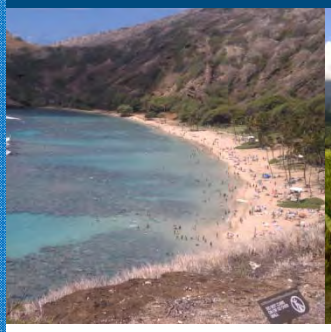
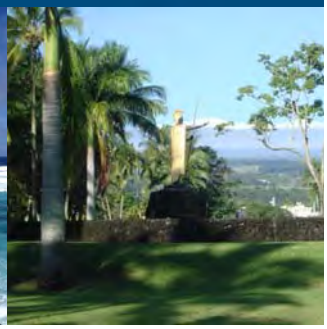
Hawai'i Ocean Resources Management Plan

July 2013





Hawaii CZM Program
Coastal Zone Management
HAWAII STATE OFFICE OF PLANNING

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

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ORMP POLICY GROUP ENDORSEMENT

We, the undersigned, having participated in the update of the *2006 ORMP,* commit *to* continued coordination of state, county, and federal jurisdictions, pursuant to HRS section 205A-62, and to strive to ensure and support the perspectives, management priorities, and goals of the *2013 ORMP*. By signing below, we recognize the importance of coordination and cooperation to ensure the vision for Hawaii's ocean resources as a healthy, productive, and sustainable ocean ecosystem that fosters economic growth while preserving and protecting Hawaii's values and needs.

Office of Planning*

Department of Business, Economic Development, and Tourism**

Department of Health **

Department of Transportation**

University of Hawai'i, Sea Grant**

County of Maui, Planning Department

City & County of Honolulu, Department of Planning and Permitting

Marine and Coastal Zone Advocacy Council

Department of Agriculture**

State Civil Defense**

Department of Land and Natural Resources**

University of Hawai'i, School of Ocean and Earth Science and Technology**

Office of Hawaiian Affairs

County of Kaua'i, Planning Department

County of Hawai'i, Planning Department

Honolulu Board of Water Supply

* Lead Agency for Coastal Zone Management (CZM) as defined by HRS §205A-1.
** State agencies with responsibilities relating to marine and coastal zone management identified under HRS §205A-62(3).

FEDERAL AGENCY ACKNOWLEDGEMENTS

The following federal agencies participated in the development of the *ORMP* and through their participation acknowledge and recognize the importance of ocean resource management in Hawai'i.

- NOAA Pacific Services Center
- NOAA Office of National Marine Sanctuaries, Pacific Islands Regional Office
- NOAA Office of Ocean and Coastal Resource Management

United States Army Corps of Engineers, Honolulu District, Civil and Public Works Branch

United States Navy, Hawai'i Region

United States Coast Guard, 14th District

United States Environmental Protection Agency, Pacific Island Contact Office

EXECUTIVE CHAMBERS

HONOLULU

NEIL ABERCROMBIE
GOVERNOR

Governor's Message

Aloha,

Where there is water, there is life. From rainfall in Hawai'i's mountains, through streams, rivers, and underground geological networks, to the ocean surrounding Hawai'i, water influences all aspects of our lives.

The *Hawai'i Ocean Resources Management Plan* (ORMP) is a comprehensive state plan that provides a framework for ocean and coastal resource management in Hawai'i. It strives to achieve the delicate balance between economic, ecological, and cultural needs. The ORMP coordinates the actions of various county, state, and federal agencies and the input from interested communities to achieve the sustainable use of Hawai'i's ocean and coastal resources for current and future generations.

I am pleased to see the endorsement of a wide range of government entities with resources and authority to implement the ORMP. I support their efforts, and the goals and objectives they have identified for action.

Imua Hawai'i!

Neil Abercrombie

NEIL ABERCROMBIE
Governor, State of Hawai'i

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July 2013

Aloha,

Hawaii's unique coastal and marine resources enable industry and commerce, support cultural traditions that connect us to our past and future, and provide sustenance to Hawaii's families. Ensuring that our coastal and marine resources are available for current and future generations requires a multi-jurisdictional, multi-disciplined approach. The 2013 Ocean Resources Management Plan (ORMP) identifies a collective vision of Hawaii's preferred future and State actions that will get us there. More importantly, it identifies public, private, and community partners that are needed to execute short-term and long-term actions.

This ORMP plan update is the fourth in a series dating back to 1985, and the Office of Planning (OP) is the designated lead for its update and tracking implementation. This planning effort would not have been possible without the support and participation of county, state, and federal agencies with resource responsibilities and the communities that benefit from resource management that is efficient, effective, and accountable. With the help of these participants, we were able to produce a plan that includes meaningful benchmarks, targets, and metrics that will ensure implementation.

The overarching framework for implementing the ORMP is Hawaii's Coastal Zone Management (CZM) Act of 1977. The purpose of the Act is to "provide for the effective management, beneficial use, protection, and development of the coastal zone [which includes the entire State and its territorial waters]." The ORMP is a primary means for achieving these objectives across jurisdictions, disciplines, and communities. The ORMP identifies eleven management priorities for the next 5-years. It addresses the challenges of our time and the future, such as increasing land use and ocean resource development, competing human uses, the impacts from climate change, and the health of our natural environments.

Hawaii is not alone in these efforts. In 2010, President Obama announced the National Ocean Policy (NOP). Like the vision of the NOP, the ORMP seeks to achieve a Hawaii where "…stewardship ensures that the ocean [and] our coasts…are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations."

The ORMP brings us closer to realizing this larger vision for the greater good of the people of Hawaii.

Mahalo,

Jesse K. Souki, Director

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Appendices

Acronyms

AIS	Aquatic Invasive Species
AIS Team	Aquatic Invasive Species Team
BMP	Best Management Practices
BVR	Beach Vulnerability Rating Project
BWS	Honolulu Board of Water Supply
CBSFA	Community-Based Subsistence Fishing Area
CEC	Commission on Environmental Cooperation
CEQ	Council on Environmental Quality
C-MORE	Central for Microbial Oceanography: Research and Education
CMSP	Coastal and marine spatial planning
CNMI	Commonwealth of the Northern Mariana Islands
CNPCP	Coastal Nonpoint Pollution Control Program
COEMAP	DLNR *Coastal Erosion Management Plan*
CRest	NOAA Coastal Resilience Networks
CRCP	NOAA Coral Reef Conservation Program
CRP	NOAA Community-Based Restoration Program
CSP	NOAA Coastal Storms Program
CWRM	DLNR Commission on Water Resources
CZARA	Coastal Zone Act Reauthorization Amendments
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DAR	DLNR Division of Aquatic Resources
DBEDT	Department of Business, Economic Development & Tourism
DLNR	Department of Land and Natural Resources
DOA	Department of Agriculture
DOBOR	DLNR Division of Ocean Boating and Ocean Recreation
DOCARE	DLNR Division of Conservation and Resources Enforcement
DOFAW	DLNR Division of Forestry and Wildlife
DOH	Department of Health
DOI	U.S. Department of Interior
DOT	Department of Transportation
DP	Development Plan
DPP	City & County of Honolulu Department of Planning and Permitting
EEZ	Exclusive Economic Zone
ENSO	El Niño/La Niña—Southern Oscillation
EPA	U.S. Environmental Protection Agency
EPICS	Climate Extremes in the Pacific Integrated Case Studies
ESA	Endangered Species Act
FAO	Food and Agriculture Organization of the United Nations
FDA	U.S. Food and Drug Administration
FEMA	Federal Emergency Management Agency
FMA	Fishery Management Areas
GIS	Geographic Information System
GMO	Genetically Modified Organism
GPS	Global Positioning Satellite
HANO	Hawai‘i Alliance of Non-Profit Organizations

HCA	Hawai‘i Conservation Alliance
HCDA	Hawai‘i Community Development Authority
HCEI	Hawai‘i Clean Energy Initiative
HCRS	*Hawai‘i Coral Reef Strategy*
HIMB	Hawai‘i Institute of Marine Biology
HI-MDAP	*Hawai‘i Marine Debris Action Plan*
HRS	Hawaii Revised Statutes
HTA	Hawai‘i Tourism Authority
ICAP	University of Hawai‘i Sea Grant College Program, Center for Island Climate Adaptation and Policy
IOOS	U.S. Integrated Ocean Observing System
IOPTF	Interagency Ocean Policy Task Force
IPCC	Intergovernmental Panel on Climate Change
JTMD	Japan Tsunami Marine Debris
KIRC	Kaho‘olawe Island Reserve Commission
LAMA	UH Loli Aniau, Maka‘ala Aniau (Climate Change, Climate Alert)
MACZAC	Marine and Coastal Zone Advocacy Council
MACZMAG	Marine and Coastal Zone Management Advisory Group
MLCD	Marine Life Conservation Districts
MMA	Marine Managed Area
MOA	Memorandum of Agreement
MPR	Management Plan Review
NAR	Natural Area Reserve
NCRS	U.S. Department of Agriculture, Natural Resources Conservation Service
NELHA	National Energy Laboratory of Hawai‘i Authority
NERRS	National Estuarine Research Reserve System
NFWF	National Fish and Wildlife Foundation
NGO	Non-Governmental Organization
NMFS	NOAA National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NOC	National Ocean Council
NOP	National Ocean Policy
NPDES	National Pollutant Discharge Elimination System
NPS	NOAA National Performance Standards
OCCL	DLNR Office of Conservation and Coastal Lands
OCRM	NOAA’s Office of Ocean and Coastal Resource Management
OCS	Outer Continental Shelf
OHA	Office of Hawaiian Affairs
ONMS	Office of National Marine Sanctuaries
OP	Office of Planning
OP-CZM	State of Hawai‘i, Office of Planning, Coastal Zone Management Program
ORMP	*Hawai‘i Ocean Resources Management Plan*
OTEC	Ocean Thermal Energy Conversion
PacIOOS	Pacific Islands Ocean Observing System
PaCIS	Pacific Climate Information System
Pacific RISA	Pacific Regional Integrated Sciences and Assessments
PASH	Public Access Shoreline Hawai‘i
PIFSC	NOAA Pacific Islands Fisheries Science Center
PIRCA	Pacific Islands Regional Climate Assessment
PIRO	NOAA Pacific Islands Regional Office

PIRPB	Pacific Islands Regional Planning Body
PLS	Public Listening Sessions
PMNM	Papahānaumokuākea Marine National Monument
PRCP	DOH Polluted Runoff Control Program
PRiMO	Pacific Risk Management ‘Ohana
PROP	Pacific Regional Ocean Partnership
PSC	NOAA Pacific Services Center
ROMS	Regional Ocean Modeling System
ROH	Revised Ordinances of Honolulu
RPB	Regional Planning Body
RPS	Renewable Portfolio Standards
SAMP	Special Area Management Plan
SAM	Shoreline Assessment Model
SCD	Hawai‘i State Civil Defense
SEB	PMNM Senior Executive Board
SLH	Session Laws of Hawaii
SLR	Sea Level Rise
SMA	Special Management Area
Sub-ROP	Hawai‘i Sub-Regional Ocean Partnership
SSBN	OCCL Small Scale Beach Nourishment Program
SWAN	Simulating Waves Nearshore
UH	University of Hawai‘i
UH CTAHR	University of Hawai‘i College of Tropical Agriculture and Human Resources
UHERO	University of Hawai‘i Economic Research Organization
UH SOEST	University of Hawai‘i School of Ocean and Earth Science and Technology
UNESCO	United Nations Educational, Scientific and Cultural Organization
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USCOP	U.S. Commission on Ocean Policy
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMC	U. S. Marine Corps
WHRFMA	West Hawai‘i Regional Fisheries Management Area
WMMWP	West Maui Mountains Watershed Partnership
WMS	Web Mapping Service
WPRFMC	Western Pacific Regional Fishery Management Council
WRF	Weather Research and Forecasting Model
WW III	WaveWatch III

I. Introduction and Vision

The Hawaiian Archipelago sits in the Pacific Ocean, 2,000 miles from the nearest land mass. The Hawaiian chain includes the eight inhabited islands of the State of Hawai‘i and the Northwestern Hawaiian Islands. Completely surrounded by ocean water, all land mass is classified as within the coastal zone; Hawai‘i is the only state with this characteristic. It makes ocean resource protection an acute and life-sustaining necessity for people, for marine species, and for their habitat.

When Hawaiians speak of water, they are referring to a life source. Aia ke ola i ka wai: With water, there is life. Rainfall water falls onto the top of the mountains, feeds the waterfalls, the streams and rivers, and ultimately runs into the ocean that surrounds Hawai‘i. Therefore, resource management includes both ocean and coastal resources, and the water that feeds the ocean surrounding the islands.

The *Ocean Resources Management Plan* (*ORMP*) is a comprehensive plan mandated by Hawaii Revised Statutes (HRS) Chapters 205A and 225M. The *ORMP* is prepared to address activities by agencies and entities in the State of Hawai‘i. As a state plan, the first audience is state agencies with responsibilities for the land, coast, and ocean. But since jurisdiction for these activities also includes federal and local entities, they are considered partners in state activities. Furthermore, as citizen stewards of the land and the ocean, every person present in Hawai‘i, resident and visitor alike, plays an important role in protection and preservation of ocean and coastal resources.

The purpose of the *ORMP* as required in HRS Section 205A-4 is to provide a framework and implementation strategy for state agencies and others working with state agencies. The framework considers ecological, cultural, historic, aesthetic, recreational, scenic, and open space values. The framework considers coastal hazards and it balances protection with economic development in marine and coastal areas.

The *ORMP* is updated every five years through a process that includes extensive government feedback and statewide public input as required by HRS Section 205A-62. This is the fourth Hawai‘i *ORMP* since the first plan was written in 1985.

Addressing pressures on Hawaii’s ocean and coastal ecosystems, competing uses and overuse, sustainability, and preserving these assets for future generations are all critical in this plan, just as they are in the *Hawai‘i 2050 Sustainability Plan*.

Vision

The vision for Hawaii’s ocean resources is for a healthy, productive, and sustainable ocean ecosystem that fosters economic growth while preserving and protecting Hawaii’s values and needs.

This vision is adapted from the statutory language for ocean resource management found in HRS Chapter 205A. Public and private interests acknowledge the interconnection between land practices and the ocean, and seek to practice sustainable living. Agriculture, development, military, and visitor industry activities cooperate and coordinate with each other and to resolve conflicts in a manner which is pono or fair to all parties, a central theme in management. Each person carries a kuleana or responsibility for

using sustainable practices on the land and the ocean, and for supporting the health and well-being of the ocean by all users, enhancing the quality of life for all who live, work, and visit Hawai‘i.

In this vision, cooperation and collaboration are important among agencies at all levels: state, county, and federal. In this vision, government agencies interact with the community and with non-profit organizations to further the vision, perspectives, and goals of ocean protection.

Importance of Ocean Resource Management to the Economy

A vibrant and healthy ocean environment is essential to the quality of life in Hawai‘i. The ocean is Hawaii’s greatest natural resource, providing both economic vitality and spiritual renewal to residents and visitors alike. The State of Hawaii's 1,052 miles of coastline includes world famous sandy beaches, remote sea cliffs, estuaries, and newly formed lava (*The State of Hawai‘i Data Book 2011*, Department of Economic Development & Tourism (DBEDT)).

Hawaii’s landscape is being transformed from working agricultural lands to suburban and urban areas. According to Population and Economic Projections for the State of Hawai‘i by DBEDT (2012), the population in Hawai‘i is expected to increase 17.5% in the next 20 years from 1.36 million in 2010 to 1.60 million in 2030. In addition, with nearly 8 million visitors per year (DBEDT 2012), there will be increased pressure on marine and coastal resources, existing infrastructure, and water and land use.

Direct marine-related industries including fishing, aquaculture, tourism, recreation, and shipping provide approximately 15% of Hawaii’s 649,150 civilian jobs. According to the National Oceanic Atmospheric Administration *(NOAA) Report on the Ocean and Great Lakes Economy of the United States* (2012) prepared by Booz Allen Hamilton for NOAA’s Coastal Services Center, Hawaii’s ocean economy accounted for 92,160 jobs and over $2.5 billion in wages. Nearly 98% of the imported goods come through the state’s harbor system as their point of entry. The value of aquaculture shellfish and finfish is $2,000,000 annually, and is expected to increase. The microalgae industry, used mainly in nutritional supplements, contributed $25 million in sales to Hawaii’s economy. (*Hawai‘i Farm Facts*, October 2012).

Seafood is critically important to Hawaii’s food security and economy. A 2012 University of Hawai‘i (UH) College of Tropical Agriculture and Human Resources (CTAHR) study stated that Hawai‘i residents spend more on seafood per capita than the rest of the United States. In 2010, Hawai‘i residents spent $330.68 per capita or 11.4% of their total food consumption at home and in restaurants. This is over twice as much as the U.S. per capita of $143.68. These figures do not take into account all of the seafood consumed from subsistence fishing some communities call “ohana fishing,” or fishing to feed one’s family.

DBEDT statistics show that visitor expenditures were $11.2 billion in 2010, which was approximately 17% of the state’s Gross Domestic Product. In 2010, nearly 7 million visitors arrived by air; approximately 70% from the U.S. and 30% from other countries. (DBEDT, 2011) The recreational value of the state’s oceans and waterways to the tourism industry and to those that live in Hawai‘i has not been formally measured, however, the University of Hawai‘i Economic Research Organization (UHERO) will complete a study in 2013 and provide some economic data. One study on just the economic importance of Hawaii’s coral reefs, when considering recreational, amenity, fishery, and biodiversity values, estimated the value at $360 million per year of direct economic benefits. (Cesar, et.al, 2002)

In order to enjoy the economic benefits described here, the state must commit to preserve and to enhance Hawaii’s ocean resources. There must be regular, meaningful, and significant investments of financial and human capital dedicated to the ORMP management priorities. By giving serious attention, and

investing now in effective ocean management, there is an opportunity to protect the public health, promote public recreation, respect traditional practices, advance food security, enhance tourist activity, and grow Hawaii's economy as a whole.

ORMP Three Perspectives

The *2006 ORMP* charted a new course of action. The pinnacle of the approach was the Three Perspectives. The Three Perspectives are a way to integrate ocean resource management and to provide guidance for all of the actions that the ORMP agencies and partners do to manage Hawaii's ocean resources. The ORMP Three Perspectives are neither priorities nor goals, but they provide an overall statement of broad outcomes.

***ORMP* Three Perspectives**

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.

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

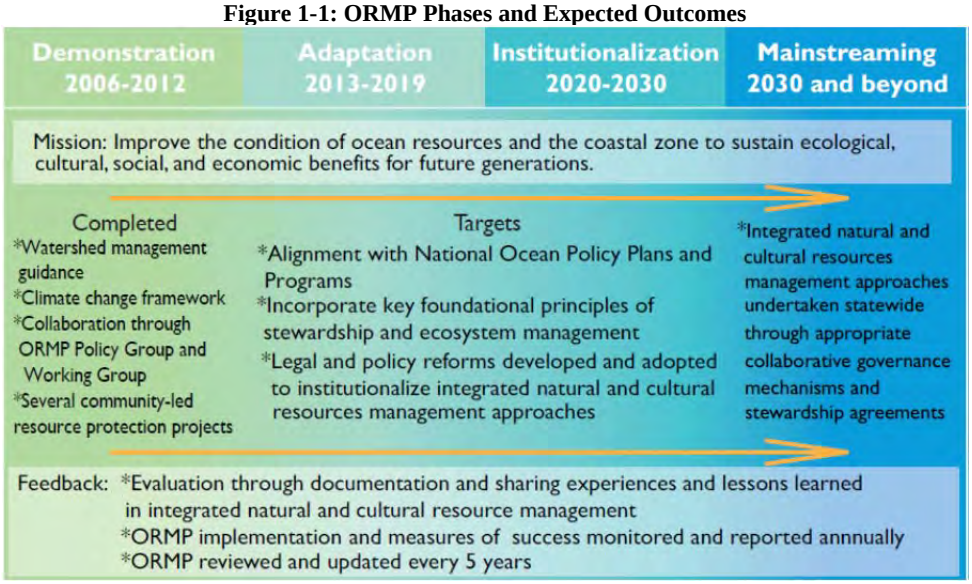
Perspective 3: Promoting Collaboration and Stewardship
Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and the sea.

ORMP Phasing Approach

The *2006 ORMP* moved from a sector-based approach implemented by jurisdictional entities to a place-based approach implemented by a broad base of stakeholders. Realizing that resource protection would take many years, a phased approach was initiated as shown in Figure 1-1. Experiences and lessons learned from each phase were to be documented to inform the next phase. A review of accomplishments from the Demonstration Phase is contained in Appendix B.

The second phase, termed *Adaptation*, is when Demonstration Phase strategies start being applied more broadly. This *2013 ORMP* addresses priorities for the Adaptation Phase. The third phase, termed *Institutionalization*, will more firmly implant the perspectives in agency work plans. The final phase, termed *Mainstreaming*, comes when the perspectives are practiced as standard, without the need to consider them for priority attention. Each phase will build upon lessons learned from the previous phase while recognizing and addressing new threats and forces.

Figure 1-1: ORMP Phases and Expected Outcomes

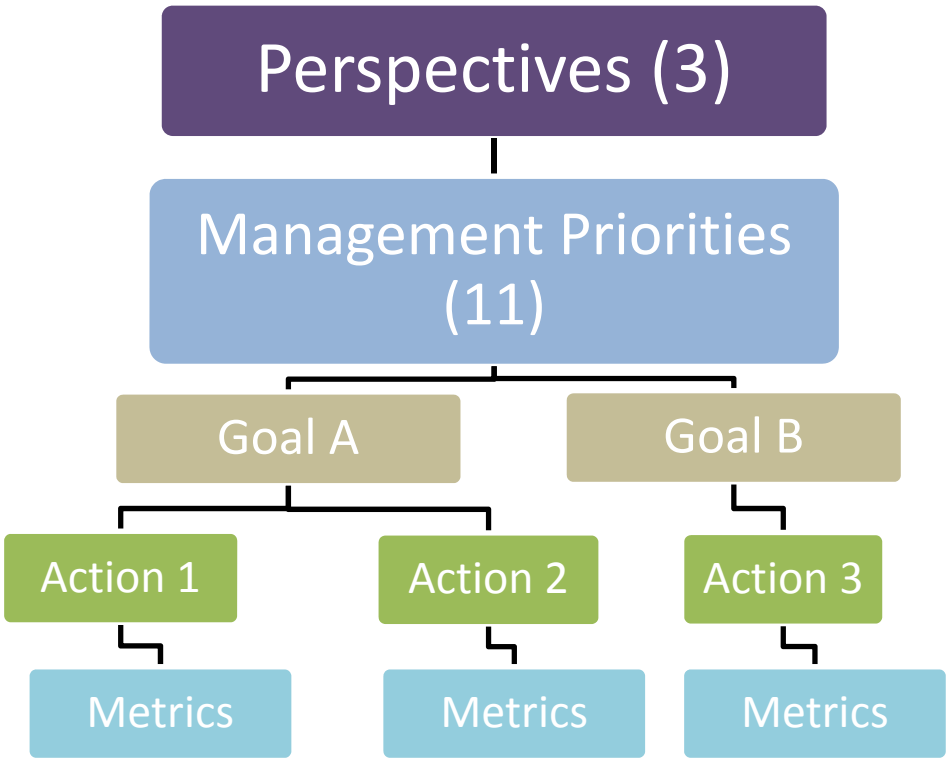


Source: Adapted from 2006 ORMP and Updated

Approach for Adaptation Phase

The high-level structure of the Adaptation Phase plan is shown in Figure 1-2. The plan identifies eleven Management Priorities for ocean resource management. Each management priority has at least two goals, actions to address these goals, and metrics for measuring where we are, where we would like to be, and indicates what will be measured and reported.

Figure 1-2: Management Priorities Hierarchy



The *ORMP* works by identifying eleven Management Priorities for the next five-year planning period, by identifying responsible agencies and resources, and by providing a method for performance measures and reporting. This responsibility can be found in HRS Section 205A-62.

This plan seeks to advance the area of measurement in the plan's goals, management priorities, actions, and metrics. Implementation of this plan will set baseline and benchmark measures, monitor progress, and address the results. This will create a continuous feedback loop, inform decision making, and help to adjust priorities for staffing and funding in ocean resource management.

These *2013 ORMP* Management Priorities replace the *2006 ORMP* Management Goals and Strategic Actions. The 2008 *ORMP Consolidated Work Plan* recognized that not all of the *2006 ORMP* management goals and strategic actions were being implemented. It was determined that the full list of activities and strategic actions, while important, were too numerous for effective and meaningful monitoring. Many activities were simply reported as "Ongoing" or "In Progress." While these activities are no longer being used or tracked, a list of the *2006 ORMP* activities (updated and amended) is shown as Appendix B.

While all activities are important to get a complete picture of ocean resource management, the activities in *2006 ORMP* Appendix B will no longer be monitored by the Office of Planning. Actions that will be monitored are those that are listed as Management Priorities for the Adaptation Phase and shown in Chapter III.

Management Priorities and Perspectives

The ORMP Management Priorities are the goals and actions which agencies of the State of Hawai‘i have committed to address and to make substantial and measurable progress during the period of 2013 to 2018. They are not listed in order of importance. Collectively they contribute to resource protection.

Perspective 1: Connecting Land and Sea

Management Priority #1	Appropriate Coastal Development
Management Priority #2	Management of Coastal Hazards
Management Priority #3	Watershed Management

Perspective 2: Preserving our Ocean Heritage

Management Priority #4	Marine Resources
Management Priority #5	Coral Reef
Management Priority #6	Ocean Economy
Management Priority #7	Cultural Heritage of the Ocean

Perspective 3: Promoting Collaboration and Stewardship

Management Priority #8	Training, Education, and Awareness
Management Priority #9	Collaboration and Conflict Resolution
Management Priority #10	Community and Place-Based Ocean Management Projects
Management Priority #11	National Ocean Policy and Pacific Regional Ocean Initiatives

How This Plan Was Prepared

Work towards preparation of an updated *ORMP* began in 2011, when the Office of Planning (OP) received a grant from NOAA to begin the update process. After contracting with a consultant, work began in earnest during 2012 with a series of in-depth interviews with state and county agency participants in the ORMP Policy Group, comprised of cabinet-level directors of agencies that manage the ocean, and the ORMP Working Group, consisting of ocean and coastal resource planners from state, county and federal agencies. Previous documents and related plans prepared by the participating agencies were reviewed to identify coordination and integration issues.

A series of eight statewide Public Listening Sessions (PLS) were held from April to June 2012. These were attended by over three hundred individuals who described issues and problems on their island. Summaries of both the interviews and the PLS were prepared and discussed with the ORMP Working Group as part of working meetings to determine the appropriate areas of emphasis and priority for the ORMP Update.

A *Public Review Draft 2013 ORMP* was made available in October 2012. It was widely circulated and became the basis for a second round of nine statewide Public Listening Sessions held from October to November 2012. A comment period was held open until the end of January 2013.

Comments from individuals, government agencies, businesses, and community groups were solicited at both rounds of the PLS, through the *ORMP* website, and on public access television. These comments are incorporated in the *ORMP*. Meetings with state agency directors were conducted to ensure they were willing and able to make commitments to the Management Priorities.

What Has Changed in the 2013 Ocean Resources Management Plan

This *2013 Ocean Resources Management Plan* is considered an update of the *2006 ORMP*. It continues the new direction and course of action. It is the fourth *ORMP* for Hawai‘i.

The *2013 ORMP* uses new terms that more closely mirror the way terms are used in other state plans such as the *Hawai‘i 2050 Sustainability Plan* and the *New Day Plan.* New graphics have been added and editing has been done to make the plan more reader- and user-friendly.

Issues and drivers are identified, explained, and incorporated in Chapter II and Appendix C.

ORMP Terminology

Three Perspectives = Broad Outcomes

Management Priorities = Eleven areas of focus which involve one or more state agencies, working with county, federal, non-governmental organizations, or private multiple parties, and those comprising actions which will be closely tracked and monitored during the Adaptation Period.

Goals = Each of the eleven Management Priorities has at least one or more goals. These goals are linked to metrics.

Actions (formerly Strategic Actions) = projects and activities to achieve the Management Priorities

Metrics = Indicators or measures of performance and progress

The Management Priorities for the upcoming Adaptation Phase of the ORMP are detailed in Chapter III. They are new or newly characterized. Each Management Priority has one or more goals. The goals are accomplished by actions. Management Priorities are linked to the policies and objectives in HRS Chapter 205A. The Management Priorities are also linked to the National Ocean Policy (NOP), which is explained later in this chapter.

Also new in the *2013 ORMP* are measures of implementation of the *ORMP*. Benchmarks ("Where we are now"), targets ("Where we want to be"), and quantifiable indicators or metrics are provided for monitoring and reporting progress.

Because this is the first effort to include measurements, emphasis was made to find metrics that are already collected by agencies and reported elsewhere. By consolidating ocean resource metrics, a picture begins to emerge regarding status and, later, progress.

This is a first attempt at performance measurement. It is expected to change and evolve, and by the time of the next ORMP Update, it is expected to improve as a useful and meaningful tool for decision-makers.

National Priority Objectives

The National Ocean Council and the National Ocean Policy (NOP) were established in July 2010 by the President's Executive Order 12547 and are discussed in more detail in Chapter IV. The Executive Order was established based on the *Final Recommendations of the Interagency Ocean Policy Task Force* (2010). This groundbreaking policy provides the framework for federal agencies to work together to pursue the National Ocean Policy's Vision.

