1991 ORMP, the 1998 Review, and other supporting documents.

ORMP Review Team

CZM organized an ORMP Review Team consisting of CZM and OP staff, a DLNR representative, a MACZAC representative and an OHA representative. The Review Team met periodically to provide feedback and advice on the ORMP throughout its various stages of development.

Agency Reviews

In addition, CZM consulted representatives of governmental agencies with extensive implementation responsibilities. These agencies include DLNR, DOH, DOT-Harbors and representatives of the Counties. An initial draft of the plan was circulated via e-mail to stakeholders who had requested to be notified of ORMP-related activities and/or who had attended the 2005 workshop. They helped develop the management goals and strategic actions and identified current and future initiatives regarding ocean resources management. These entities have large jurisdictions impacting ocean resources management, and their input is an essential element in the successful implementation of the plan. The following highlights the comments from the groups:

DOT Harbors:

- Need for additional space
- Recommends "Maritime Lands" land use classification be established to prevent diminishing land resources for increasing harbor uses and needs
- Need for increased revenue generation to perform its core functions, such as terminal development, facility maintenance, security, etc.
- Increased collaboration with DBEDT, DOH, DLNR, DOA and Counties on improving spatial needs, establishing financial stability, and monitoring water quality, invasive species and solid waste pollution issues

DLNR:

- Investigate and pursue a comprehensive Integrated Shoreline Policy
- Continued management of watershed resources through public-private partnerships such as DLNR's watershed partnership program
- Need to continue implementation of Hawai'i's Comprehensive Wildlife Conservation Strategy
- Establish indicators of coral reef conditions in selected areas
- Continued work of the Hawai'i Invasive Species Council and implementation of key proposed actions of HISC's "Hawai'i Strategic Plan for Invasive Species Prevention, Control, Research and Public Outreach"
- Integrate best management practices, cultural values and experiences into marine tourism business plans
- Develop Marine Managed Area policy framework
- Protect natural resources while reducing ocean recreation user conflicts
- Long-term sustainability of fisheries
- Promoting prevention and compliance first, rather than focusing solely on enforcement actions
- Develop tools and data systems to better understand cumulative impacts of development

- Expand network function between government agencies

DOH:

- Incomplete Individual Wastewater Systems (IWS) inventory
- Need to reduce or eliminate large-capacity cesspools over time
- Encourage Counties to install sewage treatment plants
- Implementation of Hawai'i's Coastal Nonpoint Pollution Control Program Management Plan

County Planning Department Representatives:

- DLNR and Counties underfunded for enforcement; beaches have a lack of lifeguards
- Counties would benefit from increased collaboration with DLNR on shoreline certification and enforcement issues
- Repairing and maintaining properly the numerous leaking sewer lines
- "Paper" hookups in sewer areas and other "missing" hookups

Public Review

On September 11, 2006, a draft of the 2006 ORMP was made available at public libraries statewide, and on the State's Coastal Zone Management Program website. The public was invited to comment at a series of public meetings held statewide, or directly to the CZM program via mail or email. The public comment period occurred from September 11 to October 13, 2006. The ORMP was generally well-received. Many noted that the ORMP was well-written and that the place-based management approach was a tremendous improvement over the previous management documents and the current manner in which the State conducts natural resource management.

Public Meeting Schedule and Location

September 18, 2006	Kapa 'a, Kaua'i: Kaua'i Community College
September 20, 2006	Kailua-Kona, Hawai'i: Kealakehe High School
September 21, 2006	Hilo, Hawai'i: Hilo state Office Building
September 25, 2006	Kahului, Maui: Maui Community College
September 26, 2006	Honolulu, O'ahu: Ala Wai Elementary School
September 27, 2006	Lāna'i City, Lāna'i: Lāna'i High & Elementary School
September 28, 2006	Kaunakakai, Moloka'i: Kaunakakai School
October 19, 2006	Hāna, Maui : Hāna Community Center

A total of 122 people attended the public meetings, with the attendees of each meeting providing a perspective unique to their island. Many comments were incorporated to broaden the scope of the plan. We hope that people who provided perspectives from the diverse communities across our State can see their comments and recommendations incorporated within this plan, as our primary objective is to focus on the unique issues and strengths from communities across our State and to provide a governmental framework with which to assist these communities with developing appropriate solutions. Common themes and questions from these meetings included the availability and source of funding for specific projects, the urgency to implement the plan, a lack of educational initiatives, questions on the mechanism for determining priority watersheds, the need for increased enforcement, and skepticism on the ability to develop the necessary coordination needed to implement the new course of action called for in the plan.

Thirty written comments were submitted during the public comment period, including five from federal agencies and five from State agencies. Many of these written comments were extensive and helpful in addressing inaccuracies, providing information on gaps, clarifying statements, and offering examples of

relevant ongoing and proposed projects. These comments covered all sections of the draft ORMP, but focused primarily on the three perspectives, the accompanying tables, and the implementation section. All input, from both the public meetings and the written comments, was carefully considered and incorporated in the appropriate sections. We thank the public for their effort to improve the ORMP and invite them to stay active throughout the implementation of the strategies and actions to achieve the specific goals and overall vision discussed in the document.

All public comments from the eight meetings and the 30 written submissions are summarized in the document "The Hawai'i Ocean Resources Management Plan, Summary of Public Comments," available from the CZM Program office.

Appendix B

List of Acronyms

AIS	Alien and Invasive Species
AOHCC	Association of Hawaiian Civic Clubs
CZM	Coastal Zone Management Program (OP)
CWA	Clean Water Act
DAR	Division of Aquatic Resources (DLNR)
DBEDT	Department of Business, Economic Development and Tourism
DES	Department of Environmental Services (City & County of Honolulu)
DLNR	Department of Land and Natural Resources
DOA	Department of Agriculture
DOH	Department of Health
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information Systems
HACD	Hawai‘i Association of Conservation Districts
HCDA	Hawai‘i Community Development Authority (DBEDT)
HISC	Hawai‘i Invasive Species Council (DLNR, DOA)
HOCC	Hawai‘i Ocean and Coastal Council
HRS	Hawai‘i Revised Statutes
LAC	Limits of Acceptable Change
MACZAC	Marine and Coastal Zone Advocacy Council (CZM)
MACZMAG	Marine and Coastal Zone Management Advisory Council (CZM)
MHI	Main Hawaiian Islands
MLCD	Marine Life Conservation District (DLNR)
NARS	Natural Area Reserve System (DLNR)
NELHA	Natural Energy Laboratory of Hawai‘i Authority (DBEDT)
NMFS	National Marine Fisheries Service
NMSP	National Marine Sanctuary Program
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWHI	Northwestern Hawaiian Islands
OHA	Office of Hawaiian Affairs
OP	Office of Planning
ORMP	Ocean Resources Management Plan (OP)
SGCN	Species of Greatest Conservation Need (DLNR)
SMA	Special Management Area (Counties & CZM)
SWCD	Soil and Water Conservation Districts
UH	University of Hawai‘i
USCG	U.S. Coast Guard
WPCRF	Water Pollution Control Revolving Fund (DOH)
WPFMC	Western Pacific Fishery Management Council