The *Final Recommendations* contain nine National Priority Objectives that describe various approaches to ocean and coastal resource management as shown in Table 1-1 along with how they relate to the Three ORMP Perspectives.

Table 1-1: National Priority Objectives and ORMP Perspectives

ORMP Perspective	National Priority Objective
Perspective 1: Connecting Land and Sea • *ORMP* adopts place-based as a foundational principal, which applies to nearshore fisheries, coral reefs, sea grasses, and other resources. • This goal addresses soil erosion and pollutant loads.	Ecosystem-Based Management Regional Ecosystem Protection and Restoration
Perspective 2: Preserving Our Ocean Heritage • *ORMP* recognizes marine resources, coral reefs, the ocean economy, and the cultural heritage of the ocean as ways to promote a sustainable Hawai'i	Changing Conditions in the Arctic Water Quality and Sustainable Practices on Land
Perspective 3: Promoting Collaboration and Stewardship • *ORMP* aims to build capacity for community participation in resource management through education and outreach • *ORMP* includes Pacific Regional Ocean Partnership (PROP) and Hawai'i Sub-Regional Ocean Partnership (Sub-ROP) • Climate change adaptation is included	Coastal and Marine Spatial Planning Inform Decisions and Improve Understanding Coordinate and Support Resiliency and Adaptation to Climate Change and Ocean Acidification Ocean, Coastal, and Great Lakes Observations, Mapping and Infrastructure

All of the NOP National Priority Objectives are important to Hawaii's ocean resources. Even the National Priority Objective of "Changing Conditions in the Arctic" while geographically distant, is important. Changing conditions in the Arctic are linked to climate change and the warming of the oceans, which in turn contributes to ocean acidification, coral bleaching, and the degradation and habitat loss of

entire reefs. The changing conditions in the Arctic are being monitored by the U.S. Integrated Ocean Observing System (IOOS) in collaboration with the Pacific Islands Ocean Observing System (PacIOOS).

The critical ocean resources management issues described in the next chapter track closely to the National Priority Objectives. During the Adaptation Phase, new institutional frameworks for Pacific region collaboration will be put into effect. New tools will be developed for coastal and marine spatial planning. These are part of the Management Priorities addressed in Chapter III.

II. Pressures On The Ocean and Critical Issues That Need To Be Addressed

This chapter examines pressures on the ocean and coastal resources and associated issues that need to be addressed. This chapter references other statewide plans and policies that discuss these critical, ocean-related issues. This chapter was informed by feedback that the State of Hawai‘i, Office of Planning, Coastal Zone Management Program (OP-CZM) received at two rounds of Public Listening Sessions during 2012, which were held on the islands of Kaua‘i; east, west, and central parts of O‘ahu; west and central parts of Maui; Moloka‘i; Lāna‘i; and the east and west sides of Hawai‘i Island.

A longer version of this Chapter, with additional information such as key ocean-related plans from other state and federal agencies, can be found in Appendix C, Ocean Resource Management Issues and Related Plans.

Future economic growth and activities of the population are expected to place great demands on Hawaii’s ocean and coastal resources. Increased urbanization, tourism, recreation, and commercial uses utilize the ocean resources in different ways. While economic growth is vital to Hawai‘i, its impacts must be properly managed to preserve our natural resources and reduce conflicts among resource users.

This chapter discusses several issues that affect ocean and coastal resource management:

- Urbanization
- Impacts from Tourism
- Military Use of Lands
- Commercial and Recreational Ocean Uses
- Shoreline Access and Conflicting Uses
- Coastal Hazards, Sea Level Rise, and Coastal Erosion
- Climate Change Adaptation: Disaster Preparedness and Community Resilience
- Marine Debris
- Watershed Management: Water Quality and Water Quantity
- Agricultural Lands
- Damage to Coral Reefs
- Endangered Species
- Aquatic Invasive Species
- Terrestrial Invasive Species
- Food Security
- Alternative Energy

Urbanization

The 2010 U.S. Census shows the state of Hawaii's total population at 1,360,301 people, with 455,338 households. According to DBEDT forecasts, the state's population is expected to increase by 140,000 persons every ten years. Future population growth and accompanying growth in urbanization need to be properly managed to preserve the State's natural resources while allowing necessary economic growth. The updated management priorities in this *ORMP* outline actions to minimize impacts to the coastal environment through support of appropriate coastal development.

Figure 2-1 illustrates a balance between social, economic, and environmental needs, showing how they are all interdependent. This is a diagram based on the definition of sustainability in Hawai'i from the *Hawai'i 2050 Sustainability Plan*:

(1) Respect of the culture, character, beauty, and history of the State's island communities;
(2) Striking a balance between economic, social, community, and environmental priorities; and
(3) Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Figure 2-1: Striking a Balance

Balancing the need to protect the environment can be done while driving the economy and providing social benefits to society. In other words, acquiring balance in one sector does not need to be at the expense of another.

Impacts from Tourism

The UH Economic Research Organization (UHERO) reports that Hawaii's tourism industry is the largest sector of the state's economy, providing 22% of Hawaii's gross domestic product in 2010 (UHERO, 2011). While most tourists arrive via plane, the ocean plays an important entry point for some. The number of visitors arriving to Hawai'i aboard cruise ships increased 23% to 124,650 visitors between 2010 and 2011, and even more visitors boarded cruise ships in Hawai'i after flying to the islands, bringing to total cruise visitors to 246,236 (Hawai'i Tourism Authority, 2012). The cruise ship industry is just one facet of tourism that impacts the ocean. Fishing tours, ecotourism, water sports and recreation, and the shipping of supplies to support nearly 8 million annual visitors all impact the ocean.

Aside from the economic impact of tourism on the ocean resources, additional impacts such as environmental and social are also considered. While the recreational value of the ocean for both tourism and residents has not been formally measured, UHERO will complete a study sometime in 2013 that will provide data for policy makers.

New visitor destinations and activities such as increased international visitors, the cruise ship industry, coastal-dependent resort development, increased marketing of the neighbor islands, and ecotourism alternatives can all be made aware of how to exist while protecting Hawaii's most sensitive and unique natural resources.

Military Use of Lands

The military is an integral part of Hawaii's past and present, as well as a major driver of the state's economy. National and homeland security requires that access to certain shorelines be off limits to the general public, such as at Pearl Harbor. On occasion, the military will allow access to certain beaches, such as at Bellows Air Force Station Beach in Waimānalo. The military often supports the community by participating in beach clean-ups. Further collaboration between the state and the military may help to open up more shorelines, even on a limited basis, for recreation and fishing.

Ordnance left from World War II and training exercises in the ocean and along the coastline is a concern in some areas of Hawai'i. The most extreme example of this would be the uninhabited island of Kaho'olawe, which was used as a U.S. Navy practice bomb target area for several decades. Military ordnance has also been reported by community members off the Wai'anae Coast on O'ahu and north of Kailua-Kona on Hawai'i Island. Continued collaboration between the State of Hawai'i and assigned military liaisons can assist in removal of ordnance.

Commercial and Recreational Ocean Uses

Hawaii's oceans are used for commerce, recreation, cultural practices, and transportation. Approximately 80% of all goods consumed in Hawai'i are imported from out of state, and of those, 98% arrive by sea. With approximately 8 million visitors arriving in the islands annually and projected to rise, the recreation sector of jobs has also increased by nearly 2% year over year (DBEDT, 2013). Because the islands are surrounded by the Pacific Ocean, many of the recreational jobs are centered on ocean uses, which may include a variety of uses from kayak rentals to recreational fishing tours to whale watching. All of these uses of ocean and coastal resources need to co-exist.

Shoreline Access and Conflicting Uses

The state has long recognized a policy of supporting public use of the shoreline area. The landmark 1995 Hawai'i State Supreme Court case, referred to as PASH or Public Access Shoreline Hawai'i, reaffirmed these rights. Hawai'i courts have consistently held that nearly all state submerged lands, including shoreline areas, are considered public lands held in trust for the benefit of its people. Accordingly, the state may not dispose of these lands, or encumber these lands to the detriment of public access and other public interests. In terms of shoreline areas, except for very specific circumstances, submerged lands extend to the highest wash of the waves during the season when the waves are highest. For example, HRS Section 46-6.5 states that the counties, in the subdivision process, must ensure public access to land below the high-water mark. Shoreline setback areas, Coastal Zone Management Act statutes and rules, and other state and county land use laws further recognize the importance of public access to the shoreline and coastal areas.

Access to the shoreline for Native Hawaiian traditional and customary gathering practices is guaranteed in the Hawai'i State Constitution, statutes, and case law. As such, agency decisions affecting the shoreline must make specific findings relating to potential impacts to traditional and customary practices and cultural, historical, or natural resources, and take feasible actions to reasonably protect cultural rights. Cultural impacts of applicable projects in or affecting the shoreline area must also be assessed via the environmental review process embodied in HRS Chapter 343, as well as through federal and state laws which may also require consultation with Native Hawaiian Organizations and practitioners.

HRS Chapter 6E Relating to Historic Preservation recognizes the "value of conserving and developing the historic and cultural property within the State for the public good." It is similar to Section 106 of the National Historic Preservation Act (1966), which includes a federal requirement for consultation with

Native Hawaiian Organizations whenever federal agencies determine that there is an undertaking that could affect historic properties. State and Federal laws recognize that there could be historic and cultural properties in submerged lands as well as at the coastline and that government agencies must consider the Native Hawaiian perspective in order to preserve these historic and cultural properties.

Despite having laws in place, many people expressed during the statewide ORMP Public Listening Sessions that access is sometimes limited, either through restricted parking, non-availability of public access in areas that are land locked, or other restrictions of protected Native Hawaiian gathering places. New resorts constructed on undeveloped shorelines may reduce public access to ocean resources and may degrade scenic views. Increased marine-related tourist attractions, including whale and dolphin watching, shark feeding, charter fishing, parasailing, jet skiing, swimming, snorkeling and diving, can 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 Hawai‘i.

Coastal Hazards, Sea Level Rise, and Coastal Erosion

Coastal hazards that affect ocean resources include beach erosion, inundation of land, increased flood and storm damage, saltwater intrusion into the freshwater lens aquifer, the rising of the water table, and more frequent or more powerful weather events. Proper coastal development, watershed management, and disaster preparedness in coastal regions are necessary tools to deal with the effects of sea level rise and coastal hazards.

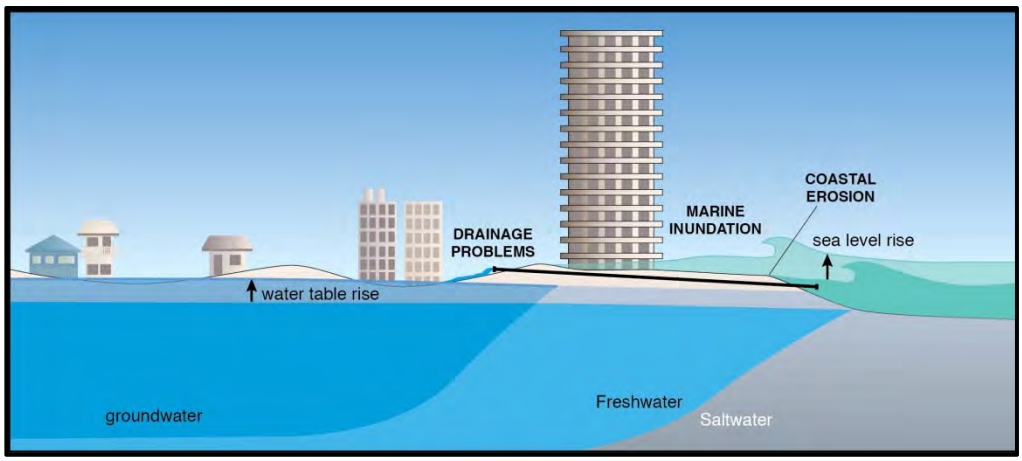
According to the 2012 U.S. Geological Survey *National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands*, 70% of beaches on Kaua‘i, O‘ahu, and Maui are eroding with an average long-term rate of -0.11 meters per year. Twenty-two kilometers or 9% of beaches on the three islands were completely lost to erosion over the past century—in nearly all of these locations, the shoreline is now characterized by coastal armoring such as seawalls.

Seawalls and other hardened shoreline structures to protect coastal properties exacerbate coastal erosion and beach loss (Fletcher, et. al., 1997). Currently, only the islands of O‘ahu, Kaua‘i, and Maui have documented erosion rates, and the University of Hawai‘i School of Ocean and Earth Science and Technology (UH SOEST) plans to document erosion rates for the other islands in the near future.

Sea level rise is defined as when the mean high tide level increases year after year. Figure 2-2 on the following page illustrates the coastal hazards that can develop from sea level rise.

When the sea level rises, coastal erosion increases. When there is a storm surge, and an increase the height of storm waves, this causes marine inundation. In some locations, the saltwater can impact the level of the water table, causing a water table rise and inland flooding. The water table rise can cause drainage problems in interior areas, because there is nowhere for stormwater or rainwater to drain.

Figure 2-2: How Sea Level Rise and Other Coastal Hazards Interact with Coastal Development



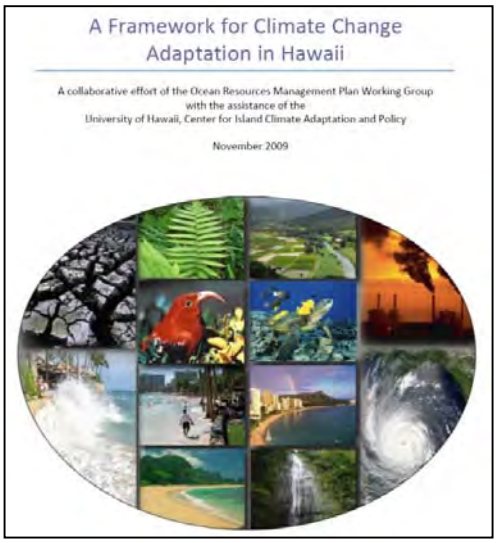
Source: Chip Fletcher, Ph.D., University of Hawai'i, SOEST

Climate Change Adaptation: Disaster Preparedness and Community Resilience

Climate change has been documented to have impacts on the atmosphere, coasts, and marine resources. Mitigation and adaptation to climate change and coastal hazards need to be addressed in order to combat the pressure that exist today, as well as prepare Hawai'i for future impacts. Because of the cumulative impacts of climate change, the state has put a focus on adaptation.

Global warming is predicted to cause an increase in frequency and power of both storm surge and hurricanes.

Figure 2-3: A Framework for Climate Change Adaptation in Hawai'i



Global Trends in Wind Speed and Wave Height by Young, et. al. (2011) suggests that wind velocity will increase by as much as 25 percent by the end of the 21st century, partially in response to the warming oceans. The Intergovernmental Panel on Climate Change (IPCC) states that a one-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). Changes in precipitation, with heavier rainfalls, are also expected, which impact the amount of runoff from Hawaii's watersheds.

According to the University of Hawai'i Sea Grant College Program, Center for Island Climate Adaptation and Policy (ICAP) *Hawaii's Changing Climate Briefing Sheet* (2010) while they are heavier rainfalls, there is an overall reduction in rainfall feeding the groundwater, and this is likely tied to decreased rainfall. Hawai'i is getting warmer, with an even greater warming trend at higher elevations, decreasing rainfall. Rising air temperatures, decreased rainfall, and decreased stream discharge all tie in to the sources of water to the ecosystem, which can affect agriculture, water quantity, and water quality.

In 2009, the ORMP Working Group and ICAP prepared *A Framework for Climate Change Adaptation in Hawaii*. Topics included building a climate change adaptation team, developing and adopting a long-term

vision, identifying planning areas and opportunities relevant to climate change, scoping climate change impacts to major planning sectors, conducting a vulnerability assessment, and conducting a risk assessment. Such planning efforts aid in disaster preparedness and build resilient communities. A core group of ORMP partners drafted climate change policy legislation that became part of the Governor's 2012 Legislative Packet as Senate Bill 2745. This climate change adaptation bill passed the 2012 Legislature and was signed by Governor Neil Abercrombie as Act 286 (2012).

Marine Debris

Marine debris is defined as any solid material that is manufactured or processed and directly or indirectly disposed of or abandoned into the marine environment. Debris may enter directly from a ship, or indirectly when washed out to sea from rivers, streams, or storm drains. Marine debris includes a wide variety of items, including plastic bags, glass bottles, rubber slippers, derelict fishing gear, and abandoned or derelict vessels. Activities that create marine debris occur both on land and in the ocean.

Marine debris can be categorized as chronic such as derelict fishing gear or episodic such as the Japan Tsunami Marine Debris (JTMD). The debris ranges in size from microscopic, such as broken pieces of plastic, to items weighing many tons, such as abandoned fishing vessels.

According to the *Hawai'i Marine Debris Action Plan* (HI-MDAP) (NOAA, 2013), there is a role for everyone, including federal, state, and county agencies, as well as community members and academia, in prevention of and dealing with marine debris. Beach clean ups are just one way of addressing marine debris, as pictured in Figure 2-4.

Figure 2-4: Marine Debris Removed from Kanapou, Kaho'olawe, Before and After Photos

Source: Kaho'olawe Island Reserve Commission, Kanapou Cleanup

Watershed Management: Water Quality and Water Quantity

There are over 500 watersheds in the State of Hawai'i, according to the *Hawai'i Watershed Guidance* (Office of Planning 2010). The Department of Land and Natural Resources, the Department of Health, the Office of Planning, and the various county water supply agencies manage most of the state's watersheds. However, many of the watersheds are private property. Because of their vast size and

limited accessibility, many stakeholders need to partner in order to manage and improve functionality of the watersheds. Watershed management must take into account the quality as well as quantity of water within a given watershed. Freshwater from streams, estuaries, and anchialine ponds flows into nearshore waters. Irrigation ditches, many left over from the sugar cane plantations, were constructed over one hundred years ago to provide millions of gallons per day of water for irrigation across the state. Many of these irrigation ditches remain and are also a source of fresh water flowing into the ocean, increasing water quantity as well as runoff from former agricultural lands. The amount of water flow (quantity) is as important as water quality.

Polluted surface water runoff, combined with an aging sewage system incapable of handling system overloads, is threatening coastal water quality. According to the U.S. Environmental Protection Agency, 64% of Hawaii's streams are considered "impaired" by pollutants. As population density increases along shoreline areas, landscape hardening to protect property continues as a serious coastal issue. Channelized streambeds for floodwater control exacerbate water quality problems and contribute to stream and estuarine habitat loss.

Urban and agricultural lands are major sources of nonpoint source pollution. Pharmaceutical contamination, injection wells, and cesspools were raised at the ORMP Public Listening Sessions (PLS) as anecdotal examples of pollution that is occurring. Stream diversions such as the irrigation ditches and wells that affect surface waters have changed the water flow to wetlands, streams, estuaries and nearshore waters. Careful and appropriate use of the land and freshwater is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.

Agricultural Lands

While much of Hawaii's agriculture is beyond the shoreline, agricultural lands throughout the state directly impact the coast and the ocean. Much of Hawaii's agricultural lands at the turn of the 20th century were used for sugar cane and pineapple production. As these uses cease, diversified agriculture has been planted on some of the former plantation lands. Other lands have been converted to urban use. As discussed in the previous section on Watershed Management, runoff from agricultural lands is seen to affect the coast and ocean.

The designation of important agricultural lands as called for in Act 233 of 2008, Act 183 of 2005, and Article XI, Section 3 of the Hawai'i State Constitution has been taking place over the past several years. The Hawai'i Department of Agriculture (DOA), working with the Department of Taxation and various stakeholders as well as the Office of Planning has been trying to identify incentives for agricultural lands to stay in agricultural use. The 2007 *DOA Final Report to the State Legislature* lists permits, tax credits, administrative rules, and transfers of land as steps in this process. The designation of lands as important agricultural lands provides an opportunity for agencies to make the connections between land and sea.

Damage to Coral Reefs

Coral reefs are called the "rainforests of the sea" due to their complex and rich biodiversity. According to the *2050 Sustainability Plan*, there are 7,000 known species of coral represented in 410,000 acres of living reef in the main Hawaiian Islands. More than one quarter of these species are only found in Hawai'i. Threats to coral include urban and agricultural runoff, over-fishing, damaging recreational use, coral disease, acidification of ocean water, aquatic invasive species, and bleaching caused by increasing sea water temperature.

The depletion of coral reefs decreases biodiversity, which impacts not only the island population's ability to recreate and subsist, but is a loss to the state's chief income producer, tourism.

The Makai Watch Program was developed to enhance the management of nearshore marine resources by providing community members opportunities for direct involvement in management activities. This program builds community awareness and encourages compliance through observation, identification, and reporting of illegal activities to the Department of Land and Natural Resources Division of Conservation and Resources Enforcement (DOCARE).

Figure 2-5: Hawai'i Coral Reef

Source: The Nature Conservancy

Climate change is a threat to coral. Increased levels of carbon dioxide emissions, a greenhouse gas, are changing the ocean's chemistry. The added carbon dioxide causes a decrease in the pH of the water; in turn, the ocean becomes more acidic, which decreases the rate of calcium carbonate production by coral polyps. Additionally, increasing sea water temperature causes coral bleaching. While corals can recover from bleaching if other conditions are good and the high temperatures do not persist over many weeks, climate scientists agree that bleaching conditions will be widespread and regular by the end of the century.

Coral cover throughout the Pacific is expected to decline 15% to 35% by 2035. (Britt Parker, NOAA Coral Reef Conservation Program (CRCP), *Case Studies from the 2012 Pacific Islands Regional Climate Assessment (PIRCA)*, 2012). Without healthy coral reefs, entire ecosystems are at risk.

Endangered Species

One-third of all endangered species in the United States are found in Hawai'i. Examples of endangered species in the ocean and coastline areas are the Humpback Whale, the Green Sea Turtle, the False Killer Whale, and the Hawaiian Monk Seal. With increasing frequency, other marine species found in Hawai'i are also being considered for listing. There are critical estuaries where fresh and salt water mix and serve as habitat for endangered birds such as the Hawaiian Moorhen, Hawaiian Stilt, Hawaiian Coot, and Kōloa Duck. Balancing protection of endangered species with other priorities of ocean resource management is critical.

The Hawaiian Islands Humpback Whale National Marine Sanctuary (National Marine Sanctuary) is managed as a partnership between NOAA and the State of Hawai'i. The National Marine Sanctuary is discussed in Chapter IV as an example of a coordinated approach to the management of ocean resources.

Aquatic Invasive Species

Aquatic invasive species (AIS) are plants or animals introduced into a water body that have the potential to harm the ecosystem, people, and/or the economy. The Hawaiian Archipelago is home to 85% of the country's coral reefs, and these ecosystems include a variety of corals, fish, seaweed, and other marine

life, some seen nowhere else in the world. Protecting the fragile ecosystems as well as keeping waterways clear and preserving the environment that commerce and tourism are both dependent upon are all important to the State of Hawai‘i. Prevention and early detection are essential in the control of aquatic invasive species.

Aquatic invasive species can be introduced accidentally by sea faring vessels. Ballast water discharges from vessels and biofouling of submerged areas are the major means by which vessels act as a pathway for introduction of marine invasive species. The National Invasive Species Act of 1996 amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. The U.S. Coast Guard (USCG) Ballast Water Management program addresses AIS introduction from ballast water.

Terrestrial Invasive Species

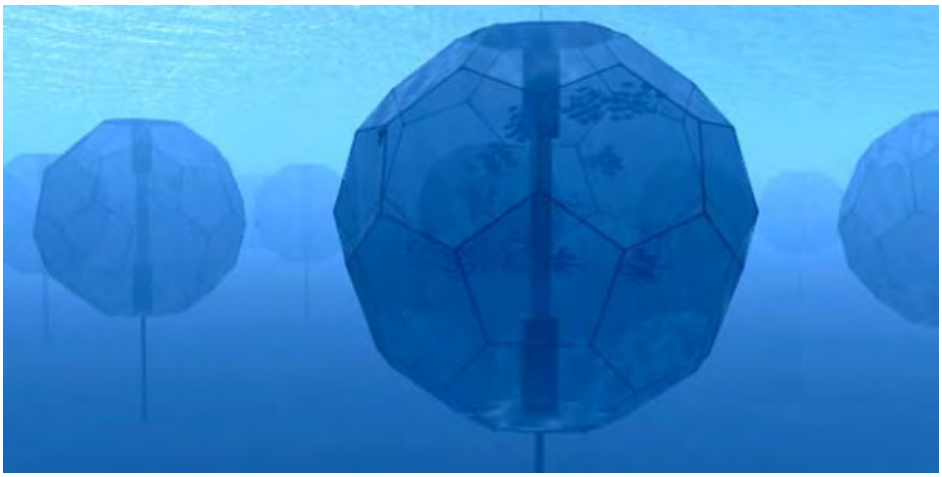
Terrestrial Invasive Species are non-native plants or animals introduced on land. The introduction of a non-native species can interrupt and damage the land ecosystem. This is important to ocean and coast resource management, because what happens at the top of the ridge can affect water quantity and the ocean’s water quality.

An example is damage that hoofed animals cause to the watershed through erosion and by promoting the spread of invasive plant species. Ungulate barriers such as fencing have been used in forests and watersheds to conserve the ecosystems. Other terrestrial invasive species such as the brown tree snake are important to keep out of the islands because their introduction could wipe out native bird populations, and affect the biodiversity of the forests. Invasive Species Committees on O‘ahu, Maui, Moloka‘i, Kaua‘i, and Hawai‘i Island seek to identify and implement appropriate management strategies.

Food Security

Approximately 85-90% of Hawaii’s food is imported into the state, mostly on ships. This makes Hawaii’s food security vulnerable to natural disasters and global events that could disrupt the food supply. In 2012, the Office of Planning in cooperation with the DOA prepared the *Increased Food Security and Food Self-Sufficiency Strategy*.

Figure 2-6: Open Ocean Fish Cage



Source: Hawaii Oceanic Technology, Inc.

The three objectives of the strategy are: to increase demand for and access to locally grown foods; increase production of locally grown foods; and provide policy and organizational support to meet food self-sufficiency needs.

Supporting restoration of fishponds, providing access to the coastline for gathering, proactively managing near shore fishing, and sustainable aquaculture are all ways to increase food security. Collaboration among agencies and community groups to increase access to the shoreline and improve ocean water

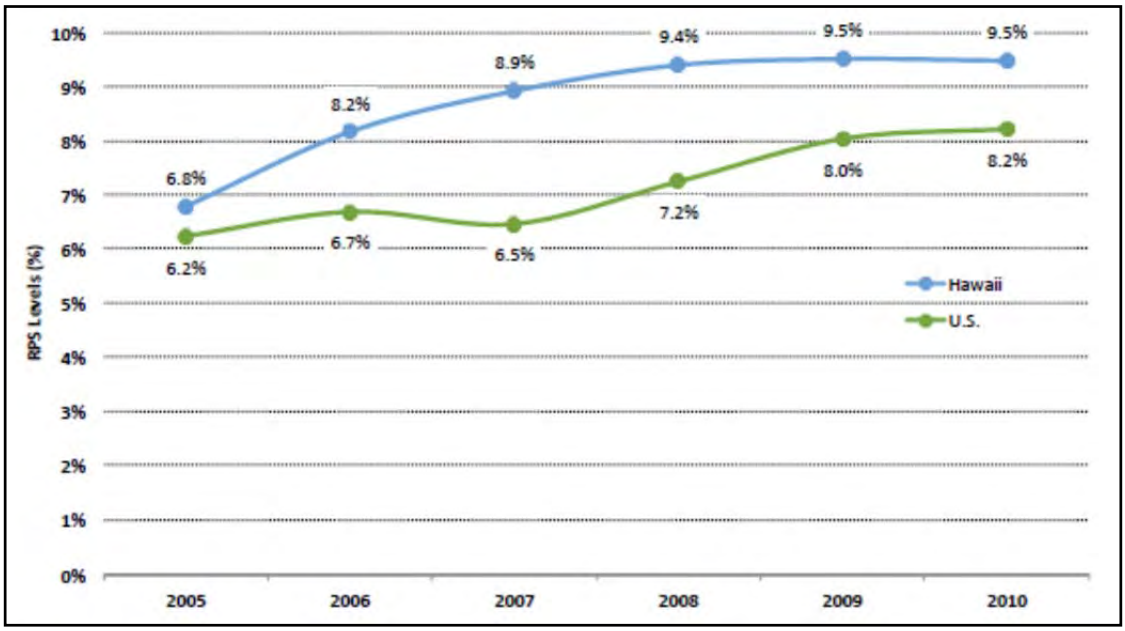
quality for subsistence or "'ohana fishing" helps support the state's goal. Working with commercial fishers, open ocean aquaculture businesses, and agencies in a cooperative manner will assist in this effort.

Alternative Energy

The Hawai'i Clean Energy Initiative (HCEI) set ambitious but critical goals for increased energy self-sufficiency and for increased use of clean technologies. The near term goal is to produce at least 15% of the electricity sold from clean energy technologies by 2015. With the projects currently under development or planning, Hawai'i is on target to meet this goal. However, the goals of 25% renewable generation by 2020 and 40% renewable generation by 2030 leave much work to be done.

Hawaii's renewable electricity generation as a percentage of total generation is approximately 13.9%, according to annual Renewable Portfolio Standards (RPS) reports submitted by the electric utilities to the Hawai'i Public Utilities Commission in 2013. In 2010, Hawai'i was at 9.5% of renewable electricity generation, which at the time was approximately 1.8% higher than the rest of the United States as shown in Figure 2-7.

Figure 2-7: Hawai'i Renewable Energy Generation 2005-2010



Source: State of Hawai'i Energy Resource Coordinator's Annual Report 2011

According to Governor Abercrombie's *A New Day in Hawai'i Plan (2010)*, Hawaii's most important economic enterprise is to pursue energy independence. Alternate energy for Hawai'i includes wind, solar, hydro, ocean thermal, marine hydrokinetic, biomass, and geothermal sources. To increase the state's Renewable Portfolio Standards (RPS) percentage and lower the state's dependence on foreign oil imports, over 40 renewable energy projects have been constructed and another 40 utility-scale projects are currently proposed throughout Hawai'i. Many of these projects will impact the ocean and coastal resources in various ways, including but not limited to: ecologic impacts from marine infrastructure,

effluent discharges (tempered and/or processed), visual impacts, and recreational and commercial impacts. Coupled with the newly formed Hawai‘i Outer Continental Shelf (OCS) Renewable Energy Task Force, the sustainable development of Hawaii’s marine resources is a major component of HCEI.

Proper siting and cumulative impact mitigation of renewable energy projects are critical to the sustainable use of the state’s ocean resources. The Hawai‘i State Energy Office within DBEDT works with stakeholders and regulatory agencies to help ensure individual projects are developed with consideration of local and statewide impacts, both short term and long. Some renewable energy power plants, such as wave energy devices, interisland cables, or offshore wind, could directly impact marine resources because of their location. Even land-based renewable projects, such as geothermal and bioenergy, could affect the ocean if they produce effluent or run-off into the nearby ocean. If the Hawaiian Islands’ electricity grids are linked by an undersea cable, other impacts to the ocean need to be considered. Hawaii’s present reliance on shipped fossil fuels such as oil and coal have the potential to significantly impact the ocean through spills or other accidents.

The Pacific Ocean is an integral part of Hawaii’s environment, culture, and economy, and has vast potential to support the production of renewable energy. Sustainable management of Hawaii’s energy resources will help to protect our unique ocean resources.

III. Management Priorities for the Adaptation Phase

With this ORMP Update, the ORMP moves into the Adaptation Phase, and this is scheduled to run approximately from 2013 to 2018. This phase will implement and track actions to measure progress on eleven Management Priorities that were identified through the ORMP Update process.

This chapter outlines and discusses the Management Priorities along with their goals, benchmarks, targets, actions, and metrics, which will be the focus of the Adaptation Phase. Each Management Priority has a state lead agency or agencies, names other state and county agencies involved, and names partners from federal, university, and non-profit or community organizations.

Management Priorities and Perspectives

Perspective 1: Connecting Land and Sea

Management Priority #1	Appropriate Coastal Development
Management Priority #2	Management of Coastal Hazards
Management Priority #3	Watershed Management

Perspective 2: Preserving our Ocean Heritage

Management Priority #4	Marine Resources
Management Priority #5	Coral Reef
Management Priority #6	Ocean Economy
Management Priority #7	Cultural Heritage of the Ocean

Perspective 3: Promoting Collaboration and Stewardship

Management Priority #8	Training, Education, and Awareness
Management Priority #9	Collaboration and Conflict Resolution
Management Priority #10	Community and Place-Based Ocean Management Projects
Management Priority #11	National Ocean Policy and Pacific Regional Ocean Initiatives

The ORMP Management Priorities are not listed in order of importance. They do identify issues which agencies of the State of Hawai‘i have committed to address and to make substantial and measurable progress during the period from 2013 to 2018.

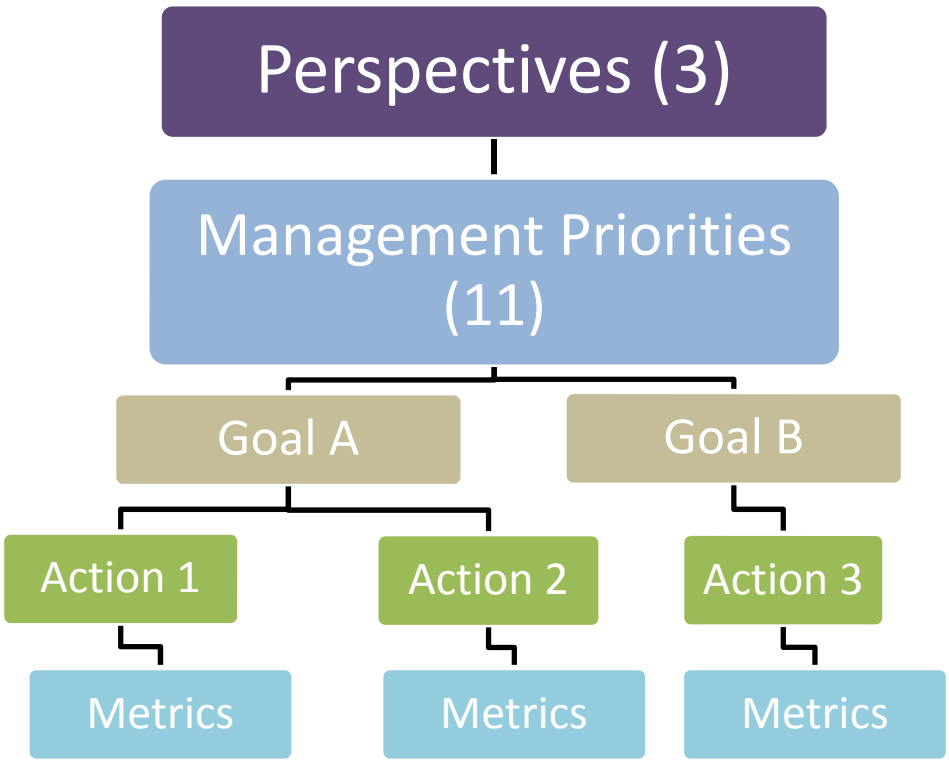
Criteria

The Management Priorities for ocean resource management were selected because they met one or more of the following criteria:

- Present an immediate and urgent threat
- Present a long term threat, which can lead to irretrievable harm if not addressed sooner
- Work has been initiated by a government agency that requires several years of effort
- Work has been initiated by a community group and place-based progress has been demonstrated
- The work could be completed during the Adaptation Phase
- The Management Priority fits within HRS Chapter 205A
- The Management Priority fits within one of the nine objectives in the National Ocean Policy

The Management Priorities Hierarchy is shown below. Each Management Priority falls under one of the guiding principles, also known as the Three Perspectives. For each Management Priority, there are one or more ORMP goals, and under these there are several Management Priority actions. These goals and actions are assigned to ORMP agencies and partners. Measuring performance of achieving these goals is done through metrics. The lead agency for each Management Priority is responsible for tracking their performance, and assisting OP-CZM in collection of metric data.

Management Priorities Hierarchy



Implementation

Some Management Priority actions are associated with or conform to other statewide plans that have been prepared by other state agencies. This was done on purpose and is envisioned in HRS Chapter 205A. When work has already been initiated by a government agency through their departmental plans, achievement of the Management Priority is considered realistic and possible.

Under HRS Section 205A-62, OP-CZM Program is to be the lead agency to oversee the overall implementation of the ORMP. It is not possible for OP-CZM to directly conduct or fund each of these Management Priority Actions. Rather, overseeing ORMP implementation will require coordination of various government agencies, stakeholders, non-profits, and community groups. Much of this coordination can be achieved at the ORMP Working Group and Policy Group meetings.

References and Background

Each Management Priority references at least one ORMP Perspective, applicable sections of the Hawaii Revised Statutes (HRS), the National Ocean Policy objectives referenced in the *Final Recommendations of the Interagency Ocean Policy Task Force* (2010), and any other applicable federal, state, or county laws, including Hawaii Administrative Rules and the state constitution. The National Ocean Policy Objectives can be found in Chapter IV.

Background information on each Management Priority came from different sections of this ORMP as well as input from ORMP coordinating agencies.

Measurement

Each Management Priority contains information on what is being measured. This starts with "Where we are now" to present a snapshot of current conditions. This is followed by "Where we want to be," which explains targets for improving ocean and coastal resources in this Management Priority. The initial measure will become the ORMP baseline, and future measures will be compared to that point.

Tracking and Reporting on Progress

Responsible lead agencies will report to OP-CZM on a twice yearly basis using the metrics described. On an annual basis, OP-CZM will consolidate the performance metrics and report to both the Legislature and the public on progress made. Written reports are expected, but may also be posted on the OP-CZM website. Statewide meetings are encouraged as resources permit.

Management Priorities Summary Matrix Explanation

A Management Priorities Summary Matrix listing the goals, lead agencies, partner agencies, and metrics is included at the end of this Chapter.

Management Priority # 1 Appropriate Coastal Development

Appropriate Coastal Development Goals:

Goal A: *Adoption of county plans which specify guidance on coastal development.*
Goal B*: Strengthen and integrate data management to ensure appropriate coastal development.*
Goal C: *Expand options to protect existing developments from further coastal erosion.*

References

Perspective 1: Connecting Land and Sea
HRS Sections 205A-2(b) [Objectives]: (3), (5), (6), (7), and (9); and 205A-2(c) [Policies]: (3)(D), (5)(A), (5)(C), (6)(A through D), (7) (A), (7)(B), (9)(A), and (9)(C)
HRS Section 226-109, *Climate change adaptation priority guidelines*
HRS Chapters 321 (partial), 322 (partial), 340E, 340F, 342D, 342E,
Hawaii Administrative Rules (HAR) Title 11
National Ocean Policy Objectives 3 & 5

Background

One of the goals of the CZM Program is to ensure that appropriate setbacks and protections are put into place to ensure appropriate development and structures along the coastal areas. Appropriate coastal development addresses the issues identified under the CZM Act, including coastal hazards (including sea-level rise), historic resources, coastal ecosystems, and Hawaii's economy for current and future generations. The most difficult issues to address are coastal development issues that stem from development that already exists. While great strides have been made, there are many structures "grandfathered" under old codes, and continued pressure from landowners for legislative exemptions from regulatory review. This pressure can be very contentious and stressful for county and state permitting agencies.

Benchmark – Where we are now

- The County of Kauaʻi is considering amendments to its Comprehensive Zoning Ordinance, based on new sea level rise mapping.
- There are unsettled legal issues regarding permits for shoreline armoring or other protections for existing threatened structures.
- PacIOOS has upgraded its Ocean Observation System, incorporating data layers that could assist in appropriate coastal development.
- OP manages the Geographical Information System (GIS) layers for the State of Hawaiʻi, which can also assist in appropriate coastal development

Target – Where we want to be

- Manage Retreat. Develop long-term planning and strategies to support managed retreat, which would include location-specific adaptation strategies such as retreat zones, prohibition of shoreline armoring, and assessment of impacts on underground infrastructure and utilities. Public and private property owners may be encouraged to relocate structures inland, with incentives that may include tax-based incentives and third-party acquisition of threatened parcels in fee or by easement.
- Site Appropriately. Proposed projects/actions are evaluated during the land use entitlement process to determine the sufficiency of proposed adaptation measures and infrastructure durability over the lifetime of the project, taking into account individual and public economic impacts. This includes considering additional shoreline access, where appropriate.
- Plan for Passive Survivability. Communities should be resilient to extended power outages, interruptions of fuel supply, or loss of water and sewer services.

- Enhance Natural Infrastructure to Build Coastal Resilience. Cost-effective beach nourishment is implemented and streamlined for offshore permitting.
- Allow Flexibility in Retrofitting Existing Structures. Allow for retrofitting of existing structures that also accounts for long-term conservation of coastal resources and shoreline ecosystems, including beaches and reefs.

Example Actions to Accomplish the Appropriate Coastal Development Goals

- OP continues to review projects during land use entitlement process to determine the sufficiency of proposed adaptation measures and infrastructure durability over the lifetime of the project, taking into account individual and public economic impacts.
- OP to support additional shoreline access in its land use reviews.
- ORMP Working Group collaborates on supporting legislation for appropriate coastal development.
- ORMP Working Group collaborates on ways to work with State and County agencies and departments on appropriate coastal development.
- County Planning Departments incorporate coastal impacts into their General Plans, Development Plans, Sustainable Community Plans, and land use regulations.
- Department of Land and Natural Resources Office of Coastal and Conservation Lands (DLNR-OCCL) works on ways to support appropriate coastal development on public and private projects.
- Hawai‘i Department of Transportation (DOT) works on ways to support appropriate coastal development of their Capital Improvement Program projects for highways, harbors, and airports.
- PacIOOS continues to work on strengthening and integrating data management to ensure appropriate coastal development.
- UH SOEST continues to work on strengthening and integrating data management to ensure appropriate coastal development.
- DBEDT continues to work on strengthening and integrating data management to ensure appropriate coastal development.
- Hawai‘i Department of Health (DOH) to continue to review and comment on Environmental Assessments and Environmental Impact Statements from environment and health perspectives.

Metrics – Indicator Measures

GOAL A:

- Increase in number of additional shoreline access (OP-CZM)
- Increase in number of counties implementing planning practices that include adaptation strategies when planning for coastal areas (OP-CZM)
- Increase in number of state agencies implementing capital improvement plan projects that include adaptation strategies for coastal areas (OP-CZM)

GOAL B:

- Layers added to the statewide GIS that address coastal measures (OP GIS)

GOAL C:

- Number of projects reviewed by OP during land use entitlement process that include coastal impact risk assessments (OP-CZM)
- Number of projects reviewed by DOH during land use entitlement process that include coastal impact risk assessments (DOH)

Agencies

Lead Agency: OP-CZM

Other State and County Agencies: County Planning Departments, DLNR-OCCL, DOT (Harbors, Airports, and Highways), DOH,

Partners: Federal Emergency Management Agency (FEMA) National Flood Insurance Program, UH Sea Grant College Program, PacIOOS, UH SOEST Coastal Geology Group, NOAA Office of Ocean and Coastal Resource Management (OCRM) and Pacific Services Center (PSC)

Management Priority # 2 Management of Coastal Hazards

Management of Coastal Hazards Goals:

Goal A: *Support adoption of county laws for Best Management Practices to reduce risks from coastal hazards, including the impacts from climate change.*
Goal B: *Complete coastal mapping of the Main Hawaiian Islands to assist with management of coastal hazards such as coastal erosion and sea level rise.*
Goal C: *Collaborate and support county and state efforts to develop climate change risk analysis and adaptation strategies for public facilities.*

References

Perspective 1: Connecting Land and Sea
HRS Sections 205A-2(b) [Objectives]: (2), (4), (6), (7), (8), and (9); and 205A-2(c) [Policies]: (3) (C), (3) (D), (6) (A through D), and (9) (A through C)
HRS Section 226-109, *Climate change adaptation priority guidelines*
National Ocean Policy Objectives 5 & 6
Framework for Climate Change Adaptation in Hawai'i (2009)

Background

One of the key objectives of The National Ocean Policy is to "strengthen resiliency of ocean communities and marine environments…and their abilities to adapt to climate change impacts and ocean acidification." Disaster avoidance measures would include institutional and governmental measures to reduce risks from coastal hazards.

Benchmark – Where we are now

Sea Level Rise Map for Honolulu Harbor Shows one meter Sea Level Rise by 2100

Source: UH SOEST

- The importance of managing coastal hazards is magnified as more is learned about the effects of climate change, and in particular sea level rise. Sea level rise will affect all the islands and will impact areas already developed. While the immediacy of this occurrence is not within the next five years, some effect can already be seen and measured. The challenge of identifying and implementing adaptation measures indicates that work needs to begin now.
- The ORMP Working Group in collaboration with the UH Center for Island Climate Adaptation and Policy (ICAP) prepared the *Framework for Climate Change Adaptation in Hawai'i (2009).*
- Shoreline erosion studies have been completed for Kaua'i, Maui, and O'ahu but need to be updated as new information becomes available.
- OP, in consultation with the ORMP Policy Group, Working Group, and other stakeholders, successfully passed Act 286 (2012), Hawaii's climate change adaptation priority guidelines. The Act is codified as HRS Section 226-109, so that it is integrated into Hawaii's statewide planning and land use system.

Target – Where we want to be

- Build Capacity. Develop best management practices and guidance that integrate HRS Section 226-109, *Climate change adaptation priority guidelines*, into county and state decision-making.
- Additional information on the science and mapping of sea level rise exists and complete sea level rise maps, shoreline erosion studies, and erosion risk maps are completed for every island.
- A comprehensive and integrated shoreline policy is adopted that addresses the impacts of chronic and episodic coastal hazards. This may or may not involve new or amended state law.
- Adaptation strategies are identified, which may include retreat zones, prohibition of shoreline armoring, and assessment of impacts on underground infrastructure and utilities.

Example Actions to Accomplish the Management of Coastal Hazards Goals

- Adoption of land use regulations with climate change adaptation elements.
- Completion of shoreline erosion studies and preparation of erosion risk maps for Hawai‘i Island, Lāna‘i and Moloka‘i.
- Calculation of shoreline change at the parcel-level scale in maps for Kaua‘i, O‘ahu, and Maui.
- Preparation of mapping of shoreline hazards including wave inundation, storm surge, and beach erosion due to sea level rise and climate change.
- Seek funding for further studies, research, and mapping.
- Conduct annual training at fundamental and advanced levels for State and County planners on climate change risk assessment and adaptation.
- DLNR-OCCL works on ways to mitigate coastal hazards.

Metrics – Indicator Measures

GOAL A:

- Develop guidance on how to integrate climate change policy into County Development Plans/Sustainable Community Plans and regulatory permits (OP-CZM)
- Increase in number of state departments completing coastal hazards risk analysis for their facilities (OP-CZM)
- Increase in number of county general and community/development plans that include a climate change adaptation component (County Planning Departments)
- Creation of greenhouse gas emissions rules (DOH)

GOAL B:

- Shoreline erosion studies and maps completed for Hawai‘i Island, Lāna‘i, and Moloka‘i (UH-SOEST)
- Review and update shoreline erosion maps for Kaua‘i, Maui, and O‘ahu (UH-SOEST)

GOAL C:

- Increase in number of climate change adaptation training sessions held (OP-CZM)
- Increase in number of state departments adopting climate change adaptation strategies in their maintenance plans and capital improvement program plans (OP-CZM)

Agencies

Lead Agency: OP-CZM

Other State and County Agencies: County Planning Departments, DLNR-OCCL, County and State Civil Defense, DOT, DOH

Partners: FEMA National Flood Insurance Program, UH Sea Grant College Program, PacIOOS, UH SOEST Coastal Geology Group, NOAA OCRM, NOAA PSC, Papahānaumokuākea Marine National Monument, co-managed by NOAA, USFWS, OHA and the State of Hawai‘i (PMNM)

Management Priority # 3 Watershed Management

Watershed Management Goals:

Goal A: *Increase the amount of protected watershed priority areas based on climatic conditions (elevation and moisture zones) and land cover types that provide higher recharge and fog capture as stated in the "Rain Follows the Forest Plan" (2011).*
Goal B: *Improve coastal and stream water quality.*

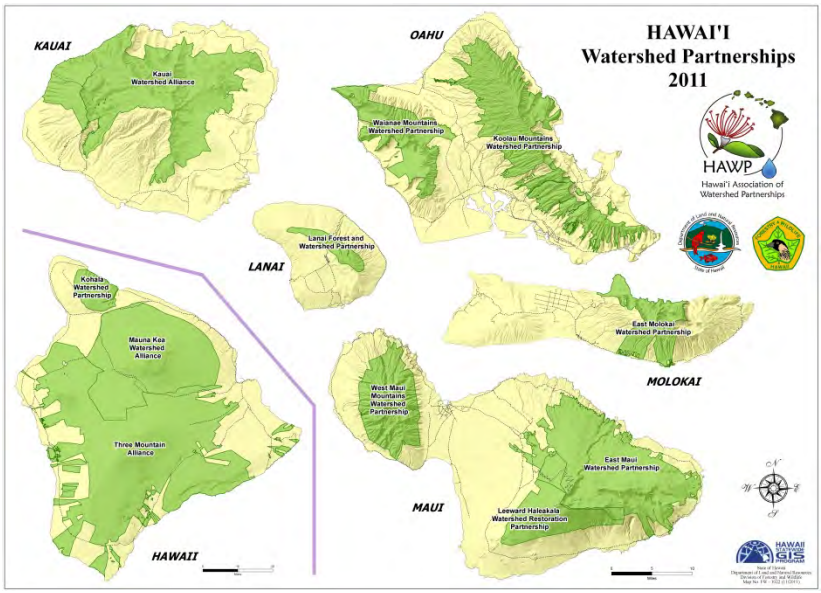
References

Perspective 1: Connecting Land and Sea
HRS Section 205A-2(b) [Objectives]: (1), (5), and (7); and 205A-2(c) [Policies]: (4) (A through C & E)
HRS Section 183-31, Watershed areas and HRS Chapter 174C, State Water Code
National Ocean Policy Objectives 1, 5, & 7
The Rain Follows the Forest: A Plan to Replenish Hawaii's Source of Water (2011)
Hawai'i Watershed Guidance (2010)

Background

The State of Hawai'i has approximately 580 watersheds in the state of Hawai'i as listed in the *Hawai'i Watershed Guidance* (2010).

Watershed Partnerships in Hawai'i are shown in green



Source: DLNR-DOFAW

The DLNR Division of Forestry and Wildlife (DLNR-DOFAW) defines Watershed Partnerships statewide, which include both public and private land. There are currently eleven Watershed Partnerships as shown in the figure at right.

The ORMP addresses watersheds from two different viewpoints, the mauka watersheds that provide the water quantity and the watersheds moving makai that affect the ocean water quality. Ensuring the health of the water supply, allowing for water recharge, and preserving good water quantity entails taking care of the watersheds. Water flows from mauka to makai and ends in the ocean, filling the streams, providing species habitat, and improving the coastal and nearshore water quality. Good quality and sufficient quantity of water is needed feed the island's reef systems.

Benchmark – Where we are now

- DLNR-DOFAW works with the eleven established Watershed Partnerships made up of large public and private land owners. These partnerships work closely with and managers and the five island-based Invasive Species Committees, which are made up of private, public, and nonprofit partners.
- The Polluted Runoff Control Program (PRCP), also known as the Section 319 Program and administered by DOH, provides funding to reduce nonpoint source pollution in priority watersheds. The purpose of the DOH-PRCP is to address water quality problems (impairments) through the development and implementation of watershed plans.
- Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217 requires Hawai‘i to develop a Coastal Nonpoint Pollution Control Plan (CNPCP). The CNPCP is the responsibility of the State DOH and OP-CZM Program, and it is jointly administered by the Environmental Protection Agency (EPA) and NOAA. The *Hawai‘i Watershed Guidance* (2010) is a streamlined version of *EPA’s Handbook for Developing Watershed Plans to Restore and Protect our Waters* (2008). Hawai‘i is working towards submittal of final draft management measures to EPA and NOAA.
- There are 840,000 acres of the Priority I and II Watersheds statewide, which contain native forests. Currently only 10% of the priority watershed areas are protected and this level of management has taken 40 years to achieve.
- DLNR’s *The Rain Follows the Forest* plan outlines seven watershed protection and restoration actions, which are listed below as targets for the Management Priority.

Target – Where we would like to be

- Remove all invasive hooved animals from Priority I and II areas.
- Remove or contain damaging invasive weeds that threaten Priority I and II areas.
- Monitor and control other forest threats including fires, predators, and plant diseases.
- Restore and plant native species in priority areas and buffer areas.
- Establish benchmarks and monitor success of the on-the-ground actions.
- Educate Hawaii’s residents and visitors about the cultural, economic, and environmental importance of conserving native forests.
- Promote consistent and informed land use decision-making that protects watersheds.
- EPA and NOAA approval of CNPCP.

Example Actions to Accomplish the Watershed Management Goals

- Develop collaborative arrangements among stakeholders, such as the volunteer watershed partnerships and invasive species committees which include large landowners and other partners, to protect forest lands, water recharge, and conservation, and habitat.
- Work with EPA and NOAA to resolve issues and obtain final acceptance of CNPCP.
- Pursue funding to support continued community stewardship in partnership with government agencies. As recommended in DLNR’s *Rain Follows the Forest Plan (2011)*, there is a continuing need for a stable funding source of $11 million per year for the next ten years. This funding would support native forest restoration and protective fencing installation.
- DOH will continue outreach to wastewater treatment plant operators to increase wastewater recycling. This includes outreach to the Department of Defense.

Metrics – Indicator Measures

GOAL A:

- Increase in acreage of land protected from invasive plant and animal species as well as wildfires through invasive species removal, fencing, integrated pest management, or other strategies (DLNR-DOFAW)

GOAL B:

- Decrease in the number of Impaired Streams (DOH)
- Increase in percentage of Wastewater Recycled Annually (DOH)
- Implementation of Section 319 Projects (DOH)
- Increase in number of outreach activities conducted for wastewater recycling (DOH)
- EPA and NOAA approval of Coastal Nonpoint Pollution Control Program

Agencies

Lead Agency: DLNR-DOFAW

Other State and County Agencies: OP-CZM, DLNR Commission on Water Resource Management (CWRM), County water departments, County planning departments, DOH Polluted Runoff Control Program-Section 319, DOH Wastewater Branch, DLNR Division of Aquatic Resources (DLNR-DAR)

Partners: Watershed Partnerships, Invasive Species Committees, The Nature Conservancy, EPA, and NOAA.

Management Priority # 4 Marine Resources

Marine Resources Goals:

Goal A: *Promote protection and sustainable use of marine resources.*
Goal B: *Reduce and remove accumulated marine debris on all islands and shores.*
Goal C: *Minimize the spread of aquatic invasive species from bays where there is coral or water quality degradation.*
Goal D: *Minimize the likelihood of aquatic invasive species introductions and spread into and within Hawai'i from sources associated with vessels.*
Goal E*: Promote fishing practices that increase fish stocks.*

References

Perspective 2: Preserving our Ocean Heritage
HRS Sections 205A-2(b) [Objectives]: (9) and (10); and 205A-2(c) [Policies]: (10) (A through E)
National Ocean Policy Objectives 2 & 3
Hawai'i Marine Debris Action Plan (2013)
Hawai'i Aquatic Invasive Species Plan (2003)

Background

Marine debris is defined as any solid material disposed of or abandoned in the marine environment. It is a chronic problem for Hawai'i that can be introduced by ships, arrive as wash from rivers, streams, and storm drains, or reach Hawaii's shores from ocean currents. Depending on its origin, marine debris also has the potential to introduce invasive species. Examples vary greatly, but include plastic bags, bottles, rubber slippers, derelict fishing gear, equipment, and nets, and abandoned or derelict vessels. Causes may be accidental, natural disaster, illegal dumping, or abandonment of vessels. Land activities that can end up in the ocean include littering, dumping, improper waste management, and industrial losses. Also included are stormwater runoff, materials washed down storm drains, or trash deposited during storms, high winds, or waves.

A special case of marine debris is the materials adrift in the ocean or washing ashore that originated in the Japanese earthquake and tsunami of March 2011. These are referred to as Japan Tsunami Marine Debris (JTMD).

Aquatic invasive species (AIS) may be introduced in other ways through shipping activity, typically arriving through biofouling (previously referred to as hull fouling) or ballast water, or through purposeful introduction such as dumping. The majority of non-indigenous aquatic species seen in Hawai'i today arrived on vessels as biofouling or in their ballasts. Many of these species cause negative impacts to important ecosystems.

Aquatic invasive species pose significant threat to Hawaii's native plants, animals, ecosystems, economy as well as the human population. While most island ecosystems in the world are highly vulnerable, Hawaii's isolation makes its ecosystems even more vulnerable than others.

Hawai'i contains 40% of the threatened and endangered species in the U.S. But as a major transportation hub and tourist destination, the threat of invasion can never be completely eradicated and requires constant vigilance.

According to the National Marine Fisheries Service, Hawai‘i has the highest per capita non-commercial fisheries catch in the nation at 1.4 million fishing trips for a total near 2.7 million fish in 2011. For commercial fishing, the port of Honolulu ranks among the top ten fishing ports in the nations with $83 million dollars of fish landed in Honolulu Harbor in 2011.

Benchmark – Where we are now

- Hawaii's position in the North Pacific Gyre makes it a hotspot for the aggregation of marine debris. Large floating debris impacts marine life such as seabirds, Hawaiian monk seals, green sea turtles, and other species which ingest the debris or become entangled.
- Concern over marine debris has received heightened attention recently as the world tracks JTMD. The Governor appointed DLNR as the lead agency for JTMD, and they are preparing a response plan. The DOH assesses and tests all JTMD for radiation.
- The *Hawai‘i Marine Debris Action Plan* (2013) preparation was facilitated by NOAA and U.S. EPA with the active participation of the marine debris community, government agencies, non-governmental organizations, academic, and private interests.
- DOH Compliance Assistance Office works with businesses to ensure compliance with DOH rules, regulations, and permits. This office held 24 workshops with businesses and other permit holders in 2012.
- DOH Solid and Hazardous Waste Branch enforces illegal dumping in state waters and issues fines.
- *Fisheries* – Both commercial and non-commercial fishing contribute to Hawaii's food security. Commercial fishing contributes directly to food security as well as to jobs in ways such as through fish auction, fish dealers, and grocers. Commercial fishers include bottomfish and pelagic fisheries, deepwater coral and coral reef fisheries, and crustacean fishing. Charter fishers are included in this category.
- *Recreational fishing* is motivated by sport or pleasure. Fishermen often sell their catch through informal networks. Sport fishermen participate in several dozen fishing tournaments across the state of Hawai‘i annually. A 2006 SOEST report estimates the economic impact of direct fishing tournament spending at $6.2 million annually, with non-tournament expenses such as airfare and hotel accounting for an additional $5.1 million annually. Others fish for reasons beyond sport or pleasure, such as for subsistence, sustenance, and tradition. Some call this "ohana fishing."

Target – Where we would like to be

- Through implementation of strategic actions in the *Hawai‘i Marine Debris Action Plan* (2013), the state reduces and prevents the impacts of marine debris.
- Through implementation of strategic actions in the *Hawai‘i Aquatic Invasive Species Plan* (2003) there is reduction of existing invasive species and further introductions can be avoided or eliminated shortly after they are discovered.
- A permanent statewide AIS Coordinator is hired.
- Education and awareness are increased as a major management strategy to more effectively control and prevent degradation of the ocean and coastal resources.
- Research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources exists.

Example Actions to Accomplish the Marine Resources Goals

- Actions as contained in the *Hawai‘i Marine Debris Action Plan* (2013). The four goals of the HI-MDAP are to:
    - Reduce the backlog of accumulated marine debris;
    - Decrease the introduction of solid waste and fishing gear at sea and coastal areas;
    - Decrease the number of abandoned and derelict vessels; and
    - Reduce land-based debris in waterways.

- Actions as contained in the *Hawai'i Aquatic Invasive Species Plan (2003).* The objectives are coordination and collaboration; prevention; monitoring and early detection; response, control, and eradication; education and outreach; research; and policy.
- Ongoing funding for the Ballast Water and Hull Fouling Prevention Program in DLNR Division of Ocean Boating and Ocean Recreation (DLNR-DOBOR).
- Establish and fund a permanent state position for an AIS Coordinator.
- PacIOOS provides mapping and data management services.
- A Marine and Coastal Zone Advocacy Council (MACZAC) fishing industry working group is created to analyze the fishing industry's impact on Hawai'i.

Metrics – Indicator Measures

GOAL A:

- Increase in number of educational workshops and programs conducted on marine debris for state and county agencies (OP-CZM)
- Increase in number of Makai Watch Training provided to community groups (DLNR-DAR)

GOAL B:

- Increase in number of community marine debris clean ups (Hawai'i Interagency Marine Debris Group, including DLNR and DOH)
- Decrease in number of abandoned and derelict vessels (DLNR-DOBOR)
- Number of enforcement actions taken by DOH Solid and Hazardous Waste Branch for illegal dumping in state waters (DOH)
- Increase in number of educational workshops held by DOH Compliance Assistance Office (DOH) for public
- Number of Japan Tsunami Marine Debris items tracked, assessed for contamination, and disposed (NOAA)

GOAL C:

- Increase number of urchins introduced to control invasive algae (DLNR-DAR)
- Increase in number of pounds of invasive algae removed (DLNR-DAR)
- A permanent state position for the AIS Program is established, funded, and filled (DLNR-DAR)

GOAL D:

- Increase in number of ballast water reports processed (DLNR-DAR)
- Rules for managing biofouling on vessels are developed and adopted (DLNR-DAR)
- Ongoing funding is created for the Ballast Water and Hull Fouling Prevention Program (DLNR)

GOAL E:

- Increase in percent compliance with commercial fisheries reporting requirements (DLNR-DAR)
- Increase in number of enforcement officers assigned exclusively to enforce fishing rules (DLNR Division of Conservation and Resources Enforcement (DLNR-DOCARE))
- Increase in number of targeted reef fish species that show an increase in size and/or abundance on at least one island (DLNR-DAR)

Agencies

Lead Agency: DLNR-DAR

Other State and County Agencies: DOH, DOT-Harbors, Kaho'olawe Island Reserve Commission, DLNR-DOCARE, DLNR-DOBOR, County Public Works and Environmental Services Departments

Partners: U.S. Coast Guard, U.S. Fish & Wildlife Service, U.S. EPA, NOAA, Bishop Museum, The Nature Conservancy, University of Hawai'i, PacIOOS, Hawaiian Islands Humpback Whale National Marine Sanctuary (Co-Managed by NOAA and the State of Hawai'i) (National Marine Sanctuary), PMNM, WPRFMC, MACZAC Agency members of the Hawai'i Interagency Marine Debris Working Group (includes Federal, State, and County agencies), Community Work Day Program on Maui, and Trilogy, which operates on Maui, Lāna'i, and Moloka'i.

Management Priority # 5 Coral Reef

Coral Reef Goals:

Goal A: *Improve the health and productivity of coral reef ecosystems at priority sites identified by the Hawaii Coral Reef Program.*
Goal B: *Implement place-based projects that demonstrate effective stewardship practices that can be applied to other areas.*
Goal C: *Implement an effective day-use moorings program that minimizes impacts to coral reef ecosystems and user conflicts.*

References

Perspective 2: Preserving our Ocean Heritage
HRS Sections 205A-2(b) [Objectives]: (4); and 205A-2(c) [Policies]: (4) (A through D)
National Ocean Policy Objective 6
Hawai'i Coral Reef Strategy: 2010-2020 (2010)

Background

Many of the greatest threats to the reefs come from land-based sources of pollution, including sediment, nutrients, cesspools, sewer treatment plant overflow, and road run-off. Excess nutrients promote the growth of algae that compete for space on the benthic reef surfaces and affect the ability of coral to establish and grow. Another threat to the health of reefs is grounded vessels.

Climate change impacts on coral include effects from ocean warming, coral bleaching, and ocean acidification. Coral bleaching is becoming more frequent as the oceans warm, with predictions that by 2050 many of the reefs of the Pacific will bleach annually. Increased acidification of the ocean is caused by rising levels of carbon dioxide absorbed by sea water. With ocean acidification, less carbonate is available for coral reefs to build their calcium carbonate skeletons, causing coral loss. Coral cover throughout the Pacific is expected to decline 15% to 35% by 2035.

Benchmark – Where we are now

- DLNR Division of Aquatic Resources (DLNR-DAR) finalized the *Hawai'i Coral Reef Strategy: 2010-2020* (2010) and has begun implementing place-based management in two selected priority sites:
    - in South Kohala on the Island of Hawai'i, utilizing *The South Kohala Conservation Action Plan* (2012) that was developed by local experts and stakeholders to address impacts to coastal resources; and
    - on the Island of Maui, using both the West Maui Ridge to Reef Initiative to begin watershed planning in 2012 and the *Kahekili Conservation Action Plan* (2013).
- DLNR-DAR, with support from partners, is developing and expanding community-based stewardship and co-management efforts.
- DOT-Harbors Division is working with federal agencies to improve and streamline mitigation efforts for planned impacts, such as harbor improvements, necessary for the State's economy.

Target – Where we would like to be

- As pilot projects are implemented, they are evaluated so that the most effective ones can be applied, as appropriate, in additional areas.
- Education is a key strategy to address coral threats as residents and visitors are aware of the significance of the coral reefs and how easily they can be damaged.

- An effective day use mooring program is in place, which reduces boating impacts to reef ecosystems, improves public access to resources, and helps to reduce user conflicts.

Example Actions to Accomplish the Coral Reef Goals

- Implement *Hawai'i Coral Reef Strategy 2010-2020* (2010) prepared by DLNR-DAR.
- NOAA Coral Reef Conservation Program Plan to leverage additional funding.
- DOH to improve water quality metrics that affect coral reefs and nearshore waters.
- Coral Reef Alliance installation of additional reef etiquette signs through partnership with industry, community groups, counties, and DLNR-DAR.
- DLNR DOBOR and DLNR-DAR work with commercial and recreational vessels as well as other stakeholders to identify appropriate locations for new Day Use Moorings. This program will be improved by increased collaboration between DLNR-DAR, DLNR-DOBOR, and users along with implementation of strategic management and reliable funding for maintenance.

Metrics – Indicator Measures

GOAL A:

- Decrease in number of impaired coastal waters listed (DOH)
- Decrease in number of shoreline postings due to sewage or other water pollution (DOH)

GOAL B:

- Increase in number of projects or Best Management Practices (BMPs) implemented and evaluated at priority coral reef sites (DLNR-DAR)

GOAL C:

- Day use mooring program funded and implemented in consultation with communities (DLNR-DOBOR)
- Increase in percent of day use moorings maintained and managed by the state (DLNR-DOBOR)
- Increase in number of classes/educational efforts completed to educate boaters on day use moorings and the importance of mooring maintenance (DLNR-DOBOR)

Agencies

Lead Agency: DLNR-DAR
Other State and County Agencies: DLNR -DOCARE, DLNR-DOBOR, DOT-Harbors, DOH
Partners: U.S. Army Corps of Engineers (USACE), Hawai'i Coral Reef Working Group, National Marine Sanctuary, PMNM, The Nature Conservancy, NOAA Coral Reef Conservation Program, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service, Hawai'i Tourism Authority, Coral Reef Alliance

Management Priority # 6 Ocean Economy

Ocean Economy Goals:

Goal A: *Develop aquaculture standards, based on current scientific data, to support culturally, environmentally, and economically sustainable operations which increase production for local consumption.*
Goal B: *Encourage use of ocean-based energy to contribute towards achieving Hawai'i Clean Energy Initiative while balancing the need to protect ocean resources.*
Goal C: *Ensure a healthy shipping industry that uses ocean and coastal resources sustainably.*
Goal D: *Ensure a healthy tourism industry that uses ocean and coastal resources sustainably.*

References

Perspective 2: Preserving our Ocean Heritage
HRS Sections 205A-2(b) [Objectives]: (5); and 205A-2(c) [Policies]: (7) (B)
HAR Title 11, Chapter 35, Shellfish Sanitation
2009 National Shellfish Sanitation Program Model Ordinance
National Ocean Policy Objectives 1 & 8
Permits and Regulatory Requirements for Aquaculture in Hawai'i (2011)

Background

Hawaii's economy is dependent on the health of the ocean. The marine-related industries of fishing, aquaculture, tourism, recreation, and shipping provide approximately 15% of Hawaii's civilian jobs. According to the National Ocean Economics Program (NOEP), in 2010 Hawaii's ocean economy accounted for 100,215 jobs and over $3.1 billion in wages.

According to UH College of Tropical Agriculture and Human Resources, Hawai'i residents eat more seafood per capita than the rest of the United States. In 2010, Hawai'i residents spent $330.68 per capita or 11.4% of their total food consumption at home and in restaurants. This is over twice as much as the U.S. per capita of $143.68. Hawaii's aquaculture value of shellfish and finfish is $2,000,000 annually, and expected to increase.

Shellfish rules were created in the early 1980s to accommodate a fledgling shellfish industry, and because the industry did not survive, the DOH lab lost its Food and Drug Administration (FDA) certification to analyze shellfish growing waters and shellfish meat samples. In recent years, there has been a concerted effort to create a viable shellfish industry, and the DOH Food Safety Program and DOH lab have revived the shellfish sanitation program.

Benchmark – Where we are now

- *Aquaculture* – Many believe that aquaculture is one of the major potential sources for achieving food security and sustainability in the State of Hawai'i. A single commercial fish farm exists off the Kona coast, producing over ten thousand pounds of kampachi every week.
- The Hawai'i Department of Agriculture has prepared an Aquaculture Guidebook, *Permits and Regulatory Requirements for Aquaculture in Hawai'i* (2011).
- The DOH labs on O'ahu and Hawai'i Island are now FDA certified to analyze shellfish waters and shellfish samples. Three applications were received by the DOH Food Safety Program to classify shellfish growing waters, and DOH Environmental Health & Safety Division has completed their assessments for two areas on O'ahu (Moli'i and He'eia Kea ponds) and one artificial growing area on Kaua'i. Growing water sampling has commenced for permit approvals.

- NOAA Pacific Islands Regional Office (PIRO) has facilitated development of an aquaculture permitting process with DLNR-OCCL and USACE. NOAA Pacific Islands Fisheries Science Center (PIFSC) has developed a mapping portal to aid in siting open ocean aquaculture.
- *Shipping* – The state's economy is completely dependent on the state's harbors. Hawai'i imports 80% of its required goods, and nearly 99% of these come through the harbor system as their point of entry. With ten commercial harbors on six islands, the health of this state asset is important to the overall economy.
- *Energy* – The Hawai'i Clean Energy Initiative (HCEI) goal is to achieve 70% clean energy by 2030. This includes 30% from energy efficiency measures and 40% from locally generated renewable sources. Several companies are looking at harnessing ocean-based energy such as Ocean Thermal Energy Conversion (OTEC), deep seawater air conditioning, and electricity from wave and wind to achieve this goal. In addition, the interconnection of separate island electrical grids via undersea cable has been identified as one of the keys to achieving Hawaii's energy goals.

Target – Where we would like to be

- Suitable aquaculture standards are developed and implemented, based on current scientific data, to support culturally, environmentally, and economically sustainable operations, with the goal to increase local food production.
- Aquaculture standards are integrated into the existing permitting process to facilitate new aquaculture development and improve ongoing industry oversight.
- Development of the permitting process for aquaculture is completed.
- DOH completes its environmental assessments and classification of all three proposed shellfish growing areas.
- Interstate (export) of shellfish.
- Tons of cargo arriving at Hawai'i ports is increased.
- Clean energy goals of the HCEI are met while balancing the need to protect the ocean and coastal resources.

Example Actions to Accomplish the Ocean Economy Goals

- Work with Department of Agriculture, Aquaculture Development Program to develop an operational plan for aquaculture standards.
- DOH Environmental Health Sanitation Branch completes environmental assessments of all three proposed shellfish growing areas.
- DOH labs complete sampling frequency and classification of all three shellfish growing areas.
- DOH approves depuration facilities needed to process shellfish.
- DOH continues collaboration with FDA and the Interstate Shellfish Sanitation Conference to allow for future exports of shellfish to the rest of the U.S.
- Continued funding for the Environmental Health & Safety Division and O'ahu and Hilo laboratories to maintain the Shellfish Program.
- Investment in small boat harbors, for example, a dry dock facility on Maui.
- DOT-Harbors Division to improve capacity and efficiency at Hawai'i ports.
- DBEDT Energy Office to increase percentage of alternate energy coming from ocean sources while balancing the need to preserve our ocean heritage.

Metrics – Indicator Measures

GOAL A:

- Increase in pounds of commercially raised fish sold (DOA)
- Increase in dollar value of commercially raised fish (DOA)
- Increase in number of viable classified shellfish growing waters (DOH)
- Increase in number of permitted commercial shellfish operators (DOH)

- Increase in number of pounds of shellfish sold to local markets/restaurants in Hawai‘i (DOH)
- Increase in number of pounds of shellfish exported out of state (DOH)

GOAL B:

- Increase in percentage of alternate energy coming from ocean sources, as measured in megawatt-hours (DBEDT Energy)

GOAL C:

- Increase in tons of cargo arriving at Hawai‘i ports, until ports reach full capacity (DOT-Harbors)

GOAL D:

- Improved beach water quality monitoring data (DOH)
- Increase in number of hotels with recognized sustainability certifications or program affiliations (DBEDT-Energy Office-Hawai‘i Green Business Program)
- Increase in number of tour operators who are recognized as Dolphin SMART (DLNR)

Agencies

Lead Agencies: Department of Agriculture (DOA) Aquaculture Development Program; Department of Health; OP-CZM; DOT-Harbors; DBEDT-Energy Office

Other State and County Agencies: DLNR-DAR, DLNR-DOBOR, OHA

Partners: National Energy Laboratory of Hawaii Authority (NELHA), NOAA NMFS, National Marine Sanctuary, WPRFMC, Coral Reef Alliance, Hawai‘i Ecotourism Association, Hawai‘i Tourism Authority

Management Priority # 7 Cultural Heritage of the Ocean

Cultural Heritage of the Ocean Goals:

Goal A: *Preserve cultural heritage of the ocean and protect Native Hawaiian rights for access and gathering in ocean and on coastline, and protect ocean and coastal resources upon which Native Hawaiian cultural practices depend.*
Goal B: *Support restoration of Hawaiian fishponds through permitting, community projects, and technical assistance.*

References

Perspective 2: Preserving our Ocean Heritage
HRS Sections 205A-2(b) [Objectives]: (2) and 10; and 205A-2(c) [Policies]: (2) (A through C)
National Ocean Policy Objective 1
HRS Chapter 1-1
HRS Chapter 7-1
HRS Section 46-6.5
HRS Section 115-2
Hawai‘i State Constitution, Article XII, Section 7

Background

Limu

Native Hawaiian access and gathering rights are protected by state laws and by the State of Hawai‘i constitution. These laws also require all state and county agencies to affirmatively protect and enforce these rights. The Constitution of the State of Hawai‘i, Article XII, Section 7, “Traditional and Customary Rights,” protects certain rights to shoreline access. HRS Chapters 1-1 and 7-1 protect public access that has been fixed by Hawaiian judicial precedent or established by Hawaiian usage, including Native Hawaiian gathering rights. HRS Section 46-6.5 states that the counties, in the subdivision process, must ensure public access to land below the high-water mark on any coastal shoreline. When this statute is not applicable, HRS Section 115-2 requires counties to acquire public rights-of way.
Food is still traditionally gathered on the shoreline and in the water. The shoreline contains pa‘akai (salt) and limu (seaweed). In addition, the shoreline and ocean are used for religious and spiritual ceremonies.

Keawanui Fishpond, Moloka‘i, part of EPA Project Loko I‘a

Hawaiians built rock-walled enclosures in near shore waters to raise fish, an integral part of the ahupua‘a. Fish entered through a wooden gate or sluice in the stone wall on the seaward side and as they grew, they became too large to return to the open ocean. In ancient Hawai‘i, it was estimated that there were 488 fishponds statewide, and more than 75 fishponds were in production on Moloka‘i alone. Yet the fishponds went out of use, became contaminated, and most disappeared.

Benchmark – Where we are now

- *Fishponds* –A revival of fishponds has occurred in recent years, and thirteen have been restored to some level. Six are in use, including three on Moloka‘i, one on Maui (Ao‘ao Na Loko I‘a o Maui at Ko‘ie‘ie Fishpond), one on Hawai‘i Island, and one on O‘ahu (He‘eia). Project Loko I‘a at the

Keawanui fishpond on Molokaʻi provides learning and demonstration lessons. Restoration is very labor intensive and difficult work.

- In 2012, the State Legislature passed Senate Resolution No. 86, urging DLNR, DOH, and OP to streamline the permitting process for the restoration of Hawaiian fishponds.
- OP, through its CZM Program, developed a General Concurrence for fishponds restoration activities under Coastal Zone Management Act (CZMA) federal consistency regulations. The federal approval process through NOAA has been approved.
- The *Koʻolauloa Watershed Management Plan* estimates a restoration cost of $100,000 and annual management costs of $30,000-40,000 for each fishpond within the Koʻolauloa district of Oʻahu.
- NOAA Pacific Islands Regional Office (PIRO) is coordinating an effort to streamline permitting of fishpond restoration through a State Programmatic General Permit working with DLNR-OCCL, USACE, and the National Marine Sanctuary.
- On the island of Lānaʻi, a group of community members has begun the Lānaʻi Limu Restoration Project with support of NOAA.

Target – Where we would like to be

- Involved agencies work to support restoration of fishponds with an eye towards increasing fish stocks and opportunities for gathering.
- Community groups and Non-Governmental Organizations (NGOs) collaborate to restore fishponds by streamlining the permitting process, providing technical assistance, and providing guidance on best practices.
- The streamlined permitting process for fish pond restoration is complete.
- Shoreline and coastal access for Native Hawaiian gathering is protected.

Example Actions to Accomplish the Cultural Heritage of the Ocean Goals

- OP and OHA to provide technical assistance to community groups for assistance with fishpond restoration and restoration of traditional gathering areas.
- OP to support additional shoreline access in its land use reviews.
- Collaboration with USACE on fishpond restoration permitting issues.
- Department of Agriculture's Aquaculture Development Program to continue to provide technical support for permitting and fishpond activities.
- DLNR to work with ʻAha Moku Council on recommendations for improving Native Hawaiian access, gathering rights, and the resources upon which these rights depend.

Metrics – Indicator Measures

GOAL A:

- Increase in number of moorings for Native Hawaiian canoes that are operated exclusively for educational purposes (DLNR-DOBOR)

GOAL B:

- Decrease in average number of months to obtain all permits necessary for fishpond restoration (DLNR-OCCL and DOH)
- Increase in number of fishpond restoration projects given technical assistance and support for permitting processes (OP-CZM)

Agencies

Lead Agency: DLNR-OCCL
Other State and County Agencies: Office of Planning; DOA Aquaculture Development Program, DOH, DLNR; OHA
Partners: USACE, NOAA, National Marine Sanctuary, PMNM, community groups

Management Priority # 8 Training, Education, and Awareness

Training, Education, and Awareness Goals:

Goal A: *Develop training curriculum, at the fundamental and advanced levels, for state and county agency staff as well as boards and commissions working on ocean and coastal protection and begin annual training.*
Goal B: *Partner to expand existing citizen stewardship awareness and active engagement curriculum for widespread dissemination through various community outlets.*

References

Perspective 3: Promoting Collaboration and Stewardship
HRS Sections 205A-2(b) [Objectives]: (8); and 205A-2(c) [Policies]: (8) (B), and (8) (C)
National Ocean Policy Objectives 2, 3, & 4

Background

The science and information on the ocean ecosystems and climate change are rapidly changing. Data collection and monitoring both yield new information. Institutional responsibilities, rules, and regulations need to be understood by State and County agency staff so that they can make informed decisions. While networking such as in the ORMP Working Group provides a valuable exchange of knowledge, there is a need for a more systematic way for staff to receive basic and advanced training.

Benchmark – Where we are now

- There are strong community partnerships in place, for example with the Hawai‘i Conservation Alliance, Mālama Maunalua, Koke‘e Resource Conservation Program, Hanalei Bay Watershed Alliance, Coral Reef Alliance, and others form an excellent foundation for citizen stewardship. Many of these have public awareness and education as a core function.
- There is no organized systematic program for in service training in the sciences of ocean resource management and climate change. State and county planners and officials ask for training in the science, law, and good management practices for climate change and other topics.
- Community groups on all islands have expressed a desire to involve youth in both ocean resources management and in preserving the ocean’s cultural heritage.

Target – Where we would like to be

- State and county agency staffs are offered classes in environmental literacy and in advanced environmental science. A regulatory and science-based curriculum, that provides knowledge for increasingly technical duties of the staff agencies, enhances communication between government and the public. This curriculum may be developed through public-private-non-profit partnerships.
- As government agency personnel are trained, public education and outreach materials and programs are developed and implemented. These outreach materials reduce the number of requests that have to be denied while propagating a wider understanding and appreciation for new regulations.
- Community outreach includes spreading awareness of PacIOOS and their app-based system for ocean water quality monitoring and alert system.
- There is expanded awareness of DLNR-DAR and Coral Reef Alliance web database for Herbivore Enhancement Area Surveys.
- Youth are involved in ocean resource management including at the school level.

Example Actions to Accomplish the Training, Education, and Awareness Goals

- OP-CZM Program to coordinate training of agency staff based on curricula developed with partners.
- A regulatory and science-based curricula informs staff agencies on their technical duties. Develop curriculum for staff training through public-private-non-profit partnerships.
- Include training on applicable laws in the curricula.
- MACZAC to work on community outreach on ocean resource management and provide educational opportunities with the public.
- The ORMP Policy Group to assist with networking between non-governmental organizations, private schools, the Department of Education and UH system.
- ORMP Working Group to add the Department of Education as a partner for cooperation and collaboration on training.
- OP-CZM Program to work with Hawai‘i Tourism Authority for visitor training on ocean resources.
- Coral Reef Alliance installs additional reef etiquette signs through partnership with industry, community groups, counties, and DLNR-DAR.
- PacIOOS provides informational tools and services.

Metrics – Indicator Measures

GOAL A:

- Curricula on fundamentals of ocean resource management on advanced environmental science is developed (OP-CZM)
- Increase in number of agency employees attending environmental science training (OP-CZM)

GOAL B:

- Increase in number of community outreach and awareness events held and/or participants reached (OP-CZM, DLNR-DAR, and National Marine Sanctuary)
- Inclusion of Hawai‘i marine resource module as part of required boater education certification requirement (DLNR-DOBOR)

Agencies

Lead Agency: Office of Planning, CZM Program
Other State and County Agencies: DLNR, DOH
Partners: MACZAC, PacIOOS, UH Sea Grant College Program, National Marine Sanctuary, PMNM, Hawai‘i Tourism Authority, Coral Reef Alliance, The Nature Conservancy

Management Priority # 9 Collaboration and Conflict Resolution

Collaboration and Conflict Resolution Goal:

Fully utilize the ORMP Policy Group as a forum to discuss State ocean resource management, and to raise and resolve issues, and to resolve conflicts when appropriate.

References

Perspective 3: Promoting Collaboration and Stewardship
HRS Sections 205A-2(b) [Objectives]: (10); and 205A-2(c) [Policies]; (8) (B) and (8) (C)
National Ocean Policy Objectives 2, 4 & 9

Background

The ORMP Policy and Working Groups were established in 2007 and have been meeting regularly since then. Both groups work on implementation of the ORMP. They provide a forum for state agencies and county and federal partners to share information, improve coordination, and prevent duplication. They offer an opportunity to increase partnerships and collaborations for effective and efficient conservation efforts in the Hawaiian Islands.

Benchmark – Where we are now

- Coordinated efforts have the potential to yield better results than would have resulted from a single agency approach. The ORMP groups and committees provide a network for agencies and professionals engaged in similar efforts. Knowledge sharing, capacity-building and interfacing through participation in the Policy and Working Groups enable regular communication and cooperation on mutual interests. While coordination is difficult to measure in a quantitative manner, success in this regard has been noteworthy, as remarked during participant interviews.
- Participants note the following benefits they have received from collaboration through the ORMP Groups: creation of a network that they are able to use collectively and in their own work; expanded knowledge of the operations of state and county governments as well as federal activities that may affect State waters; discovering the programs operated by various agencies and learning about the challenges they face and how they are dealing with them; and sharing different perspectives on issues that might not have been otherwise heard.
- While collaborative implementation of the ORMP has occurred and is significant, challenges remain that cannot be fully overcome just by collaboration. Budget restrictions and staffing shortages demonstrate that collaborative governance is essential to carrying out the goals and objectives of the ORMP.
- The State of Hawai‘i Office of Information Management & Technology has formulated a transformation plan that includes a framework for implementing and tracking performance measures.

Target – Where we would like to be

- A guiding framework is created that continues to address collaboration while adding methods for raising complex and overlapping issues, as well as conflict resolution.
- Resources assigned to the Policy and Working Groups are increased, which are currently provided by a single OP planner.
- The Hawai‘i Sub-Regional Ocean Partnership (Hawai‘i Sub-ROP) is established to advance the framework for collaboration.

Example Actions to Accomplish the Collaboration and Conflict Resolution Goal

- Following completion of the *2013 ORMP*, the Policy Group meets more regularly, bi-monthly or quarterly, to work toward implementation of the Adaptation Phase Management Priorities.
- Policy Group and Working Group develop baseline for metrics and track progress on the Management Priorities and ORMP implementation.
- Move the ORMP Policy and Working Groups towards a formalized Hawai‘i Sub-Regional Ocean Partnership.
- Through meetings of the Policy Group, examine various governance models with the goal of developing a collaborative governance framework for the Policy Group, and eventually of the Hawai‘i Sub-Regional Ocean Partnership.

Metrics – Indicator Measures

- Work with the State of Hawai‘i Office of Information Management & Technology to create a state performance measures website for the ORMP metrics (OP-CZM)
- Increase in number and range of issues handled by ORMP Policy Group and/or Hawai‘i Sub-ROP (OP-CZM)
- Increase in number of Management Priority issues that receive state funding and where needed, legislative attention (OP-CZM)
- Increase in number of obstacles to ORMP implementation identified and resolved by Sub-ROP (OP-CZM)

Agencies

Lead Agency: Office of Planning, CZM Program
Other State and County Agencies: DLNR, DOH, DOA, DOT, Hawai‘i State Civil Defense (SCD), OHA, County Planning Departments, Board of Water Supply (BWS)
Partners: MACZAC, PacIOOS, UH Sea Grant College Program, UH SOEST, UH ICAP, National Marine Sanctuary, PMNM, USACE, U.S. Navy, USCG, NOAA, EPA, The Nature Conservancy

Management Priority #10 Community and Place-Based Ocean Management Projects

Community and Place-Based Ocean Management Projects Goals:

Goal A: *Advance community level eco-based, place-based ocean management projects currently in place.*
Goal B: *When funding becomes available, assist in the creation of additional community level eco-based, place-based ocean management projects.*
Goal C*: Partner with communities to better manage Hawaii's marine resources.*

References

Perspective 3: Promoting Collaboration and Stewardship
HRS Sections 205A-2(b) [Objectives]: (8); and 205A-2(c) [Policies]: (8) (A)
HRS Sections 188-22.6-22.9
National Ocean Policy Objective 6

Background

During the Demonstration Phase a variety of place-based initiatives and models for integrated government and community emerged. Many projects involve active involvement of community members who worked to restore part of an ecosystem and began to monitor and watch that ecosystem. As projects continue forward and results are seen, they attract additional interest and resources.

Benchmark – Where we are now

- The Demonstration Phase yielded over a dozen examples of place-based community projects and stewardship: OP-CZM financially supported and provided technical assistance to the following projects that are outlined in Appendix E: He'eia Kea (O'ahu), Ala Wai Watershed Project (O'ahu), Hanalei (Kaua'i), Honu'apo Estuary (Hawai'i Island), Hilo Bay (Hawai'i Island), Pu'u O Umi Natural Reserve and Kohala Natural Reserve (Hawai'i Island), Maunalua Bay (O'ahu), West Maui Ridge to Reef Initiative, and West Maui Watershed (Maui). Lessons learned from communities could be posted as references for others.
- The agencies recognize that in areas where people still use traditional practices, there are frequent conflicts, especially over access.
- Modern day application of ahupua'a management is no longer strictly practiced, although there are attempts at restoring this practice in several locations. Conversations about restoring this practice began in earnest with the WPRFMC puwalu series, which was initiated statewide in August 2006. These workshops focused on engaging the Native Hawaiian community in a dialogue to inform the WPRFMC Fisheries Eco-System Management Plans for Hawai'i.

Target – Where we would like to be

- Established place-based projects are supported to continue their work in ocean resource management. Where applicable, they are assisted in navigating the permit process associated with their restoration efforts, and in developing BMPs for restoration work through information and expertise sharing.
- Additional projects are identified by working with the community and supported in their efforts.

Example Actions to Accomplish the Community and Place-Based Ocean Management Projects Goals

- OP Annual Reports are sent to the Legislature and posted on OP website.
- OP updates its website with community-based efforts and outcomes, including funding opportunities for community groups.

- OP updates Community Stewardship Directory, places it online, and makes it more interactive for community group use.
- National Estuarine Research Reserve Site (NERRS) is designated through NOAA.
- Hawai‘i annual report on NOAA National Performance Standards (NPS) is posted on the OP-CZM webpage.
- OP provides an annual public “Report Card” describing progress on the ORMP Management Priorities and community and place-based ocean management projects.
- DLNR-DAR works on Community-Based Subsistence Fishing Area (CBSFA) rule packages to be submitted for adoption by the BLNR.

Metrics – Indicator Measures

GOAL A:

- Increase in number of community projects underway which are given technical or financial assistance (OP-CZM)

GOAL B:

- Increase in number of new community projects started using technical or financial assistance from an ORMP agency (OP-CZM)

GOAL C:

- Increase in number of CBSFA rule packages adopted by the BLNR (DLNR-DAR)
- Establish and fund a permanent state position for a CBSFA Coordinator (DLNR-DAR)
- Establish and fund a permanent state position for a Makai Watch Coordinator (DLNR-DOCARE)

Agencies

Lead Agency: OP-CZM and DLNR-DAR
Other State and County Agencies: DLNR, DOH, DOA, DOT, SCD, OHA, County Planning Departments, BWS
Partners: NOAA, USACE, PMNM, National Marine Sanctuary, WPRFMC, Makai Watch, West Maui Ridge to Reef Initiative, The Nature Conservancy

Management Priority # 11 National Ocean Policy and Pacific Regional Ocean Initiatives

National Ocean Policy and Pacific Regional Ocean Initiatives Goals:

Goal A: *Contribute to the Pacific Regional Priorities for Pacific Regional Ocean Partnership, which include, but are not limited to, climate change adaptation and the support of Coastal and Marine Spatial Planning.*
Goal B: *Formalize Hawai'i Sub-Regional Ocean Partnership using existing partnerships and focus on ORMP implementation.*
Goal C: *Through the Regional Planning Body, establish a coastal and marine spatial plan to be used throughout the Pacific Region.*

References

Perspective 3: Promoting Collaboration and Stewardship
HRS Sections 205A-2(b) [Objectives]: (1), (2), (4), (7), (8), and (9); and 205A-2(c) [Policies]: (9) (D), (9) (E), and 10 (E)
National Ocean Policy Objectives 1, 2, 4, 5 & 9

Background

The National Ocean Policy (NOP) was created in 2010 by President's Executive Order 13547, which was based on the Final Recommendations of the Interagency Ocean Policy Task Force. The NOP creates a framework for collaboration to enhance the country's ability to maintain healthy, resilient, and sustainable oceans, coast and Great Lakes resources. The framework developed calls for nine regional planning bodies (RPB). Hawai'i is a member of the Pacific Island Regional Planning Body (PIRPB). The framework also supports regional ocean partnership initiatives. The State is a member of the Pacific Regional Ocean Partnership (PROP) and is recognized as a sub-region of the Pacific Islands Region. The ORMP is the sub-region's resource management plan.

One objective of the NOP is to improve spatial information on the condition of the oceans. This information is meant to aid the development of public policy and decision making. The goal of the PIRPB is to complete a coastal and marine spatial plan for the Pacific Islands Region. The state also desires to develop a coastal and marine spatial tool, a mapping tool that is GIS based and tied to the state's GIS system. In the long term, the state will develop a coastal and marine plan for Hawai'i.

Benchmark – Where we are now

- PROP was formed in 2012 and a Memorandum of Agreement to formalize working relationships was signed in August 2012. Members include: State of Hawai'i, Commonwealth of the Northern Mariana Islands (CNMI), Guam, and American Samoa. The PROP highlights the importance of gathering rights, cultural sensitivities, and unique island geographies in the management of ocean resources.
- The State of Hawai'i currently convenes two inter-agency (federal, state, and county) groups for the purposes of coordinating ocean resource management. These groups formed in 2007 and are referred to as the ORMP Policy and Working Groups. These groups have been meeting regularly (Policy Group, twice a year; Working Group, monthly) since their creation. Both groups have partnered to accomplish a number of items, most recently developing a framework for climate change adaptation, which led to the passage of Act 286 in 2012 - the State's Climate Change Adaptation Policy. This policy adds climate change adaptation as a priority guideline to Part III of the Hawaii State Planning Act, HRS Chapter 226.

- DOH is working on developing Administrative Rules for the greenhouse gas bill.
- The State of Hawai‘i has initiated a project to establish the Hawai‘i Sub-Regional Ocean Partnership (Hawai‘i Sub-ROP). Once formalized, the Hawai‘i Sub-ROP will strengthen the partnerships created by the ORMP Policy and Working Groups. The group will also examine possible collaborative governance structures that the Hawai‘i Sub-ROP will adopt. It is anticipated that the Hawai‘i Sub-ROP will be established by June 2014.
- The PIRPB, along with the other eight regional planning bodies nationwide, was formed to address coastal and marine spatial planning at a regional level. The State of Hawai‘i, represented by OP and DLNR, is a member of the PIRPB, which was officially established in April 2013.

Target – Where we would like to be

- Regional priorities are coordinated with and contribute to PROP objectives.
- Hawai‘i Sub-ROP formalizes and provides structure to existing partnerships.
- A coastal and marine spatial tool within the State of Hawai‘i, for use by state and county agencies and the public, is operational.
- A coastal and marine plan for the State of Hawai‘i (similar to Oregon's Territorial Sea Plan or Rhode Island's Special Area Management Plan (SAMP)) is developed.

Example Actions to Accomplish the National Ocean Policy and Pacific Regional Ocean Initiatives Goals

- Hawai‘i contributes to the development of a PROP Action Plan to advance PROP initiatives.
- Schedule Hawai‘i Sub-ROP meetings and prepare agendas for 2013.
- Establish Hawai‘i Sub-ROP as a mechanism for ORMP implementation.
- Hawai‘i contributes to the PIRPB draft charter, work plan, and actions.
- Hawai‘i collaborates with PIRPB and PROP development of a coastal and marine spatial planning tool for the Pacific Islands Region.
- Hawai‘i develops a state coastal and marine GIS tool.
- Hawai‘i develops a coastal and marine plan utilizing the state coastal and marine GIS tool.
- PacIOOS provides data services.

Metrics – Indicator Measures (OP-CZM)

GOAL A:

- Increase in number of issues raised and information exchanged at PROP meetings
- Completion of a PROP Action Plan that contains regional priorities relevant to Hawai‘i
- Increase in number of collaborative initiatives undertaken by the PROP that are coordinated with Hawai‘i
- Hawai‘i participation in the implementation of PROP regional priorities

GOAL B:

- High attendance rates of State agencies at meetings of the Hawai‘i Sub-ROP each year
- Increase in number of ORMP implementation projects sanctioned and initiated by Sub-ROP
- Increase in number of work plans developed for the eleven management priorities
- Increase in number of collaborative initiatives undertaken at Sub-ROP
- Increase in number of meetings of the RPB attended by Hawai‘i representation
- Drafting of the RPB charter and work plan

GOAL C:

- Hawai‘i coastal and marine spatial GIS tool developed
- Number of times Hawai‘i coastal and marine spatial GIS tool used for decision making by state and county agencies

Agencies

Agencies Involved in the PIRPB	Agencies Involved in the PROP	Agencies Involved in ORMP Policy and Working Groups
Federal: U.S. Dept. of Commerce/NOAA Joint Chiefs of Staff (U.S. Navy) U.S. Dept. of Defense/USMC U.S. Dept. of Agriculture/NRCS U.S. Dept. of Homeland Security/USCG U.S. Environmental Protection Agency U.S. Dept. of Transportation/Maritime Administration U.S. Dept. of Interior/USFWS Non-Federal: Territory of American Samoa Commonwealth of the Northern Mariana Islands Territory of Guam State of Hawai‘i (represented by Office of Planning and DLNR) WPRFMC	State of Hawai‘i (represented by Office of Planning and DLNR) Territory of American Samoa Commonwealth of the Northern Mariana Islands Territory of Guam	Office of Planning, CZM Program DLNR DOH DOA DOE DOT DPS SCD OHA County Planning Departments BWS MACZAC PacIOOS UH Sea Grant College Program UH SOEST UH ICAP National Marine Sanctuary PMNM USACE U.S. Navy U.S. Coast Guard NOAA EPA The Nature Conservancy

Management Priorities Summary Matrix Explanation

The following matrix of Management Priorities, Goals, Involved Agencies, and Metrics may be used as a guide for the eleven ORMP Management Priorities.

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
1	Appropriate Coastal Development ***Goal A:*** *Adoption of county plans which specify guidance on coastal development.* ***Goal B****: Strengthen and integrate data management to ensure appropriate coastal development.* ***Goal C:*** *Expand options to protect existing developments from further coastal erosion.*	OP-CZM	County Planning Departments, DLNR-OCCL, DOT (Harbors, Airports, and Highways), DOH,	Federal Emergency Management Agency (FEMA) National Flood Insurance Program, UH Sea Grant College Program, PacIOOS, UH SOEST Coastal Geology Group, NOAA Office of Ocean and Coastal Resource Management (OCRM) and Pacific Services Center (PSC)	<u>GOAL A:</u> • Increase in number of additional shoreline access (OP-CZM) • Increase in number of counties implementing planning practices that include adaptation strategies when planning for coastal areas (OP-CZM) • Increase in number of state agencies implementing capital improvement plan projects that include adaptation strategies for coastal areas (OP-CZM) <u>GOAL B:</u> • Layers added to the statewide GIS that address coastal measures (OP GIS) <u>GOAL C:</u> • Number of projects reviewed by OP during land use entitlement process that include coastal impact risk assessments(OP-CZM) • Number of projects reviewed by DOH during land use entitlement process that include coastal impact risk assessments (DOH)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
2	Management of Coastal Hazards ***Goal A:*** *Support adoption of county laws for Best Management Practices to reduce risks from coastal hazards, including the impacts from climate change.* ***Goal B:*** *Complete coastal mapping of the Main Hawaiian Islands to assist with management of coastal hazards such as coastal erosion and sea level rise.* ***Goal C:*** *Collaborate and support county and state efforts to develop climate change risk analysis and adaptation strategies for public facilities.*	OP-CZM	County Planning Departments, DLNR-OCCL, County and State Civil Defense, DOT, DOH	FEMA National Flood Insurance Program, UH Sea Grant College Program, PacIOOS, UH SOEST Coastal Geology Group, NOAA OCRM, NOAA PSC Papahānaumokuākea Marine National Monument, co-managed by NOAA, USFWS, OHA and the State of Hawai‘i (PMNM)	GOAL A: • Develop guidance on how to integrate climate change policy in to County Development Plans/Sustainable Community Plans and regulatory permits (OP-CZM) • Increase in number of state departments completing coastal hazards risk analysis for their facilities (OP-CZM) • Increase in number of county general and community/development plans that include a climate change adaptation component (County Planning Departments) • Creation of greenhouse gas emissions rules (DOH) GOAL B: • Shoreline erosion studies and maps completed for Hawai‘i Island, Lāna‘i, and Moloka‘i (UH-SOEST) • Review and update shoreline erosion maps for Kaua‘i, Maui, and O‘ahu (UH-SOEST) GOAL C: • Increase in number of climate change adaptation training sessions held (OP-CZM) • Increase in number of state departments adopting climate change adaptation strategies in their maintenance plans and capital improvement program plans (OP-CZM)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
3	Watershed Management ***Goal A:*** *Increase the amount of protected watershed priority areas based on climatic conditions (elevation and moisture zones) and land cover types that provide higher recharge and fog capture as stated in the "Rain Follows the Forest Plan" (2011).* ***Goal B:*** *Improve coastal and stream water quality.*	DLNR-DOFAW	OP-CZM, DLNR Commission on Water Resource Management (CWRM), County water departments, County planning departments, DOH Polluted Runoff Control Program-Section 319, DOH Wastewater Branch, DLNR Division of Aquatic Resources (DLNR-DAR)	Watershed Partnerships, Invasive Species Committees, The Nature Conservancy, EPA, and NOAA.	GOAL A: • Increase in acreage of land protected from invasive plant and animal species as well as wildfires through invasive species removal, fencing, integrated pest management, or other strategies (DLNR-DOFAW) • Increase in acreage of native watershed forest fenced (DLNR-DOFAW) • Increase in acreage of pig-free fence enclosures (DLNR Watershed Partnership Program) • Increase in miles of fence line checked (DLNR Watershed Partnership Program) GOAL B: • Decrease in the number of impaired streams (DOH) • Increase in percentage of wastewater recycled annually (DOH) • Implementation of Section 319 Projects (DOH) • Increase in number of outreach activities conducted for wastewater recycling (DOH) • EPA and NOAA approval of Coastal Nonpoint Pollution Control Program

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
4	Marine Resources ***Goal A:*** *Promote protection, and sustainable use of marine resources.* ***Goal B:*** *Reduce and remove accumulated marine debris on all islands and shores.* ***Goal C:*** *Minimize the spread of aquatic invasive species from bays where there is coral or water quality degradation.* ***Goal D:*** *Minimize the likelihood of aquatic invasive species introductions and spread into and within Hawai‘i from sources associated with vessels.* ***Goal E:*** *Promote fishing practices that increase fish stocks.*	DLNR-DAR	DOH, DOT-Harbors, Kaho‘olawe Island Reserve Commission, DLNR-DOCARE, DLNR-DOBOR, County Public Works and Environmental Services Departments,	U.S. Coast Guard, U.S. Fish & Wildlife Service, U.S. EPA, NOAA, Bishop Museum, The Nature Conservancy, University of Hawai‘i, PacIOOS, Hawaiian Islands Humpback Whale National Marine Sanctuary (Co-Managed by NOAA and the State of Hawai‘i) (National Marine Sanctuary), PMNM, WPRFMC, MACZAC, Agency members of the Hawai‘i Interagency Marine Debris Working Group (includes Federal, State, and County agencies), Community Work Day Program on Maui and Trilogy, which operates on Maui, Lāna‘i, and Moloka‘i	<u>GOAL A:</u> • Increase in number of educational workshops and programs conducted on marine debris for state and county agencies (OP-CZM) • Increase in number of Makai Watch Training provided to community groups (DLNR-DAR) <u>GOAL B:</u> • Increase in number of community marine debris clean ups (Hawai‘i Interagency Marine Debris Group, including DLNR and DOH) • Decrease in number of abandoned and derelict vessels (DLNR-DOBOR) • Number of enforcement actions taken by DOH Solid and Hazardous Waste Branch for illegal dumping in state waters (DOH) • Increase in number of educational workshops held by DOH Compliance Assistance Office for public (DOH) • Number of Japan Tsunami Marine Debris items tracked, assessed for contamination, and disposed (NOAA) <u>GOAL C:</u> • Increase number of urchins introduced to control invasive algae (DLNR-DAR) • Increase in number of pounds of invasive algae removed (DLNR-DAR) • A permanent state position for the AIS Program is established, funded, and filled (DLNR-DAR) <u>GOAL D:</u> • Increase in number of ballast water reports processed (DLNR-DAR) • Rules for managing biofouling on vessels are developed and adopted (DLNR-DAR) • Ongoing funding is created for the Ballast Water and Hull Fouling Prevention Program (DLNR) <u>GOAL E:</u> • Increase in percent compliance with commercial fisheries reporting requirements (DLNR-DAR) • Increase in number of enforcement officers assigned exclusively to enforce fishing rules (DLNR-DOCARE) • Increase in number of targeted reef fish species that show an increase in size and/or abundance on at least one island (DLNR-DAR)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
5	Coral Reef ***Goal A:*** *Improve the health and productivity of coral reef ecosystems at priority sites identified by the Hawaii Coral Reef Program.* ***Goal B:*** *Implement place-based projects that demonstrate effective stewardship practices that can be applied to other areas.* ***Goal C:*** *Implement an effective day-use moorings program that minimizes impacts to coral reef ecosystems and user conflicts.*	DLNR-DAR	DLNR Division of Conservation and Resources Enforcement (DOCARE), DLNR Division of Ocean Boating and Ocean Recreation (DOBOR), DOT-Harbors, DOH,	U.S. Army Corps of Engineers (USACE), Hawai'i Coral Reef Working Group, National Marine Sanctuary, PMNM, The Nature Conservancy, NOAA Coral Reef Conservation Program, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service, Hawai'i Tourism Authority, Coral Reef Alliance	GOAL A: • Decrease in number of impaired coastal waters listed (DOH) • Decrease in number of shoreline postings due to sewage or other water pollution (DOH) GOAL B: • Increase in number of projects or Best Management Practices (BMPs) implemented and evaluated at priority coral reef sites (DLNR-DAR) GOAL C: • Day use mooring program funded and implemented in consultation with communities (DLNR-DOBOR) • Increase in percent of day use moorings maintained and managed by the state (DLNR-DOBOR) • Increase in number of classes/educational efforts completed to educate boaters on day use moorings and the importance of mooring maintenance (DLNR-DOBOR)

	Management Priority Goal(s)	Lead State Agencies	Other State and County Agencies	Partners	Metrics
6	Ocean Economy ***Goal A:*** *Develop aquaculture standards, based on current scientific data, to support culturally, environmentally, and economically sustainable operations which increase production for local consumption.* ***Goal B:*** *Encourage use of ocean-based energy to contribute towards achieving Hawai'i Clean Energy Initiative while balancing the need to protect ocean resources.* ***Goal C:*** *Ensure a healthy shipping industry that uses ocean and coastal resources sustainably.* ***Goal D:*** *Ensure a healthy tourism industry that uses ocean and coastal resources sustainably.*	Department of Agriculture, Aquaculture Development Program Department of Health OP-CZM DOT-Harbors DBEDT-Energy Office	Office of Planning, DLNR, OHA	National Energy Laboratory of Hawai'i Authority (NELHA), NOAA NMFS, National Marine Sanctuary, WPRFMC, Coral Reef Alliance, Hawai'i Ecotourism Association, Hawai'i Tourism Authority	<u>GOAL A:</u> • Increase in pounds of commercially raised fish sold (DOA) • Increase in dollar value of commercially raised fish (DOA) • Increase in number of viable classified shellfish growing waters (DOH) • Increase in number of permitted commercial shellfish operators (DOH) • Increase in number of pounds of shellfish sold to local markets/restaurants in Hawai'i (DOH) • Increase in number of pounds of shellfish exported out of state (DOH) <u>GOAL B:</u> • Increase in percentage of alternate energy coming from ocean sources, as measured in megawatt-hours (DBEDT Energy) <u>GOAL C:</u> • Increase in tons of cargo arriving at Hawai'i ports, until ports reach full capacity (DOT-Harbors) <u>GOAL D:</u> • Improved beach water quality monitoring data (DOH) • Increase in number of hotels with recognized sustainability certifications or program affiliations (DBEDT-Energy Office-Hawai'i Green Business Program) • Increase in number of tour operators who are recognized as Dolphin SMART (DLNR)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
7	Cultural Heritage of the Ocean ***Goal A:*** *Preserve cultural heritage of the ocean and protect Native Hawaiian rights for access and gathering in ocean and on coastline, and protect ocean and coastal resources upon which Native Hawaiian cultural practices depend.* ***Goal B:*** *Support restoration of Hawaiian fishponds through permitting, community projects, and technical assistance.*	DLNR-OCCL	Office of Planning; DOA, DOH, Aquaculture Development Program; DLNR; OHA,	USACE, NOAA, National Marine Sanctuary, PMNM, Community Groups	GOAL A: • Increase in number of moorings for Native Hawaiian canoes that are operated exclusively for educational purposes (DLNR-DOBOR) GOAL B: • Decrease in average number of months to obtain all permits necessary for fishpond restoration (DLNR-OCCL and DOH) • Increase in number of fishpond restoration projects given technical assistance and support for permitting processes (OP-CZM)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
8	Training, Education, and Awareness ***Goal A:*** *Develop training curriculum, at the fundamental and advanced levels, for state and county agency staff as well as boards and commissions working on ocean and coastal protection and begin annual training.* ***Goal B:*** *Partner to expand existing citizen stewardship awareness and active engagement curriculum for widespread dissemination through various community outlets.*	OP-CZM	DLNR, DOH,	MACZAC, PacIOOS, UH Sea Grant College Program, National Marine Sanctuary, PMNM, Hawai‘i Tourism Authority, Coral Reef Alliance, The Nature Conservancy	GOAL A: • Curricula on fundamentals of ocean resource management on advanced environmental science is developed (OP-CZM) • Increase in number of agency employees attending environmental science training (OP-CZM) GOAL B: • Increase in number of community outreach and awareness events held and/or participants reached (OP-CZM, DLNR-DAR, and National Marine Sanctuary) • Inclusion of Hawai‘i marine resource module as part of required boater education certification requirement (DLNR-DOBOR)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
9	Collaboration and Conflict Resolution ***Goal***: *Fully utilize the ORMP Policy Group as a forum to discuss State ocean resource management, and to raise and resolve issues, and to resolve conflicts when appropriate.*	OP-CZM	DLNR, DOH, DOA, DOT, Hawai'i State Civil Defense (SCD), OHA, County Planning Departments, Board of Water Supply (BWS),	MACZAC, PacIOOS, UH Sea Grant College Program, UH SOEST, UH ICAP, National Marine Sanctuary, PMNM, USACE, U.S. Navy, USCG, NOAA, EPA, The Nature Conservancy	• Work with the State of Hawai'i Office of Information Management & Technology to create a state performance measures website for the ORMP metrics (OP-CZM) • Increase in number and range of issues handled by ORMP Policy Group and/or Hawai'i Sub-ROP (OP-CZM) • Increase in number of Management Priority issues that receive state funding and where needed, legislative attention (OP-CZM) • Increase in number of obstacles to ORMP implementation identified and resolved by Sub-ROP (OP-CZM)
	Management Priority Goal(s)	**Lead State Agency**	**Other State and County Agencies**	**Partners**	**Metrics**
10	Community and Place-Based Ocean Management Projects ***Goal A:*** *Advance community level eco-based, place-based ocean management projects currently in place.* ***Goal B:*** *When funding becomes available, assist in the creation of additional community level eco-based, place-based ocean management projects.* ***Goal C****: Partner with communities to better manage Hawaii's marine resources.*	OP-CZM and DLNR-DAR	DLNR, DOH, DOA, DOT, SCD, OHA, County Planning Departments, BWS	NOAA, USACE, PMNM, National Marine Sanctuary WPRFMC, Makai Watch, West Maui Ridge to Reef Initiative, The Nature Conservancy	<u>GOAL A:</u> • Increase in number of community projects underway which are given technical or financial assistance (OP-CZM) <u>GOAL B:</u> • Increase in number of new community projects started using technical or financial assistance from an ORMP agency (OP-CZM) <u>GOAL C:</u> • Increase in number of Community-Based Subsistence Fishing Area (CBSFA) rule packages adopted by the BLNR (DLNR-DAR) • Establish and fund a permanent state position for a CBSFA Coordinator (DLNR-DAR) • Establish and fund a permanent state position for a Makai Watch Coordinator (DLNR-DOCARE)

	Management Priority Goal(s)	Lead State Agency	Other State and County Agencies	Partners	Metrics
11	National Ocean Policy and Pacific Regional Objectives ***Goal A:*** *Contribute to the Pacific Regional Priorities for Pacific Regional Ocean Partnership, which include, but are not limited to, climate change adaptation and the support of coastal and marine spatial planning.* ***Goal B:*** *Formalize Hawai'i Sub-Regional Ocean Partnership using existing partnerships and focus on ORMP implementation.* ***Goal C:*** *Through the Regional Planning Body, establish a coastal and marine spatial plan to be used throughout the Pacific Region.*	OP-CZM	Agencies Involved in the PIRPB Agencies involved in the PROP Agencies Involved in ORMP Policy and Working Groups		<u>GOAL A:</u> • Increase in number of issues raised and information exchanged at PROP meetings • Completion of a PROP Action Plan that contains regional priorities relevant to Hawai'i • Increase in number of collaborative initiatives undertaken by the PROP that are coordinated with Hawai'i • Hawai'i participation in the implementation of PROP regional priorities <u>GOAL B:</u> • High attendance rates of State agencies at meetings of the Hawai'i Sub-ROP each year • Increase in number of ORMP implementation projects sanctioned and initiated by Sub-ROP • Increase in number of work plans developed for the eleven management priorities • Increase in number of collaborative initiatives undertaken at Sub-ROP • Increase in number of meetings of the RPB attended by Hawai'i representation • Drafting of the RPB charter and work plan <u>GOAL C:</u> • Hawai'i coastal and marine spatial GIS tool developed • Number of times Hawai'i coastal and marine GIS tool used for decision making by state and county agencies

IV. Integrated and Coordinated Approach to Management of Ocean Resources

Introduction

This chapter discusses multiple approaches to the management of ocean resources, underscoring the importance of integration and coordination. Management approaches covered include:

- ORMP Governance Framework
- The National Ocean Policy Framework
- Current Framework for Traditional Resource Management
- Marine Management Areas and Sanctuaries
- Community Place-Based Management

In Hawai‘i, many government agencies and authorities participate in the management of ocean and coastal resources. While there are overlaps in interest, each governmental agency has its own roles and responsibilities. The OP-CZM Program recently issued *Sustainable Management of the Islands* (December 2011), which describes the network of resource agencies for coastal zone management and ocean resource protection. Agencies involved in ocean resource and coastal zone management are shown in Appendix D at the end of this plan. State agency and partner coordination is achieved through the ORMP Policy Group and Working Group and with an advisory group, Marine & Coastal Zone Advocacy Council (MACZAC). MACZAC is composed of twelve advisory members who are recruited statewide and who have diverse backgrounds in business, environment, native Hawaiian practices, terrestrial and marine commerce, recreation, research, and tourism.

The National Ocean Policy is new since the *2006 ORMP*. The National Priority Objectives can be found in Chapter I and later in this chapter. The National Ocean Policy calls for a framework for implementation including the Pacific Regional Ocean Partnership (PROP) and the Hawai‘i Sub-Regional Ocean Partnership (Hawai‘i Sub-ROP). These are both in the initial stages of formation, and the value of this new framework is just starting to be explored.

Ocean Resource Management includes entities conducting science and research. Several schools and divisions within the University of Hawai‘i system are involved with scientific and research activities in a number of fields. These schools and their science and research are listed in Appendix E.

Place-based management involves government and the community working in alliance. Appendix F lists several recent community and place-based ocean management projects. Appendix G provides selective resources and references for community organizations seeking funding and further involvement as stewards of the ocean.

ORMP Governance Framework

Office of Planning, Coastal Zone Management Program

HRS Chapter 205A is Hawaii's CZM Law, and HRS Section 205A-3 designates the OP-CZM Program as the lead agency for coastal zone management. The ORMP section of Hawaii's CZM Act, HRS Section 205A-63, provides that the unifying policy for all agencies managing marine and coastal resources is that they actively work toward the goals, objectives, and policies established by the CZM Act. The OP-CZM Program is funded with State General Funds and through grants from NOAA's Office of Coastal Resource Management (OCRM). The OP-CZM Program was enacted as the state's policy umbrella for facilitating and assuring interrelated and comprehensive coastal resource management.

Policy Group and Working Group

The ORMP Working Group and Policy Group have become major coordination bodies for the different interagency collaborations needed to manage ocean resources. Both groups were formed in July 2007, after the *2006 ORMP* was completed. The Policy Group meets twice a year, and its 20 members consist of the directors of State and County resource management agencies, the University of Hawai'i, federal partners, and MACZAC. The Working Group meets monthly and consists of managers and staff of the same offices that are tasked with coordinating their respective agency's *ORMP* implementation efforts.

Additional people are invited to the ORMP Working Group meetings from various divisions within state agencies as well as resource people from federal agencies, environmental non-profit groups that have worked on ORMP Demonstration Projects, and the University of Hawai'i.

Figure 4-1: Office of Planning Director Addresses ORMP Policy Group, June 2012

Figure 4-2: ORMP Working Group Discussion, July 2012

The full list of agencies and groups represented and participating in the ORMP groups to date are:

Federal Partners include NOAA Office of National Marine Sanctuaries, Pacific Islands Region (ONMS); NOAA Office of Ocean & Coastal Resource Management (OCRM); NOAA Pacific Services Center (PSC); United States Army Corps of Engineers (USACE); United States Coast Guard (USCG); United States Navy, and United States Environmental Protection Agency (EPA).

State Partners include State of Hawai‘i Departments of Agriculture (DOA), Civil Defense (SCD), Health (DOH), Land & Natural Resources (DLNR), Transportation (DOT), and Office of Hawaiian Affairs (OHA).

University Partners include University of Hawai‘i, School of Ocean & Earth Science & Technology (SOEST); University of Hawai‘i, Sea Grant College Program (UH Sea Grant); University of Hawai‘i Sea Grant College Program, Center for Island Climate Adaptation & Policy (ICAP); and Pacific Islands Ocean Observing System (PacIOOS).

County Partners include City and County of Honolulu, Department of Planning and Permitting (DPP); County of Hawai‘i, Planning Department; County of Kaua‘i, Department of Planning; County of Maui, Department of Planning; and Honolulu Board of Water Supply (BWS).

Community Partners include the Marine & Coastal Zone Advocacy Council.

Marine & Coastal Zone Advocacy Council

In 2001, the State Legislature passed Act 169, which became HRS Section 205A-3.5. This law clarifies OP’s responsibility to maintain a public advisory body, named the Marine & Coastal Zone Advocacy Council (MACZAC), and defines its membership. The twelve MACZAC members are advisory to OP, are recruited from the islands of Kaua‘i, O‘ahu, Maui, Moloka‘i, Lāna‘i, and Hawai‘i, and have diverse professional and community backgrounds.

MACZAC’s mission statement is, “Advocate for a comprehensive management system which restores, preserves, and protects Hawaii’s marine and coastal environment.” The MACZAC meets quarterly. They have worked on mapping coastal parking access; provided recommendations regarding shoreline certification, commercial boating regulations, and harbor facilities; discussed integrated ocean resource management, cultural resources management, coastal water quality, coastal carrying capacity, and marine managed areas; and have provided advice to OP on regulatory review, legislative advocacy, public

education and outreach. MACZAC has reached out to community and user groups including the Ocean Tourism Coalition, Maui Visitors and Convention Bureau, and the Maui Hotel and Lodging Association.

National Ocean Policy Framework

National Ocean Policy Vision

"To achieve an America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations."

The U.S. Commission on Ocean Policy (USCOP) published *An Ocean Blueprint for the 21st Century* in 2004, identifying needed actions for coastal and ocean areas. A key recommendation was to create a strong role for states in the management of their coasts and oceans and provide opportunities for them to contribute to an integrated national policy. Towards that end, the USCOP recommended creation of regional ocean councils "to help coordinate federal, state, tribal, and local planning and action." Another key recommendation was to create a National Ocean Council (NOC), which would be a multiagency body to create an integrated national ocean policy. The NOC should "provide high-level attention to ocean and coastal issues, develop appropriate national policies, and coordinate their implementation by the many federal departments and agencies with ocean and coastal responsibilities."

The Interagency Ocean Policy Task Force (IOPTF) was established in 2009, and it is comprised of senior-level officials from 24 executive departments, agencies, and offices across the federal government. The IOPTF is led by the Chair of the Council on Environmental Quality (CEQ). The mission of the IOPTF is to develop recommendations to enhance national stewardship of the ocean, coasts, and Great Lakes, and promote their long-term conservation and use.

Six years after the USCOP recommendation, the National Ocean Council and the National Ocean Policy (NOP) were established in July 2010 by the President's Executive Order 12547 "to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources, enhance the sustainability of ocean and coastal economies, preserve our maritime heritage, support sustainable uses and access, provide for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification, and coordinate with our national security and foreign policy interests."

The NOP was established based on the *Final Recommendations of the Interagency Ocean Policy Task Force* (2010). This groundbreaking policy provides the framework for federal agencies to work together to pursue the National Ocean Policy's Vision while engaging the states, native people, local authorities, regional governance structures, non-governmental organizations, the public, and the private sector. Such a broad framework for federal ocean resources policy collaboration has never been done before.

The *Final Recommendations* contain nine National Priority Objectives that call for adoption of ecosystem-based management; implementation of coastal and marine spatial planning; inform decisions and improve understanding; and increased coordination and support to address resiliency and adaptation to climate change and ocean acidification, regional ecosystem protection and restoration, water quality and sustainability on land, and ocean and coastal observations, mapping, and infrastructure. The eleven ORMP Management Priorities are closely related to these objectives.

National Priority Objectives

HOW WE DO BUSINESS

1. **Ecosystem-Based Management**: Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes.

2. **Coastal and Marine Spatial Planning**: Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.

3. **Inform Decisions and Improve Understanding**: Increase knowledge to continually inform and improve management and policy decisions and the capacity to respond to change and challenges. Better educate the public through formal and informal programs about the ocean, our coasts, and the Great Lakes.

4. **Coordinate and Support**: Better coordinate and support Federal, State, tribal, local, and regional management of the ocean, our coasts, and the Great Lakes. Improve coordination and integration across the Federal Government and, as appropriate, engage with the international community.

AREAS OF SPECIAL EMPHASIS

5. **Resiliency and Adaptation to Climate Change and Ocean Acidification**: Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.

6. **Regional Ecosystem Protection and Restoration**: Establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns conservation and restoration goals at the Federal, State, tribal, local, and regional levels.

7. **Water Quality and Sustainable Practices on Land**: Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.

8. **Changing Conditions in the Arctic**: Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.

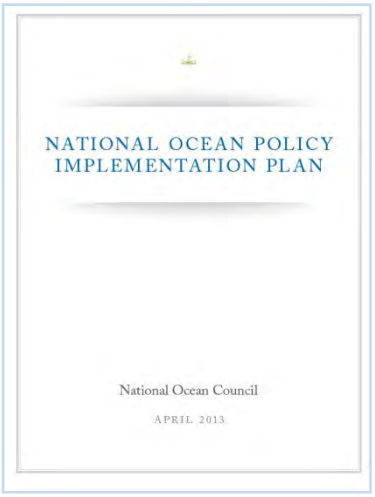
9. **Ocean, Coastal, and Great Lakes Observations**, Mapping and Infrastructure: Strengthen and integrate Federal and non-Federal ocean observing systems, sensors, data collection platforms, data management, and mapping capabilities into a national system and integrate that system into international observation efforts.

Source: Final Recommendations of the Interagency Ocean Policy Task Force **(2010)**

The *Final Recommendations* include developing coastal and marine spatial planning (CMSP) as a comprehensive, integrated, and regionally-based tool for planning and managing coastal and marine uses. It established nine regional planning bodies to develop the coastal and marine spatial plans. The Pacific Islands Regional Planning Body (RPB) was officially established in April 2013. The intent of the Pacific

Islands RPB is to develop a coastal and marine spatial plan that includes sub-plans for Hawaii and the territories of the Pacific Islands region. RPB membership consists of authorities relevant to CMSPfor that area. Hawai‘i has two representatives to the Pacific RPB: Office of Planning and DLNR.

The National Ocean Council's *National Ocean Policy Implementation Plan* (*Implementation Plan*) (April 2013) describes the actions the Federal Government will take to improve ocean and coastal ecosystem health. The recommendations of the *Implementation Plan* are viewed as opportunities for the ORMP to contribute toward and build upon at a state level.



The *Implementation Plan* includes federal actions to strengthen existing regional ocean governance partnerships and establish new partnerships. These partnerships share regional priorities and often include non-governmental agencies. The existing ORMP Policy and Working Group will serve as a sub-regional ocean governance partnership. The Hawai‘i Sub-Regional Ocean Partnership (Hawai‘i Sub-ROP) encompasses all islands in the Hawaiian chain and is discussed later in this chapter. In addition, Hawai‘i, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands (CNMI) have formed a larger Pacific Regional Ocean Partnership (PROP), formalized in August 2012. The Hawai‘i representative to the PROP is the Governor's office, who has delegated authority to the Office of Planning and the DLNR Chair.

Pacific Regional Ocean Partnership (PROP)

The Pacific Regional Ocean Partnership is a voluntary partnership between the Governors of the U.S. Pacific Islands Region, and consists of the State of Hawai‘i, and the Territories of the CNMI and Guam, and American Samoa. Unlike most of the other regional ocean partnerships, this region does not share physical boundaries.

A Governor's Agreement to formalize the working relationships between the four jurisdictions in the PROP was signed on August 22, 2012 by Governor Neil Abercrombie and the governors of American Samoa, CNMI, and Guam. The mission of the PROP is to "assist the U.S. Pacific Islands Region Governors of American Samoa, CNMI, Guam, and Hawai‘i to identify coastal and ocean management priorities that require a coordinated regional response and increased collaboration to effectively address these issues."

The actions of the PROP will complement, and take advantage of, other ongoing regional efforts while respecting individual state policy making requirements. While just formed in the summer of 2012, the structure will include an Executive Group, a Steering Group, Action Coordination Teams, and Supporting Partners.

The PROP will help to implement the National Ocean Policy, using the *National Ocean Policy Implementation Plan* (April 2013) as a resource for action, being mindful of the traditional gathering rights, cultural sensitivities, and unique geographic considerations. The *Implementation Plan* is guided by four themes: 1) adopt ecosystem-based management; 2) obtain, use, and share the best science and data; (3) promote efficiency and collaboration; and 4) strengthen regional efforts.

Hawai‘i Sub-Regional Ocean Partnership (Hawai‘i Sub-ROP)

The Office of Planning received funding from NOAA to support the existing ORMP partnerships. In November 2012, the Office of Planning hired a coordinator to formalize the Hawai‘i Sub-ROP. The Hawai‘i Sub-ROP is intended to support the implementation of the ORMP in the State of Hawai‘i and organize state resources behind shared management objectives. The Office of Planning anticipates that the formalized partnership will include many, if not all, of the ORMP partners. The ORMP partners met in January 2013 in a joint Policy and Working Group to discuss the progress of the updated *ORMP* and development of the Hawai‘i Sub-ROP.

The Hawai‘i Sub-ROP encompasses the Main Hawaiian Islands as well as the Northwestern Hawaiian Islands, a span of 1,523 miles. This area includes the 12 nautical mile Territorial Sea and the 200 nautical mile Exclusive Economic Zone (EEZ).

The ocean area covered by the Hawai‘i Sub-ROP includes waters under the jurisdiction of State and Federal agencies. The State of Hawai‘i waters are defined as any shores or water between the three nautical mile limit and the mean high tide mark on the shores of the islands of the State of Hawai‘i, and enforcement in this area is the responsibility of the DLNR-DOCARE. Federal waters under the jurisdiction of the United States are patrolled by the USCG up to the U.S. EEZ, which is any water within 200 nautical miles of shore.

The Hawai‘i Sub-ROP is meant to ensure meaningful engagement and coordination of partners and the public through natural and cultural resource management processes in Hawai‘i, with the goals and objectives of the *ORMP* forming the basis. It will also ensure consistency with federal objectives.

While many engaged stakeholders and informal partnerships have formed as a result of implementing the *ORMP*, a major objective of the Hawai‘i Sub-ROP is to formalize these partnerships. ORMP stakeholders who manage and protect Hawaii’s coastal and ocean resources are members of the ORMP Policy and Working Groups. Additional stakeholder groups such as coastal communities, recreational users, Native Hawaiian cultural practitioners, tourists and commercial interests will also have opportunities to participate in the Sub-Regional Ocean Partnership for Hawai‘i.

Coastal and Marine Spatial Planning

Coastal and marine spatial planning (CMSP) is one of the National Priority Objectives. CMSP is defined as “a comprehensive adaptive, integrated, ecosystem-based, and transparent planning process, based on sound science, for analyzing current and anticipated uses of the ocean and coastal…areas.” CMSP for the Pacific Islands Region is expected to help inform policies and guide management decisions from the various agencies involved in the coastal and marine environment, including but not limited to the Office of Planning, DLNR, and the U.S. Department of Interior, U.S. Department of Defense, and NOAA (for purposes of the *ORMP*, Territorial agencies were excluded from this list). For example, CMSP can help guide permitting for offshore renewable energy and offshore aquaculture, as well as identify which areas should or should not be closed to certain uses such as fishing, shipping, or recreation. CMSP provides an avenue by which agencies can coordinate to help mitigate conflict in the coastal and ocean areas. CMSP provides “a public policy process for society to better determine how the ocean and coasts…are sustainably used and protected – now and in future generations” (*Final Recommendations of the Interagency Ocean Policy Task Force*).

In Hawai‘i, CMSP will be an important part of collaborative management. The CMS plan that will be developed by the Regional Planning Body will be built on the extensive and widely used GIS, as well as best scientific data available (some of which will not be spatially-based in a GIS format). Best scientific data will include current oceanographic conditions, habitat data, human use data, and jurisdictional

boundaries, as well as predicted future conditions due to sea level rise, ocean acidification, and other climate variables. The Office of Planning houses the metadata for GIS for the State of Hawai‘i, and adding the metadata for the state’s coastlines and up to 3 miles out into the ocean is a natural expansion of its GIS capabilities. Other GIS mapping platforms also exist, such as PacIOOS Voyager, which also includes data to 200 nautical miles and current ocean observations. An integral part of CMSP will be a robust online information management system that allows easy access to and transparency of data and information necessary for planning, and mechanisms for frequent stakeholder and public input.

CMSP is a useful public policy tool that can be used to coordinate across multiple sectors and jurisdictions. Examples might include enhancing public beach access; improving ocean user compatibility and reducing user conflicts; reducing environmental impacts to the ocean; supporting sustainable, safe, secure, efficient and productive uses of the ocean; and enhancing collaboration. An example of CMSP is the Rhode Island Special Area Management Plan (SAMP) that helps agencies coordinate actions in their ocean and coastal zones by providing biophysical information as well as human use information, and detailing agencies involved in the multiple activities. The impetus for designing the Rhode Island SAMP was offshore renewable energy development. CMSP enabled fishermen to define important areas for their fishing, utility companies to detail where cables were laid, and the U.S. Department of Defense to delineate their shipping lanes. Now renewable energy companies have an idea about where renewable energy can be sited without creating user conflict.

Current Framework for Traditional Resource Management

Natural resources were managed traditionally in Hawai‘i using kuleana (responsibility) principles, assigned at the ahupua‘a and moku levels. An ahupua‘a is a unit of land, which contains a mostly self-sufficient amount of natural resources necessary for all of its tenants to survive and thrive. Native Hawaiians marked these land divisions, which normally follow existing contours of land and begin in the mountains, mauka, and end in the ocean, makai. Several ahupua‘a adjoining one another were delineated as a moku. Like the ahupua‘a, the moku varied in size.

The kapu system governed codes of conduct, social rules, and resource management, making certain actions kapu or forbidden. Hawaiian fishing was regulated through this kapu system in order to maintain its long-term viability. Certain fish were kapu during times of spawning or low fish counts. Designated fishing areas were also kapu during certain times when overfishing could damage the eco-system. A konohiki, or manager, would be the enforcer of the kapu system.

‘Aha Moku Resource Management

Modern day application of ahupua‘a management is no longer strictly practiced, although there are attempts at restoring this practice in several locations. Conversations about restoring this practice began in earnest with the WPRFMC puwalu series, which was initiated statewide in August 2006. These workshops focused on engaging the Native Hawaiian community in a dialogue to inform the WPRFMC Fisheries Eco-System Management Plans for Hawai‘i.

Ahupua‘a management was practiced by ‘Aha Councils**,** which were composed of a diverse group of practitioners and acknowledged experts in agriculture, fishing, water resources, and cultural skills who lived within each ahupua‘a and served together as the governing board.

Act 288, Session Laws of Hawai‘i (SLH) 2012, sets forth an ‘Aha Moku Advisory Committee within the Department of Land and Natural Resources. The ‘Aha Moku Advisory Committee will consist of eight members appointed by the governor and confirmed by the State Senate from a list of nominations submitted by the ‘Aha Moku Councils on each of the eight Main Hawaiian Islands. Ni‘ihau, Kaua‘i, O‘ahu, Moloka‘i, Lāna‘i, Kaho‘olawe, Maui, and Hawai‘i Island are each represented by one committee member.

Act 288 states that the ‘Aha Moku Advisory Committee may provide advice to the chairperson of the Board of Land and Natural Resources on issues related to land and natural resources management such as:

- Integration of indigenous resource management practices with western practices in each moku;
- Identification of a comprehensive set of indigenous practices for natural resource management;
- Foster understanding of native Hawaiian resource knowledge;
- Sustain the state’s marine, land, cultural, agricultural, and natural resources;
- Provide community education and foster cultural awareness on benefits of the ‘Aha Moku system;

Key Hawaiian Terms

Sources: (1) HRS Section 226-2
(2) *Pukui/Elbert Dictionary*, 2003, University of Hawai‘i Press
(3) Act 288, SLH 2012
(4) HRS Section 5-7.5

‘Aha Moku Council—Diverse group of practitioners from a moku serving as an advisory board. (4)

Ahupua‘a—in Hawai‘i, a subdivision of the land. Normally, it extends like a slice of the island from the mountains to the ocean so that resources from both the uplands and the sea are available to the inhabitants. Ahupua‘a boundaries often divide along natural features such as mountain lines or streams. Ahupua‘a management is Hawaiian culture embracing both resource protection and behavioral management, which ensures respect for the air, land, water, and other scarce natural resources that make life sustainable from the mountains to the sea. Adapted from (1)

Kai—sea, sea water; area near the sea, seaside, lowlands; tide, current in the sea. (2)

Kanaka Maoli—means Native Hawaiians. The indigenous people of the Hawaiian Islands or their descendants, which may be pure or part Native Hawaiian. (1)

Kapu—taboo, prohibited, forbidden, sacred, holy, consecrated; no trespassing, keep out. (2)

Keiki—child, offspring, descendant, progeny, youngster. (2)

Ko‘a—fishing grounds, usually identified by lining up with marks on shore. (2)

Konohiki—headman of an ahupua‘a land division under the chief, land or fishing rights under control of the konohiki. (2)

Kumu wai—source of a stream, spring, could also be source of wealth. (2)

Lo‘i—irrigated terrace, especially for taro. (2)

Kuleana—A right or privilege, which entails responsibility. May also mean title, business, property, jurisdiction, authority, liability, interest, claim, ownership, tenure, affair, or province. (2)

Lokahi—meaning unity, to be expressed in harmony. (2)

Makai—towards the sea; in the direction of the sea; seaward; of the lowland. (2)

Mālama —to take care of, tend, care for, preserve, protect, maintain. (2)

Mauka— towards the mountain; inland; upland; shoreward (if at sea); shore, uplands. (2)

Moku—district, island, islet, section, fragment. (2) (3)

‘Ohana Fishing—fishing for consumption by family; ‘ohana is defined as family. (2)

Pa‘akai—salt harvested from the ocean. (2)

Pono—proper, righteous, upright, just, doing the right thing. (2)

Wai—fresh water. (2)

- Foster protection and conservation of the state's natural resources; and
- Develop an administrative structure to oversee the ʻAha Moku system.

Act 288 recognizes 43 moku around the state. Prior to the formation of the ʻAha Moku Advisory Committee within DLNR, the ʻAha Kiole Advisory Committee held several statewide meetings and submitted reports to the State Legislature on their findings on best practices and structure for the management of natural and cultural resources in Hawaiʻi. The ʻAha Kiole had one representative from each of the eight Main Hawaiian Islands, but they are not necessarily the same eight people to be appointed by the Governor to the newly formed ʻAha Moku Advisory Committee in DLNR.

During the Public Listening Sessions for this ORMP Update, community members gave input on what modern day ahupuaʻa management means to them. An ahupuaʻa encompasses a "slice" of land from the mountains to the sea, and the Native Hawaiian view is that the entire land division is integrated. People spoke of kumuwai, which means both the source of wealth as well as the source of a stream, and in this instance the source comes from the rain above to the tip of the mountain, traveling through the ahupuaʻa as a stream to the ocean. There is a reverence and acknowledgement that all is connected and that it is a higher power's will that brings all water from its starting point in the heavens above to the ocean that surrounds the islands. Managing an ahupuaʻa, while similar to the term conservation, incorporates sustainability principles. The loʻi that feeds poi to the people of an ahupuaʻa also functions as a place where non-point source sedimentation occurs, slowing down the flow of water so that it can recharge the water table below the soil.

Community members expressed a need to feed their community, especially the kupuna (elders) and keiki (children) who were unable to catch or grow food for themselves. They saw traditional ahupuaʻa land management as a way to ensure food for now and sustain it for the future. A community working together can plant and maintain loʻi, reconstruct their shoreline Native Hawaiian fishponds, gather their own paʻakai (salt), and keep their stream inflows to ensure a recharging of water in the entire water cycle. Many felt that they could do this without waiting for government assistance and without a statewide plan to tell them how to manage their own land. Others were organized for their entire island's natural resources, such as on Molokaʻi, and wanted the ʻAha Moku system to be mandatory.

Framework for Marine Managed Areas

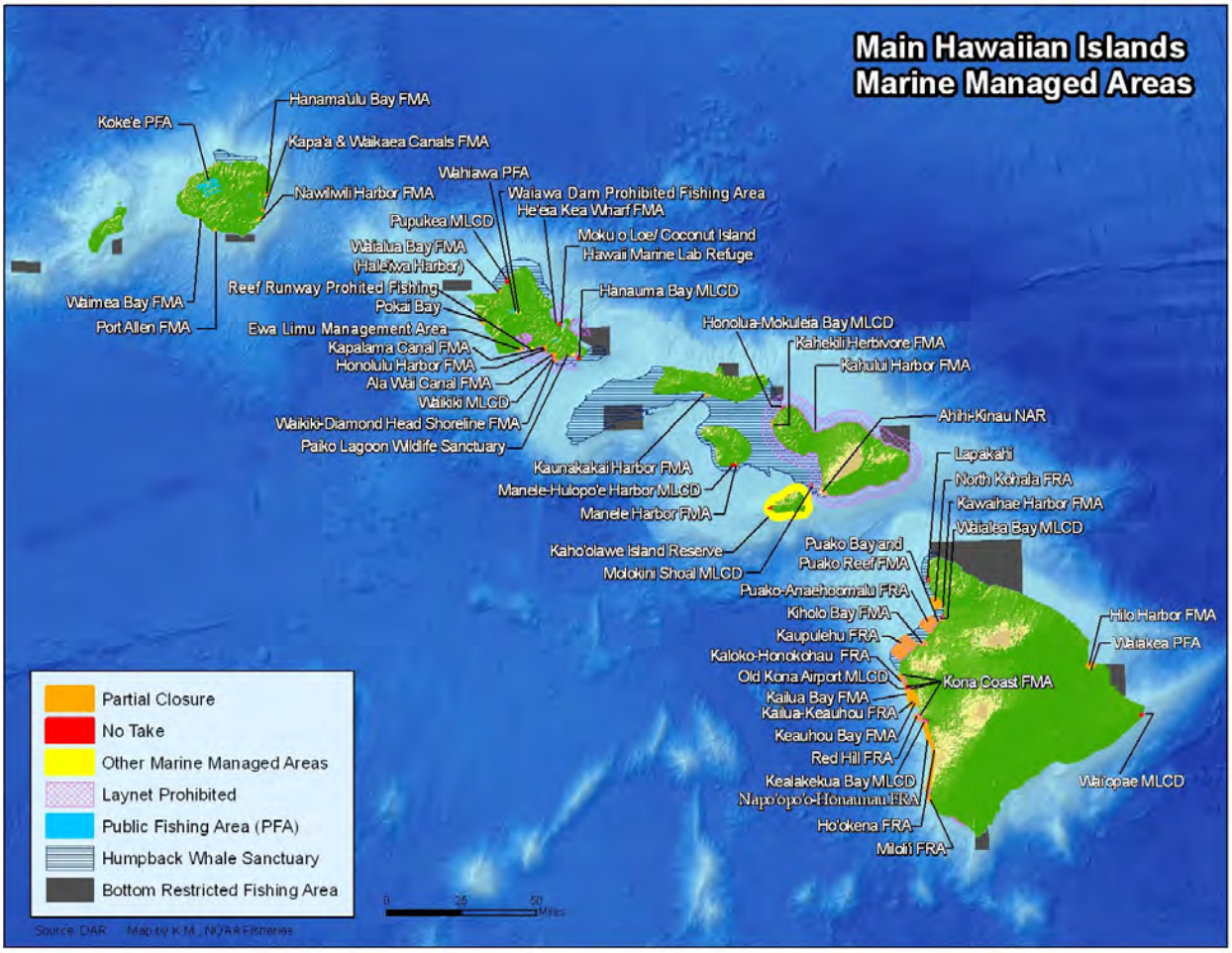
Since Statehood in 1959, the Hawaiʻi State government has assumed most of the functions once performed by the konohiki. Place-Based Management refers to designating appropriate uses for a particular geographic area to reduce user conflicts and protect the area from some or all preventable harm. Place-based management of ocean areas can take many forms. Marine Managed Areas are one form of place-based management. There are also other forms of this type of resource management. This will take different forms on each island, and even in each community.

There are seven types of Marine Managed Areas (MMAs). These are the responsibility of the State Department of Land and Natural Resources alone or in partnership.

1) Marine Life Conservation Districts
2) Fishery Management Areas
3) Bottomfish Restricted Fishing Areas
4) Wildlife Sanctuaries/Research Refuges
5) Natural Area Reserves
6) Hawaiian Islands Humpback Whale National Marine Sanctuary (co-managed with NOAA)
7) Papahānaumokuākea Marine National Monument (co-managed with NOAA, U.S. Fish and Wildlife Service (USFWS), and OHA)

A map of Marine Managed Areas is shown below as Figure 4-3.

Figure 4-3: Marine Managed Areas in the State of Hawai'i



Source: DLNR-DAR, Map by K.M., NOAA Fisheries

Marine Life Conservation Districts

Marine Life Conservation Districts (MLCD) are designed to conserve and replenish marine resources, with limited fishing and other consumptive uses. This gives a protected area for fish and other aquatic life to grow and reproduce. There are 11 MLCD throughout the State as listed in the text box at right. The first MLCD designated in the State was Hanauma Bay in east O'ahu.

MLCD in Hawai'i

O'ahu
Hanauma Bay
Pupukea
Waikīkī

Hawai'i Island
Kealakekua Bay
Lapakahi
Old Kona Airport
Waialea Bay
Waiopae Tidepools

Maui County
Honolua-Mokule'ia Bay
Manele Hulopo'e
Molokini Shoal

Source: DLNR-DAR

Fishery Management Areas

There are 21 Fishery Management Areas (FMAs) on the islands of Kauaʻi, Oʻahu, Molokaʻi, Lānaʻi, Maui, and Hawaiʻi and an additional nine FMAs in west Hawaiʻi. Each FMA has different permitted and prohibited activities with different "takes" and different fishing methodologies.

In June 2013, the Board of Land and Natural Resources approved Hawaii Administrative Rules (HAR) for the West Hawaiʻi Regional Fisheries Management Area (WHRFMA). Ten years of community discussions and several public hearings resulted in the implementation of these new rules. DLNR-DAR has posted the latest HAR on their website, which includes a spearfishing ban and a 40 species "white list."

Bottomfish Restricted Fishing Areas

Bottomfish Restricted Fishing Areas are defined by latitude and longitudes in twelve places throughout the state. There are seven fish covered, otherwise referred to as the "Deep 7," and these include onaga, ehu, kalekale, ʻōpakapaka, ukikiki, hapuʻupuʻu, and lehi. There are regulations for fishing, gear restrictions, commercial fisher reporting, minimum size, and non-commercial bag limits. The commercial fisheries for the Deep 7 open and close with a WPRFMC established Annual Catch Limit, based on a fishing year from September to August of the following year. This management regime is a coordinated state and federal effort, where the state conducts the commercial trip reporting and the National Marine Fisheries Service (NMFS) conducts the non-commercial trip reporting.

Wildlife Sanctuaries/Research Refuges

The Coconut Island Hawaiʻi Marine Laboratory Refuge in Kāneʻohe Bay and the Paiko Lagoon Wildlife Sanctuary in east Honolulu are both off the island of Oʻahu. UH uses the Hawaiʻi Marine laboratory Refuge for scientific studies, and it is illegal for anyone else to take any aquatic life from within the boundaries of the refuge. The Paiko Lagoon Wildlife Sanctuary does not allow taking of any aquatic life.

Natural Area Reserves for Oceans

The Kahoʻolawe Island Reserve is managed by the Kahoʻolawe Island Reserve Commission (KIRC), which was placed within DLNR for administrative purposes. This includes the island of Kahoʻolawe and the marine waters two miles from its shore. The KIRC is responsible for the restoration of Kahoʻolawe, which was transferred to the State of Hawaiʻi by the U.S. Navy after its use as a bombing range. There are no residents on Kahoʻolawe, and anyone visiting the island must be cleared by the KIRC.

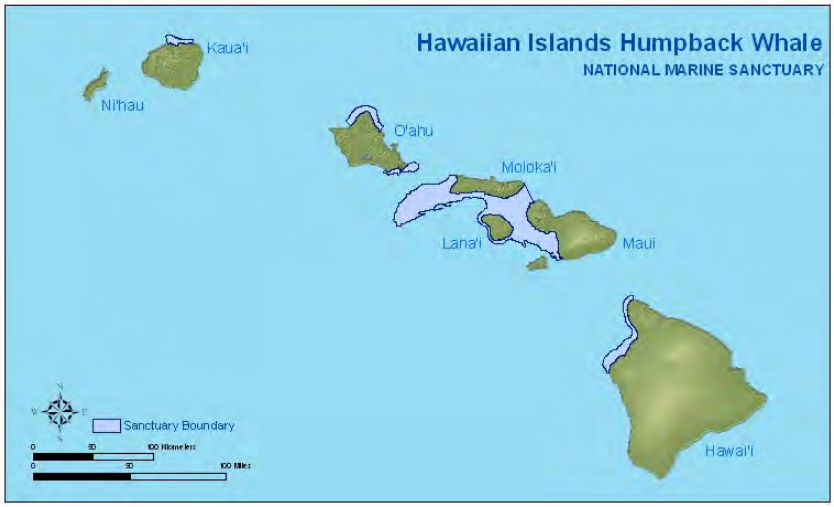
The ʻĀhihi-Kīnaʻu Natural Area Reserve (NAR) on the south shore of Maui is managed by DLNR Division of Forestry and Wildlife Natural Area Reserve System and was the first reserve in the State Natural Area Reserve System. This NAR is part of Makai Watch, which is a Community-Based Resource Management project. The Hawaiʻi Wildlife Foundation partnered with DLNR through the Makai Watch program to restore and sustain this resource. It includes a marine protected area, which is home to a rich coral reef ecosystem and many protected species. Portions of the ʻĀhihi-Kīnaʻu NAR are closed until July 31, 2014, and access to the northern and most visited portions is allowed only during the daytime.

Hawaiian Islands Humpback Whale National Marine Sanctuary

The Hawaiian Islands Humpback Whale National Marine Sanctuary (National Marine Sanctuary) is jointly managed in a cooperative partnership between NOAA and DLNR. The National Marine Sanctuary surrounds the waters around the island of Lānaʻi, parts of Molokaʻi, and Maui as one contiguous area. Non-contiguous areas include waters off the north shore of Kauaʻi, the southeast and north shores of Oʻahu, and the west shore of Hawaiʻi Island. A map showing these areas is shown in

Figure 4-4. Through education, research, and resource protection, the National Marine Sanctuary strives to protect humpback whales, as shown in Figure 4-5, and their habitat.

Figure 4-4: Hawaiian Islands Humpback Whale National Marine Sanctuary Map



Source: NOAA

Figure 4-5: Humpback Whales in Hawai‘i

Source: NOAA, National Marine Fisheries Service

Papahānaumokuākea Marine National Monument & World Heritage Site

On June 15, 2006, the Northwestern Hawaiian Islands National Marine Monument was established by Presidential Proclamation 8031 under the authority of the U.S. Antiquities Act (16 U.S.C. 431-433). In 2007, the Monument was re-named with its Hawaiian name Papahānaumokuākea, and the following year it was designated as a Particularly Sensitive Sea Area by the Marine Environmental Protection Committee of the International Maritime Organization. In 2010, Papahānaumokuākea was inscribed as a mixed (natural and cultural) World Heritage Site by the delegates to the 34th United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention in Brasilia, Brazil.

The Secretary of Commerce, through NOAA, has primary responsibility regarding the management of the marine areas of the Monument, in consultation with the Secretary of the Interior. The Secretary of the Interior, through the United States Fish and Wildlife Service (USFWS), has sole responsibility for the

areas of the Monument that overlay the Midway Atoll National Wildlife Refuge, the Battle of Midway National Memorial, and the Hawaiian Islands National Wildlife Refuge, in consultation with the Secretary of Commerce. Nothing in the Proclamation diminishes or enlarges the jurisdiction of the State of Hawai‘i. The State of Hawai‘i has primary responsibility for managing the State waters of the Monument. The State of Hawai'i through DLNR has primary responsibility for the Kure Atoll portion of the Hawai‘i State Seabird Sanctuary. The State of Hawai‘i holds the State submerged and ceded lands of the Northwestern Hawaiian Islands in trust. DLNR will collaborate with OHA in the perpetuation of Hawaiian cultural resources in the Monument, including the customary and traditional rights and practices of Native Hawaiians exercised for subsistence, cultural, and religious purposes under the Constitution of the State of Hawai‘i, Article XII, Section 7.

The 2006 Memorandum of Agreement (MOA 2006) establishing the Papahānaumokuākea Marine National Monument (PMNM) was signed by three agency Co-Trustees agreeing to share responsibility for managing PMNM resources. These three agencies are the State of Hawai‘i, USFWS, and NOAA. Their senior representatives provide policy guidance to agency staff assigned to carry out Monument management activities. They also review and amend their joint Memorandum of Agreement (MOA) at least annually. The MOA 2006 establishes the Senior Executive Board (SEB) to provide policy guidance to their respective agency staff assigned to carry out Monument management activities. SEB members are senior level designees appointed by the Co-Trustees. The DLNR Chairperson represents the State of Hawai‘i on the SEB.

The Monument Management Board was established by MOA 2006 to coordinate management of the Monument at the field level. The seven members of the MMB are representatives from:

- Division of Aquatic Resources (DAR), DLNR
- Division of Forestry & Wildlife (DOFAW), DLNR
- National Wildlife Refuge System – Honolulu, USFWS
- Pacific Islands Fish & Wildlife Office – Honolulu, USFWS
- National Marine Sanctuary Program (ONMS) – Honolulu, NOAA
- National Marine Fisheries Service (NMFS) – Honolulu, NOAA
- Office of Hawaiian Affairs (OHA), State of Hawai‘i

Major MMB responsibilities include management planning; regular review of implementation; adjustments to management framework; shared enforcement; coordinated research and monitoring; information management; identification and protocols for sensitive, significant sites; manage public use; facilitate multi-sector partnerships; collaborative educational projects; resource sharing; monitoring Monument activities; coordinated response to threats; joint permitting; and US Coast Guard coordination.

The Monument agencies together produced a *Papahānaumokuākea Marine National Monument Management Plan* (2008). This plan covers a 15 year horizon while meeting the planning requirements for USFWS, NOAA & State of Hawai‘i. The plan identifies six priority needs, which are addressed with 22 Action Plans for this geographic region.

There are several established conservation areas that are included within the PMNM, and each of these areas has a different agency managing it as shown in Table 4-1 below.

Table 4-1: PMNM Established Conservation Areas

State of Hawai'i	NOAA	USFWS
Kure State Wildlife Sanctuary	NWHI Coral Reef Ecosystem Reserve	Hawaiian Islands National Wildlife Refuge
NWHI State Marine Refuge		Midway Atoll National Wildlife Refuge/ Battle of Midway National Memorial

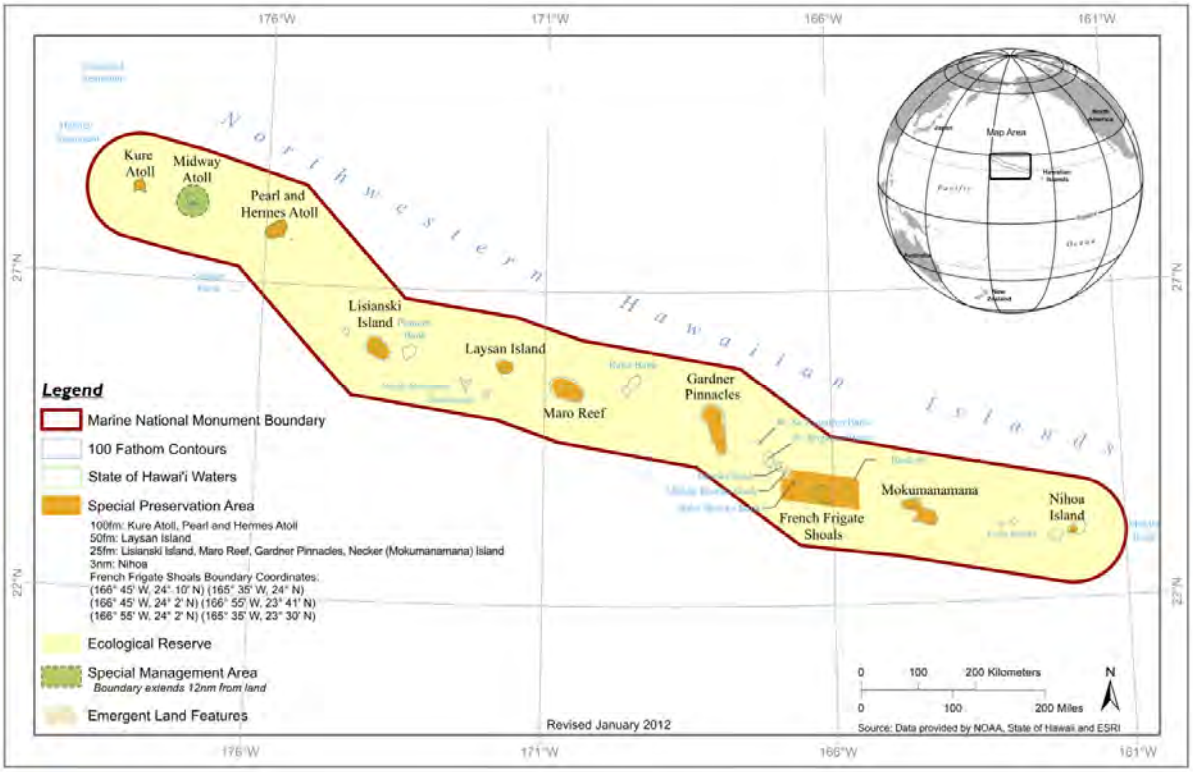
Numerous archaeological artifacts can be found on the islands of Nihoa and Mokumanamana, both of which are on the National and State Historical Register for Historic Places. Figure 4-6 at right is a photo from the Monument website, showing upright rock formations on the island of Mokumanamana, also known as Necker Island.

Figure 4-6: Mokumanamana within Papahānaumokuākea

Source: NOAA

A map of PMNM is shown in Figure 4-7. The map shows the Marine National Monument Boundary as well as State of Hawai'i Waters, Special Preservation Areas, Ecological Reserves, and Special Management Areas.

Figure 4-7: Papahānaumokuākea Marine National Monument



Source: NOAA

Western Pacific Regional Fishery Management Council

The Western Pacific Regional Fishery Management Council (WPRFMC) is one of eight regional councils established under the Magnuson-Stevens Fishery Conservation and Management Act in 1976. The WPRFMC's jurisdiction includes the U.S. EEZ waters (3-200 nautical miles) around the State of Hawai'i. The Council is comprised of 13 voting members, including the Chair of the Board of Land and Natural Resources.

Since the 1980s, the WPRFMC has managed fisheries throughout the Western Pacific Region, which includes Hawai'i, through separate species-based fishery management plans. The WPRFMC is moving towards an eco-system based approach to fisheries management, restructuring its framework from species-based to place-based fishery eco-system plans.

The WPRFMC manages fisheries coral reef, bottomfish, crustaceans, and precious corals fisheries in Hawai'i through its *Fishery Ecosystem Plan for the Hawaii Archipelago*. This fishery management plan is consistent with the Magnuson-Stevens Fishery Conservation and Management Act. Fisheries targeting pelagic species such as ahi, mahimahi, ono, and marlin are managed by the WPRFMC through its *Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region*. Coordination with the State of Hawai'i on the management of these fisheries is a key component of an ecosystem-based management approach. Furthermore, as fishery regulations are developed under the Magnuson-Stevens Fishery Conservation Management Act, they undergo a determination review by the CZM program for consistency with the CZM Act along with potential effects on the coastal resources of the state.

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Appendix A: Background and Previous Ocean Resource Management Plans

Background and Previous Ocean Resource Management Plans

The State of Hawai‘i has been formally addressing ocean management for nearly three decades. The first *Ocean Management Plan for Hawai‘i* was completed in April 1985, prepared under a grant from NOAA’s Office of Ocean and Coastal Resource Management. That version of the plan set forth policies to guide the direction and coordination of state agencies responsible for the conservation of marine resources. Topics of concern at the time included nearshore recreation, marine conservation and preservation, ocean waste disposal and accidental spills, beach erosion, fisheries, harbor development, coastal energy facilities, mariculture, ocean thermal energy conversion, and manganese nodules. Most of these sector topics remain important today.

In the period from 1989-1991, Hawai‘i embarked on its first statewide planning effort ever, which became known as the *Hawaii State Plan.* It was adopted in June 1989 and codified as HRS Chapter 226. Part I of the State Plan listed overall themes and goals; Part II established a statewide planning system to coordinate implementation; and Part III established priority guidelines in five major areas: economic development, population growth and land resource management, affordable housing, crime and criminal justice, and quality education. The twelve State Functional Plans fell under Part II. While ocean resource management was not one of the twelve Functional Plans, elements concerning ocean protection and conservation can be found in the Functional Plans for Agriculture, Conservation Land, Recreation, and Tourism, which were all adopted in 1991.

At the same time as Functional Plans were being prepared, the State prepared the *199l Hawai‘i Ocean Resources Management Plan* as required under HRS Chapter 228. The Hawai‘i Ocean and Marine Resources Council, which was a multi-agency cabinet level council, evaluated published materials and expertise from government, industry, and research to review sector-based management issues in: ocean research and education, ocean recreation, harbors, fisheries, marine ecosystem protection, beaches and coastal erosion, waste management, aquaculture, energy, and marine minerals. The *1991 ORMP* called for a central authority for planning and policy making, inter-agency coordination, communications facilitation, and conflict resolution. The central office was never established; instead, the coordination function has been carried out by the Office of Planning and the Coastal Zone Management Program (OP-CZM).

After much discussion on governance and the role of an advisory group, the *1991 ORMP* was adopted by the State Legislature in 1994. The following year, the State Legislature named OP-CZM as the lead for implementing the *ORMP* and established the Marine and Coastal Zone Management Advisory Group (MACZMAG). The group’s membership of twenty was comprised of representatives from the four County Planning Departments, eight from the Governor’s cabinet, the Dean of UH SOEST, a member of the Kaho‘olawe Reserve Commission, and six non-governmental members. MACZMAG would serve as a forum to facilitate implementation and to discuss coastal zone and ocean issues.

In 2001, the State Legislature passed Act 169, clarifying OP-CZM’s responsibility to maintain a public advisory body, now named the Marine & Coastal Zone Advocacy Council (MACZAC),

and providing for its membership. The twelve MACZAC members must represent statewide geographic distribution in the areas of business, environment, practitioners of Native Hawaiian culture, terrestrial and marine commerce, recreation, research, and tourism.

A review of the *1991 ORMP* was conducted in 1998. The review examined the sector-specific activities and recommended actions for improvement. The review also identified management issues that seemed to hamper implementation:

- lack of strategic planning;
- inadequate enforcement;
- lack of recognition of the ecological and economic importance of ocean and coastal issues;
- inadequate access to information;
- outdated management regimes for ocean and coastal management;
- inadequate management capabilities;
- lack of administrative efficiency; and
- inadequate administrative flexibility for resource managers.

In the 1998 review, the most common criticism of the *1991 ORMP* was that it no longer reflected current political and economic realities. Declining government resources, changes in government priorities and programs, and declining support for resource management had undermined specific actions in the plan. Because the context for management had changed so dramatically, some argued, what was needed was a more strategic approach to ocean resource management, with a focus on a few key issues and priorities.

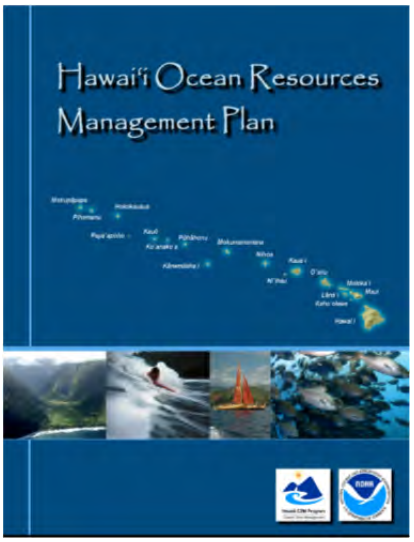
The *2006 Ocean Resources Management Plan* charted a new course of action. The pinnacle of this new approach was the Three Guiding Perspectives. The Three Guiding Perspectives are a way to integrate ocean resource management and to provide guidance for all of the actions that the ORMP agencies and partners do to manage Hawaii's ocean resources. The ORMP Three Perspectives are neither priorities nor goals, but provide an overall statement of broad outcomes.

***ORMP* New Course of Action**

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.

Perspective 2: Preserving our Ocean Heritage
A vibrant and healthy ocean environment is the foundation for the quality of life valued in Hawaii 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 the sea.



The foundation for an integrated approach to natural resource management looked to communities to help assess the health and vulnerability of their surrounding environment and to formulate best management practices for sustainable, long-term land and natural resource management alternatives. The integrated concepts bore similarities to the traditional Hawaiian practice of ahupua‘a management.

The *2006 ORMP* laid out a phased implementation approach, describing expected outcomes for each of the phases defined through the year 2030. Because change takes time, four phases of implementation were recognized in the *2006 ORMP*. The first phase, termed Demonstration, looks at how the guiding perspectives can be adopted in select communities in the State. The *2006 ORMP* is the plan for the Demonstration Phase.

The *2013 ORMP* is the plan to guide state agency activities during the Adaptation Phase. This *2013 ORMP* identifies eleven Management Priorities and corresponding metrics to measure performance.

Appendix B: Accomplishments during the First Phase: Demonstration

What Was Accomplished In the First Phase – The Demonstration Phase

The Demonstration Phase went from 2006-2012. Much was learned during the initial phase of the ORMP. This Appendix describes management goals and strategic actions completed. It is organized under the ORMP Three Perspectives to provide a policy framework for the actions taken. Working within these three perspectives required collaboration among jurisdictional authorities as well as greater involvement by communities. Collaboration and cooperation were a main theme for the Demonstration Phase. Selected accomplishments from each perspective are discussed in following sections.

Accomplishments under Perspective 1: Connecting Land and Sea

Connecting the land and the sea relates not only to land uses adjacent to the ocean but also to reducing land-based sources of pollution throughout the entire watershed, reducing coastal erosion, and preserving beaches.

2006 ORMP Management Goals Addressed

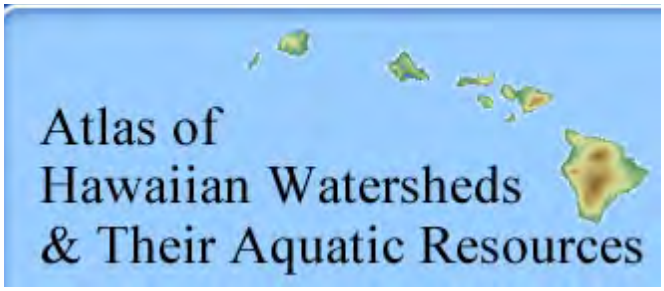
Management Goal 1.1 Improve coastal water quality by reducing land-based sources of pollution and restoring natural habitats.
Management Goal 2.2: Improve the health of coastal and ocean resources for sustainable traditional, subsistence, recreational, and commercial uses.

Strategic Actions that addressed this goal included: identification of priority watersheds, creation of a watershed guidance document, hosting a Watershed Summit, identification of channelized streams, improvement of water quality monitoring and improved interagency coordination.

Watershed Atlas

The *Atlas of Hawaiian Watersheds & Their Aquatic Resources* was prepared in partnership by the DLNR Division of Aquatic Resources (DLNR-DAR) and Bishop Museum.

Using a methodology similar to the *Hawai'i Watershed Management Plan*, this resource defines over 500 watersheds in the State of Hawai'i. Data for 430 of these watersheds is included in the *Atlas*. The 4,500+ page *Atlas* is divided by the islands that have been mapped: Kaua'i, O'ahu, Moloka'i, Maui and Hawai'i. The *Atlas* and is linked to the DAR Aquatic Surveys Database so that it can be updated dynamically as new information becomes available.



The full *Atlas* may be viewed online. This reference lists land management status, areas of watersheds that are developed, percentages of various flora planted in that watershed, stream ratings, and specific scientific references for each unique area.

2009 Watershed Summit

The State of Hawai‘i is required under the Federal Coastal Zone Management Act of 1990 to develop and submit to the EPA and NOAA a Coastal Nonpoint Pollution Control Program (CNPCP). DOH and OP-CZM are responsible for developing the state's CNPCP.

Hawai‘i submitted its first CNPCP for Federal approval in 1996, covering 70 management measures and administrative elements. In 1998, the State received conditional approval of its program, subject to conditions on 46 of the management measures and administrative elements that must be met for Hawai‘i to receive final approval of its CNPCP.

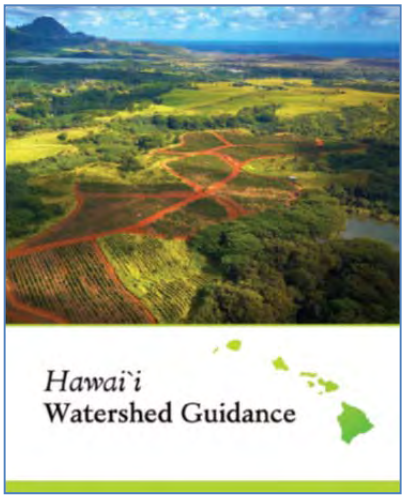
The 70 Management Measures for the CNPCP are defined for six main sources of pollutants:

- Agriculture
- Forestry
- Urban Areas
- Marinas and Recreational Boating
- Hydromodifications (for example, impacts as a result of stream channelization)
- Wetlands, Riparian Areas, and vegetated Treatment Systems

As of 2009, there were 14 management measures or administrative elements that have not received approval from EPA and NOAA. These include management measures for:

- Roads (Urban)
- Highways (Urban)
- Bridges (Urban)
- Multiple other urban measures (Urban)
- Watershed Protection (Forestry)
- Hydromodifications
- Protection of wetlands and riparian areas

In June 2009, the Office of Planning hosted a Watershed Summit to discuss the State of Hawaii's CNPCP. The workshop took each of the management measures that needed to be addressed and discussed them. Following this summit came the *Hawai‘i Watershed Guidance* (August 2010). This guidance report is intended to help those who are involved in managing watersheds in the state and it is a streamlined version of EPA's *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (March 2008).



Since the 2009 Watershed Summit and publication of the *Hawai‘i Watershed Guidance*, OP and DOH have continued to work towards obtaining NOAA and EPA approval of the remaining 14 management measures. On March 27, 2012, NOAA and EPA approved management measures for Urban (Watershed Protection and Existing Development, Site Development); Hydromodifications; and Wetlands, Riparian Areas, and Vegetated Treatment Systems.

The remaining management measures that require approval are all in the Urban Management Area: (New Development, New and Operating Onsite Disposal Systems, and Roads, Highways and Bridges); and Monitoring and Tracking.

Many members of the ORMP Working Group participated in the Watershed Summit. The interagency and intergovernmental cooperation and collaborations were assisted by the partnerships and relationships that have been formed under the ORMP Working Group and Policy Group.

Accomplishments under Perspective 2: Preserving Our Ocean Heritage

The accomplishments under this perspective addressed priority actions at sea to improve the quality of the marine environment of Hawai‘i. This perspective acknowledges that preservation of the ocean is linked to our heritage.

2006 ORMP Management Goals Addressed

Management Goal 2.5 Encourage cutting edge and appropriate ocean science and technology with safeguards for ocean resource protection.

This Management Goal included Strategic Actions to expand ocean science and technology as well as to conduct public education and outreach campaigns, which includes climate change.

2011 Climate Change Workshop

Climate change adaptation grew in attention and relevance during the Demonstration Phase. When the *2006 ORMP* was written, climate change science was an emerging issue, just gaining international attention with scientists gathering and aggregating data.

Climate change is critically important to Hawaii's coastal and ocean resources due to the potential for rising sea levels, increased storm surge, erosion of the shoreline, increased temperature of oceans, and increased salinity of oceans. According to Chip Fletcher, Ph.D. at the University of Hawai‘i School of Ocean, Earth, and Science Technology (UH-SOEST), Hawaii's sea level is expected to rise approximately one foot by 2050 with an acceleration to three feet by 2100. Storm surges and their accompanying erosion are expected to increase up to 60% by the year 2100. And increase in salinity affects coral reefs, causing "coral bleaching."

In August 2011, the OP-CZM Program, in partnership with the USACE, held a two-day workshop titled, "Visioning Hawaii's Adaptation to Climate Change." The list of participants included many of the ORMP Policy Group and Working Group members as well as other partners. The workshop was facilitated and recorded by Jim Dator, PhD, of the University of Hawaii's Hawai‘i Research Center for Futures Studies and by Donna Ching, PhD, of the Department of Family and Consumer Sciences of the College of Tropical Agriculture and Human Resources.

The purpose of the workshop was to help identify which laws, plans, policies, and actions were needed to address potential impacts of climate change, including sea level rise. The workshop results are documented in a report, *Hawai‘i 2060: Visioning Hawaii's Adaptation to Climate Change.* As a follow up, a core group of participants volunteered to work with OP to draft climate change policy legislation.

2012 Climate Change Adaptation Law

The ORMP Climate Change Working Group briefed legislators on the climate change adaptation bill prior to the 2012 Legislative Session.

The climate change adaptation bill, Senate Bill 2745, passed the 2012 Legislature and was signed by Governor Neil Abercrombie to become Act 286.

This was a management priority success. The program identified an issue, formed a partnership with a federal agency and various stakeholders, held a workshop, developed an approach, and then was able to affect change to public policy by getting the State Legislature to adopt a bill.

Accomplishments under Perspective 3: Promoting Collaboration and Stewardship

The interagency and intergovernmental collaboration achieved in the first five years not only represented a new approach to ocean resources management in Hawai‘i, but it is a collaboration that has led to achievement of many of the management priorities and strategic actions and has helped to strengthen ongoing efforts to manage ocean resources.

2006 ORMP Management Goals Addressed
Management Goal 3.1 Apply integrated and place-based approaches to the management of natural and cultural resources.
Management Goal 3.2 Institutionalize integrated natural and cultural resources management.

Strategic Actions included the development of integrated planning processes and legislative proposals to improve the management of natural resources as well as monitoring ORMP implementation.

Formation of the ORMP Policy Group and ORMP Working Group for Agency Coordination

The OP-CZM Program formed the ORMP Policy Group and ORMP Working Group in 2007 just after completion of the *2006 ORMP*. The Policy Group consists of the directors of state and county resource management agencies, the University of Hawai‘i, federal partners, and the Marine and Coastal Zone Advocacy Council. The Working Group consists of managers and staff of the same offices that are tasked with coordinating their respective agency’s implementation efforts.

Coordination lessons learned during the Demonstration Phase were that the ORMP Policy and Working Groups are an integral part to implementation of the ORMP. The *2006 ORMP* had already been written at the time of the Working Group’s formation, however, the group still needed to go through the process of finding the group’s common goals and working styles in order to perform as a group.

The Policy Group met approximately twice a year to sanction staff time and resources for the Working Group. The Working Group met nearly every month. Agency status reports were given and special topical presentations were scheduled as needed. The Working Group typically had a professional facilitator. Several of its monthly meetings in 2012 were dedicated to input and feedback on the ORMP Update.

There was a substantial amount turnover of members in the Policy Group due to change in administrations. Therefore, an orientation package was developed to assist members in their duties and roles. The Orientation Packet included key reference materials:

- Background of the CZM Program;
- Summary of the National CZM Act of 1972;
- Summary of Hawaii's CZM law (HRS Chapter 205A);
- Summary of the *2006 ORMP*;
- Listing of Federal, State, University, County, and community partners;
- Coordination/communication process showing CZM Staff, Policy Group, and Working Group roles and responsibilities; and
- ORMP implementation projects underway.

2010 Joint ORMP Policy & Working Group Appreciative Inquiry Strategic Planning Session

Mission Statement of the Policy and Working Groups

"In support of a healthy and thriving ocean for today and future generations, we are committed to adopting integrated approaches to manage our ocean's resources by: connecting land and sea; preserving our ocean heritage; and promoting collaboration and stewardship."

July 2010

ORMP Policy and Working Group members both requested that the Policy Group meet more frequently and increase their engagement with the Working Group. As a result, the OP-CZM Program developed a two-day strategic planning session for the Policy Group and the Working Group.

The Joint ORMP Policy & Working Group Appreciative Inquiry Strategic Planning Meeting was held at the Waikiki Beach Marriott in July 2010. A written record was kept of discussions at the meeting. A group memory was taken; aspirations or visions for the future and strategic issues were listed for each breakout group.

Visions for the future included more collaboration, education, and sustainability. Changes or transformations to the process identified as necessary to achieve the vision included: education of participants, buy-in, and political will. Root causes of success included: communication, resources, and leadership. Core values included: malama (stewardship), leadership, and unity expressed with lokahi (harmony).

With a mission statement in place, the ORMP Groups brainstormed and prioritized their strengths, identified and prioritized opportunities, imagined a future to work toward, and developed action plans on how to achieve success. This exercise was called SOAR: Strengths, Opportunities, Aspirations, and Results.

- Strengths included: partnerships and collaboration, resources, framework/plan itself, people capacity.
- Opportunities included: ocean planning and governance (opportunity for ORMP Policy Group) and purposeful collaboration (opportunity for ORMP Working Group).
- Aspirations included: All members of ORMP work together efficiently, the ORMP has become a living document, and adequate funding exists to implement the plan.

- Results included: Action plans to achieve the vision, such as educating the next generation on the ocean through influencing change in standards-based curriculum and developing a Succession Strategy/Plan for the upcoming transition in membership within the ORMP Group.

ORMP Consolidated Work Plan

The ORMP Working Group developed a two-year 2008 *ORMP Consolidated Work Plan*, which contained 137 activities associated with ten management goals and 28 strategic actions.

The 2008 *ORMP Consolidated Work Plan* recognized that not all of the *2006 ORMP* management goals and strategic actions were being implemented in 2008. The 2008 *Work Plan* identified that 69 of the *ORMP* strategic actions, or 61%, were in some stage of implementation by agency Working Group members. The 2008 *ORMP Consolidated Work Plan* provided a summary listing of the management goals and strategic actions being implemented through 2009 by the following agencies: County Planning Departments (Hawai‘i, Kaua‘i, and Maui), Department of Agriculture (Aquaculture Development Program), Department of Health, Department of Land and Natural Resources, Department of Transportation (Harbors Division), Office of Planning, UH School of Ocean and Earth Science and Technology, and U.S. Coast Guard.

Since agencies could not be expected to implement all strategic actions all at once, Working Group members with responsibility to implement these actions went through the ORMP Strategic Action Matrix and identified which actions their respective agency were actively implementing or intending to implement between July 2007 to June 2009. They also identified which actions were deferred, and which should be dropped or modified. The intent was for the 2008 *ORMP Consolidated Work Plan* to be updated as needed.

Lessons learned from the activity of the 2008 *ORMP Consolidated Work Plan* were that it needed to be simplified, and the number of strategic actions reduced to a manageable and measurable number.

In 2012, the Working Group reviewed the 2008 *ORMP Consolidated Work Plan* as part of this ORMP Update. This review further found that while some of the activities were accomplished, many other activities were under the purview of agencies that were not involved in the Working Group or Policy Group, such as the Department of Education. The 2012 review also found that there needed to be a lead agency associated with each action, or there would not be any leadership or accountability to measure performance. Finally, the review again found that there were too many strategic actions and activities, and that the perspectives, management goals, strategic actions, and activities needed to be simplified.

2012 Status of Strategic Actions from *2006 ORMP* and *2008 ORMP Consolidated Work Plan*

The *2006 ORMP* contained 10 Management Goals and 28 Strategic Actions. In order to accomplish each of these goals, a list of 113 sub-actions was developed. Tables 1, 2, and 3 show each of the Strategies, Actions, Sub-Actions, and Agencies, which are organized by the ORMP Three Perspectives.

Progress was measured twice: in 2009 through the *ORMP Work Plan* as an interim review and again in 2012. The 2012 status of the *2006 ORMP* Strategic Actions is shown in the following tables, and it will cease to be updated beginning in 2013.

This list of Management Goals, Strategic Actions, and sub-actions is only a tool to look back on the ORMP Demonstration Phase.

With the adoption of this *2013 ORMP*, the Office of Planning and the ORMP Working Group are no longer using this list of Strategic Actions from the 2006 *ORMP* as a way to evaluate ORMP implementation.

Going forward, the ORMP's success will be measured by the Management Priorities discussed earlier in Chapter III of this 2013 *ORMP*.

PERSPECTIVE ONE: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
Strategy 1.1: Improve coastal water quality by reducing land-based sources of pollution and restoring natural habitats, and protecting beaches, shorelines, and coasts.		
Action 1: 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
Action 2: 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	Ongoing
• Characterize pollutant loads from surface runoff, point sources, and groundwater discharge	DOH	Ongoing
• Implement watershed implementation plans, total maximum daily load implementation plans, and local action strategies to address land-based pollution threats	DOH	Ongoing
• Implement best practices to reduce pollutant loads	Landowners	Ongoing
• Increase water quality monitoring in identified areas of concern	DOH	Ongoing
Action 3: 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 in 2006
• 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 in 2006
• Identify channelized streams in priority watersheds for restoration and revitalization of wetland and estuarine habitats, prioritize streams for restoration and initiate restoration planning and implementation	DLNR-CWRM, Counties	New in 2006

PERSPECTIVE ONE: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
Strategy 1.2: Improve conservation and management of beaches, dunes, and wetlands to protect communities from shoreline erosion and other coastal hazards		
Action 4: Develop and implement a comprehensive and integrated shoreline management plan to address coastal development and the reduction of coastal erosion and other chronic and episodic coastal hazards		
• Establish a consensus on policies, management strategies and remedial actions to address shoreline erosion, beach loss, and mitigation of other coastal hazards	DLNR, OP, SOEST	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
• Develop and implement policy and management strategies that account for projected sea level rise of 1 meter by 2050	Counties	NEW
• Establish adaptation strategies such as retreat zones, prohibiting shoreline armoring, and develop incentives to relocate structures inland	Counties	NEW
• Encourage permitting authorities to analyze coastal hazards, risks, and threats to beach protection 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, SOEST	Ongoing
• Conduct statewide beach and shoreline assessment to identify high risk/erosion prone areas based on risk of coastal erosion, hazards, vulnerability of coastal communities, threats to beach protection, and presence of coastal resources and recreational areas	SOEST, 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	Ongoing
• Prepare an integrated management plan to prioritize areas for active management	DLNR	New
• Conduct coastal hazard and resource assessment and risk analysis for any proposed coastal development	SOEST, 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

PERSPECTIVE ONE: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
• Develop an on-line statewide shoreline information management system on coastal hazards and risks, and beach protection in coastal areas	DLNR, SOEST	Ongoing
• Research, 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 in 2006
Strategy 1.3: Improve and ensure maintenance and appropriate use of environmental infrastructure		
Action 5: Reduce the number of individual wastewater systems and illegal stormwater discharges to the wastewater system while inspecting and maintaining sewer collections systems, especially in the coastal environment.		
• 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
• 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	Ongoing
• Conduct public education campaign explaining the impacts of illegal storm-water discharges to public sewers on coastal water quality	DOH	Ongoing
• Conduct neighborhood reconnaissance to remind and warn residents about impacts of illegal storm-water hookups	DOH	Ongoing
• Develop new rules establishing penalties for noncompliance	DOH	Ongoing
Action 6: Through integrated policies and plans, ensure fresh water quantity is maintained in aquifers and streams to assist with restoration of flows to wetlands, streams, estuaries, and near shore waters.		
• Establish inflow stream standards	DLNR-CWRM, County Water Agencies	New and Ongoing
Strategy 1.4: Resiliency and Adaptation to Climate Change and Ocean Acidification		

PERSPECTIVE TWO: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
Strategy 2.1: Improve coastal water quality by reducing marine sources of pollution		
Action 7: To preserve the economic drivers of agriculture and tourism, minimize the introduction and spread of marine alien and invasive species into and throughout archipelagic waters, promote sustainable ocean-based tourism, and improve enforcement capacity of all rules and laws relating to ocean resource protection.		
• 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, SOEST	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, PacIOOS	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 in 2006
• Establish a technical committee to redefine wastewater-discharge restricted zones for commercial vessels in archipelagic waters based on currents, depths, and weather conditions	USGS	New in 2006
• Enforce existing federal and State regulations on wastewater-discharge restricted zones in archipelagic waters with a monitoring and enforcement plan	USCG	Ongoing
Action 8: Provide appropriate waste management infrastructure to support commercial and recreational marine facilities		
• Improve filtration systems for stormwater runoff	Counties	New
• Provide incentives to reduce nutrient inputs and to convert cesspools to septic tanks	Counties	New
• 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 in 2006
• Increase user fees for infrastructure improvements and maintenance	DOT/DLNR	New in 2006
• Ensure the State's commercial harbor system meets existing and future needs for maritime commerce in an environmentally and economically sustainable manner	DOT	Ongoing

PERSPECTIVE TWO: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
Strategy 2.2: Improve the health of coastal and ocean resources for sustainable traditional, subsistence, recreational, and commercial uses		
Action 9: Strengthen and expand marine protected area management and conservation, develop ecosystem-based approaches for nearshore fisheries management, and establish and institutionalize approaches for restoration of ancient Hawaiian coastal fishponds and salt ponds.		
• 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 in 2006
• Develop place-based marine protected area plans for priority areas	DLNR	New in 2006
• 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 in 2006
• 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
• 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, SOEST, NGOs	Ongoing
• Develop and implement a cultural education curriculum constructed around the ancient Hawaiian fishponds and respect for traditional practices	SOEST, DOE, OHA, NGOs	Ongoing
• Establish and institutionalize approaches for restoring, operating, and preserving ancient Hawaiian coastal fishponds and salt ponds for the benefit of coastal communities	OHA, DLNR	Ongoing
• Conduct education and outreach campaigns on underlying rationale for existing rules and regulations related to ocean resource use	DLNR	Ongoing
• 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

PERSPECTIVE TWO: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
• Improve enforcement capabilities through the use of administrative and civil penalties	DLNR	New in 2006
• 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
• Develop a framework to manage and protect anchialine ponds; Incorporate information on location of anchialine ponds into parcel information and integrate protection measures into SMA permits	DLNR	New
• Amend interim stream flow standards to ensure protection and enhancement of stream environments as they effect coastal communities.	DLNR	New
Strategy 2.3: Establish sustainable commercial aquaculture in coastal areas and ocean waters to diversify and expand Hawaii's economy and to provide locally produced sources of seafood.		
• Promote ecosystem-based fisheries management	DLNR,	Ongoing
Strategy 2.4: Enhance public access and appropriate coastal dependent uses of the shoreline		
Action 10: Establish, enhance, and restore public access to the shoreline 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 in 2006
• Implement shoreline enhancement and restoration plans in priority areas	DLNR, Counties, Landowners	New in 2006
• Develop public education programs to build stewardship ethic toward the coastline and ocean	DLNR, OP, MACZAC	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 in 2006
• Conduct an inventory of beaches, shoreline areas and scenic vistas requiring protection as open space	DLNR, Counties, SOEST	Ongoing
• Develop interagency agreements and public-private partnerships to acquire, preserve, and restore priority watershed areas	DLNR, Counties	New in 2006
• Establish criteria for identifying priority coastal areas for public acquisition and appropriate coastal dependent uses	DLNR, Counties, SOEST	New in 2006
• Establish new beach and shoreline areas, and scenic vistas as open space for public access	DLNR, Counties	Expansion

PERSPECTIVE TWO: 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.*		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
Strategy 2.5: Promote appropriate and responsible ocean recreation and tourism that provide culturally informed and environmentally sustainable uses for visitors and residents		
Action 11: 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 in 2006
• 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 in 2006
• Encourage community-based, culturally informed environmental education and outreach programs promoting responsible ocean recreation	DLNR, Community	New in 2006
• 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
• Establish performance standards to ensure responsible commercial ocean-based tourism	DLNR, DBEDT, Industry	New in 2006
• Establish and enforce ecotourism-related permit systems to protect the resources and visitor experience	DLNR, DBEDT	New in 2006
• Encourage the integration of best management practices and cultural values and experiences into commercial ocean-based tourism business plans	DLNR, Industry	New in 2006
• 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 in 2006
• 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
Strategy 2.6: Encourage cutting edge and appropriate ocean science and technology with safeguards for ocean resource protection		
Action 12: Promote alternative ocean energy sources and expand ocean science and technology		
• 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

PERSPECTIVE TWO: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
• 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 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
• Facilitate appropriate research and innovation in energy, ocean leasing, and other marine technologies and ocean uses	DBEDT, SOEST	Ongoing
• Develop and promote Hawai'i as a learning destination for ocean science, technology, and management applications in the Pacific and globally	DBEDT, SOEST	Ongoing

PERSPECTIVE THREE: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
Strategy 3.1: Apply integrated and place-based approaches to the management of natural and cultural resources		
Action 13: Support community-based natural resource restoration, including, where appropriate, ahupua'a management		
Action 14: Develop integrated natural and cultural resource planning processes and tools while building capacity for community participation in natural and cultural resources management		
• Facilitate integrated natural resource management in demonstration ahupua'a and moku through 'Aha Moku Council	DLNR	Revised wording
• Where appropriate, establish a moku support network to increase community dialogue, develop a framework for education, and build partnerships among various stakeholders	DLNR,	Revised wording
• Develop an integrated geographic information system for priority watersheds and coastal areas	OP	Ongoing
• 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, MACZAC	New in 2006
• Identify existing networks, community groups and organizations to work with to establish responsible management entities to implement the ORMP	OP, Counties, Community Groups	Revised wording

PERSPECTIVE THREE: 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.***		
Strategies, Actions, and Sub-Actions	**Lead**	**Status**
• Develop mechanisms and streamlined permitting processes to support community-based natural resource restoration and other activities designed to benefit ecosystem management	TBD	Revised wording
• Undertake and coordinate outreach and educational efforts, with community input, to raise awareness of program efforts to develop integrated planning approach	OP, MACZAC	Revised wording
• Expand the Mauka-Makai Watch program and provide standardized training programs and guidelines for participating community volunteers and organizations	DLNR	Ongoing
Strategy 3.2: Implementation, evaluation, and reporting		
Action 15: Integrate with National Ocean Policy		
• Assist in the formation of the Pacific Regional Ocean Partnership	OP	New
• Develop capacity for coastal and marine spatial planning	OP	New
Action 16: Develop legislative and administrative proposals to improve management of natural resources		
• Work with the ʻAha Moku Advisory Committee on a framework for wider implementation of ahupuaʻa principles	DLNR	New in 2006
• Where needed, propose legislation for statutory changes to the Hawaiʻi CZM program network, including SMA permits and possibly other regulatory programs	OP-CZM	Revised wording
• Advocate for changes to State statutes, State and county rules, or administrative policies to support within the CZM program to support ecosystem management within	OP-CZM, MACZAC	Revised wording
Action 17: Monitor and evaluate Ocean Resource Management Plan implementation		
• Identify benchmarks and milestones	OP	New
• Prepare an annual report	OP	Ongoing
• Establish multi-sectoral ORMP implementation and monitoring group	OP	New
• Develop environmental health curriculum for State Agency staff	OP	New
• Conduct ORMP monitoring and evaluation Policy Group and Working Group	OP	Revised wording
• Adjust strategic actions as needed based on monitoring and evaluation	OP	New in 2006
• Conduct biennial ORMP strategic planning session	OP	Revised wording
• Conduct 5-year review and update of the ORMP	OP	Ongoing
• Incorporate experiences and lessons learned into legal and administrative reforms	OP	Ongoing

Appendix C: Ocean Resource Management Issues and Related Plans

This Appendix looks further at pressures on the ocean and coastal resources and critical issues. Community groups play an important role in protecting ocean and coastal resources. This Appendix was informed by feedback that OP-CZM received at two rounds of Public Listening Sessions during 2012, which were held on the islands of Kauaʻi; east, west , and central parts of Oʻahu; west and central parts of Maui; Molokaʻi; Lānaʻi; and the east and west sides of Hawaiʻi Island. This Appendix also describes key ocean resource related plans from State and Federal agencies.

Future economic growth and activities of the population are expected to place great demands on Hawaii's ocean and coastal resources. Increased urbanization, tourism, recreation, and commercial uses utilize the ocean resources in different ways. While economic growth is vital to Hawaiʻi, its impacts must be properly managed to preserve our natural resources and reduce conflicts among resource users.

According to *Population and Economic Projections for the State of Hawaiʻi* (DBEDT, 2013), the population in Hawaiʻi is expected to increase 17.5% in the next 20 years from 1.36 million in 2010 to 1.60 million in 2030. Even though the population increase is down from a projected 30% increase predicted in the *2006 ORMP*, there will still be increased pressure on marine and coastal resources, existing infrastructure, and water and land use.

Academia, agencies, and communities have looked at ways to address these issues, and they remain of critical concern in all parts of the state. Lack of enforcement, insufficient funding, lack of resources to address the issues, and lack of political will have all slowed progress.

This Appendix discusses several issues that affect ocean and coastal resource management:

- Urbanization
- Impacts from Tourism
- Military Use of Lands
- Commercial and Recreational Ocean Uses
- Shoreline Access and Conflicting Uses
- Coastal Hazards, Sea Level Rise, and Coastal Erosion
- Climate Change Adaptation: Disaster Preparedness and Community Resilience
- Marine Debris
- Watershed Management: Water Quality and Water Quantity
- Agricultural Lands
- Damage to Coral Reefs
- Endangered Species
- Aquatic Invasive Species
- Terrestrial Invasive Species
- Food Security
- Alternative Energy

Abbreviated descriptions of these issues are discussed in Chapter II.

Urbanization

The 2010 U.S. Census shows the state of Hawaii's total population is 1,360,301 people, with 455,338 households. According to DBEDT forecasts, the population is expected to increase 140,000 persons every ten years. With this population increase will come an increasing need for additional housing, services, and urbanization.

Future population growth and accompanying growth in urbanization can be properly managed to preserve the State's natural resources while allowing necessary economic growth. The updated management priorities in this *ORMP* outline actions to minimize impacts to the coastal environment through support of appropriate coastal development.

Figure C-1: Striking a Balance

Figure C-1 shows how a balance between social needs, economic needs, and needs of the environment are interdependent. This is a diagram based on the definition of sustainability in Hawai'i as defined in the *Hawai'i 2050 Sustainability Plan.* Balancing the need to protect the environment can be done while driving the economy and providing social benefits to society. In other words, acquiring balance in one sector does not need to be at the expense of another.

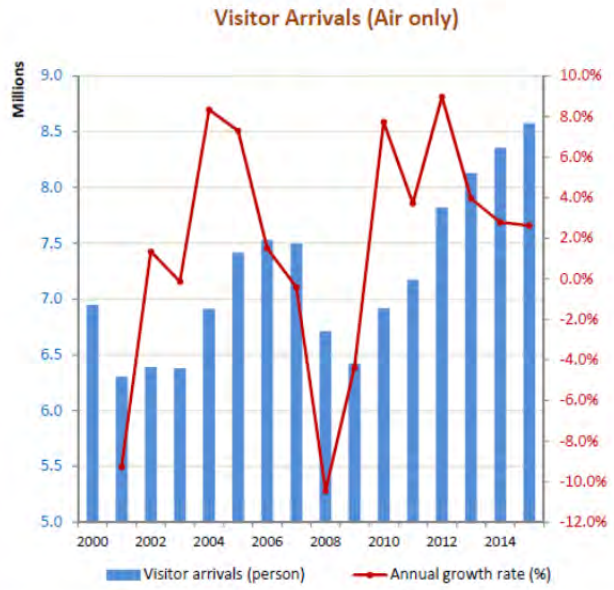
Impacts from Tourism

Hawaii's tourism industry is the largest sector of the state's economy, providing 22% of Hawaii's gross domestic product in 2010 (UHERO, 2011). New visitor destinations and activities such as increased international visitors, the cruise ship industry, coastal-dependent resort development, increased marketing of the neighbor islands, and ecotourism alternatives can be made aware of how to exist while protecting Hawaii's most sensitive and unique natural resources.

The *Hawai'i 2050 Sustainability Plan* notes that tourism generates a quarter of the state's tax revenue. The *Sustainability Plan* also notes that the State must provide incentives for industries to operate in more sustainable ways, recognizing that the visitor industry is a strong component of the state's economy. Nearly 8 million visitors arrive in Hawai'i annually. The number of visitor arrivals is projected to grow as shown in Table C-1, magnifying impacts to Hawaii's natural resources.

Table C-1: Visitor Forecasts to 2015

DBEDT Forecasts (4Q 2012): Visitor Arrival



	Air only		Total	
	person	annual growth (%)	person	annual growth (%)
2005	7,416,574	7.3%	7,494,236	7.2%
2006	7,528,105	1.5%	7,628,117	1.8%
2007	7,496,820	-0.4%	7,627,819	0.0%
2008	6,713,436	-10.4%	6,822,912	-10.6%
2009	6,420,448	-4.4%	6,517,054	-4.5%
2010	6,916,894	7.7%	7,018,133	7.7%
2011	7,174,398	3.7%	7,299,048	4.0%
2012	7,818,000	9.0%	7,982,000	9.4%
2013	8,128,000	4.0%	8,291,000	3.9%
2014	8,354,000	2.8%	8,518,000	2.7%
2015	8,574,000	2.6%	8,737,000	2.6%

Source: DBEDT (February 2013)

While most tourists arrive via plane, the ocean plays an important entry point for some. The number of visitors arriving to Hawai‘i aboard cruise ships increased 23% to 124,650 visitors between 2010 and 2011, and even more visitors boarded cruise ships in Hawai‘i after flying to the islands, bringing to total cruise visitors to 246,236 (Hawai‘i Tourism Authority, 2012). The cruise ship industry is just one facet of tourism that impacts the ocean.

During the ORMP Public Listening Sessions and outreach conducted for this plan, community members voiced concerns about what they saw as negative impacts from tourism including damage to coral reefs, harassment of endangered species, and increase in recreational user conflicts. The key to turning these into a positive and balanced visitor experience is through education and outreach, which is a Management Priority #8, Training, Education, and Awareness in this *ORMP*.

UH Sea Grant College Program administers the Hanauma Bay Education Program, which educates more than 800,000 visitors annually on the value of marine resources and reef etiquette. Each visitor to Hanauma Bay in east O‘ahu is required to watch an educational film about preserving the reef by not walking on it, preserving the abundant marine life by not feeding it, and keeping trash and litter off the beaches and out of the water. There are many other non-profit, community, research, and government groups on all islands that provide education and outreach to visitors and residents alike on Hawaii’s coastal and ocean resources.

Military Use of Lands

The military presence is an integral part of Hawaii's past and present as well as a major driver of the state's economy. National and homeland security requires that access to certain shorelines be off limits to the general public while pre-empting state laws, such as at Pearl Harbor. On occasion, the military will allow access to certain beaches, such as at Bellows Air Force Station Beach in Waimānalo. Further collaboration between the state and the military may help to open up more shoreline, even on a limited basis, for recreation and fishing.

On Marine Corps Base Hawai‘i in Kāne‘ohe, the U.S. Marines care for the Nu‘upia Ponds Wildlife Management Area. These eight interconnected ponds and wetlands cover 517 acres, and are home to the endangered Hawaiian Black-necked Stilt, the Hawaiian Coot, Hawaiian Moorhen, and the Kōloa Duck. Each year, the Marines prepare this site for the endangered Hawaiian Stilt breeding season between March and September by breaking up invasive pickleweed so that the Hawaiian Stilt can nest.

Ordnance left from WWII and training exercises in the ocean and along the coastline is a concern in some areas of Hawai‘i. The most extreme example of this would be the uninhabited island of Kaho‘olawe, which was used as a U.S. Navy practice bomb target area for several decades. Military ordnance has also been reported by community members off the Wai‘anae Coast on O‘ahu and north of Kailua-Kona on Hawai‘i Island. Continued collaboration between the State of Hawai‘i and assigned military liaisons can assist in removal of ordnance. The Kaho‘olawe Island Reserve Council's work to restore Kaho‘olawe should also continue.

Commercial and Recreational Ocean Uses

Hawaii's oceans are used for commerce, recreation, cultural practices, and transportation. Approximately 80% of all goods consumed in Hawai‘i are imported from out of state, and of those, 98% arrive by sea. The recreational value of the state's oceans and waterways to the tourism industry and to those that live here has not been formally measured, however a study on Sustainable Coastal Tourism undertaken by the University of Hawai‘i Economic Research Organization (UHERO) in conjunction with UH Sea Grant will be completed in the next year.

Because Hawai‘i is completely surrounded by the Pacific Ocean, everyone in Hawai‘i has some way to value the ocean commercially or recreationally, whether it is stand up paddling, fishing, or simply picnicking beside the ocean. Cultural practices, such as limu (seaweed) gathering, salt farming, and fishponds are all connected to the ocean and water.

All of these uses of ocean and coastal resources can and do co-exist. Management Priority #9, Collaboration and Conflict Resolution encourages addressing conflicting uses through non-judicial means. Management Priority #11, National Ocean Policy and Pacific Regional Ocean Initiatives contains a goal to create a coastal and marine spatial planning program which can identify and map uses of coastal and marine resources.

Shoreline Access & Conflicting Uses

The state has long recognized a policy of supporting public use of the shoreline area. The landmark 1995 Hawai‘i State Supreme Court case, referred to as PASH or Public Access Shoreline Hawai‘i, reaffirmed these rights. Hawai‘i courts have consistently held that nearly all state submerged lands, including shoreline areas, are considered public lands held in trust for the benefit of its people. Accordingly, the state may not dispose of these lands, or encumber these lands to the detriment of public access and other public interests. In terms of shoreline areas, except for very specific circumstances, submerged lands extend to the highest wash of the waves during the season when the waves are highest. For example,

HRS Section 46-6.5 states that the counties, in the subdivision process, must ensure public access to land below the high-water mark. Shoreline setback areas, Coastal Zone Management Act statutes and rules, and other state and county land use laws further recognize the importance of public access to the shoreline and coastal areas.

Access to the shoreline for Native Hawaiian traditional and customary gathering practices is guaranteed in the Hawai‘i State Constitution, statutes, and case law. As such, agency decisions affecting the shoreline must make specific findings relating to potential impacts to traditional and customary practices and cultural, historical, or natural resources, and take feasible actions to reasonably protect cultural rights. Cultural impacts of applicable projects in or affecting the shoreline area must also be assessed via the environmental review process embodied in HRS Chapter 343, as well as through federal and state laws which may also require consultation with Native Hawaiian Organizations and practitioners.

HRS Chapter 6E Relating to Historic Preservation recognizes the “value of conserving and developing the historic and cultural property within the State for the public good.” It is similar to Section 106 of the National Historic Preservation Act (1966), which includes a federal requirement for consultation with Native Hawaiian Organizations whenever federal agencies determine that there is an undertaking that could affect historic properties. State and Federal laws recognize that there could be historic and cultural properties in submerged lands or the coastline and government agencies must consider the Native Hawaiian perspective in order to preserve these historic and cultural properties.

Despite having laws in place, many people expressed during the statewide ORMP Public Listening Sessions that access is sometimes limited, either through restriction of parking, unavailability of public access in areas that are land locked, or the restriction of protected Native Hawaiian gathering places. New resorts 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, can 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 Hawai‘i.

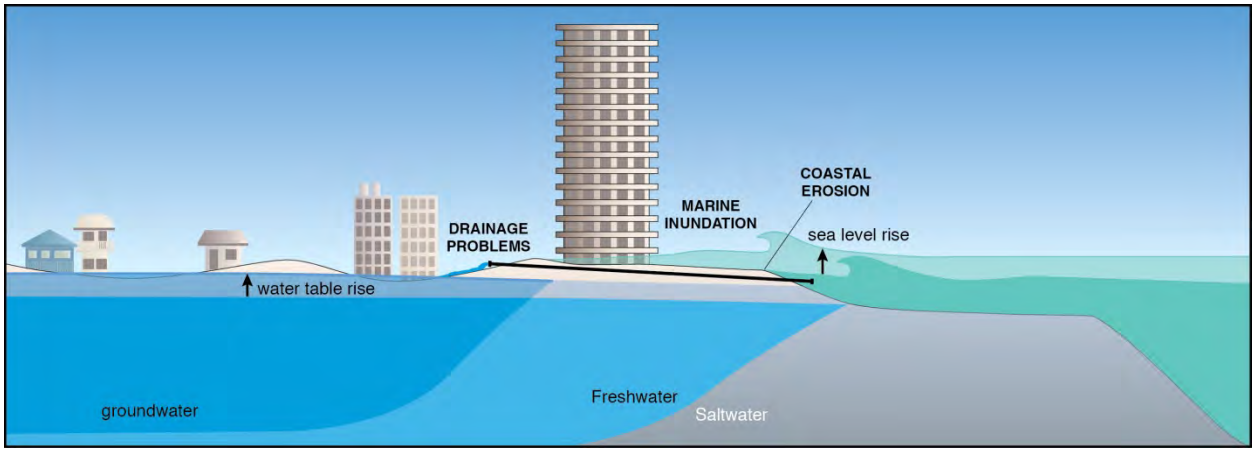
Figure C-2: Recreation at Hanalei Bay, Kaua‘i

Source: Office of Planning

Coastal Hazards, Sea Level Rise, and Coastal Erosion

Since the publication of the *2006 ORMP*, much scientific research and attention has been given to global climate change, including sea level rise. Sea level rise is defined as when the mean high tide level increases year after year. While many acknowledge that the sea level is rising, how much it rises is different in Hawai‘i than in other areas of the world. Factors such as the El Niño/La Niña-Southern Oscillation (ENSO), which is an occasional shift in winds and ocean currents centered in the South Pacific region, add to the variability of how much sea level rise one coastal location will see in comparison to another. Figure C-3 from UH SOEST, illustrates the coastal hazards that can develop from sea level rise.

Figure C-3: How Sea Level Rise and Other Coastal Hazards Interact with Coastal Development



Source: Chip Fletcher, Ph.D., University of Hawai‘i, SOEST

When the sea level rises, coastal erosion increases. When there are storm surges, this can increase the height of storm waves and cause marine inundation. In some locations, the saltwater can impact the level of the water table, causing a water table rise and inland flooding. The water table rise can cause drainage problems in interior areas, because there isn’t anywhere for stormwater or rainwater to drain.

Coastal hazards such as beach erosion, inundation of land, increased flood and storm damage, saltwater intrusion into the freshwater lens aquifer, the rising of the water table, and more frequent or more powerful weather events all affect ocean resources. Proper coastal development, watershed management, and disaster preparedness in coastal regions are all tools to deal with the effects of sea level rise and coastal hazards.

Climate Change Adaptation: Disaster Preparedness & Community Resilience

Climate change has been documented to have impacts on the atmosphere, coasts, and marine resources. Mitigation and adaptation to climate change and coastal hazards need to be addressed in order to combat the pressure that exist today, as well as prepare Hawai‘i for future impacts. Because of the cumulative impacts of climate change, the state has put a focus on adaptation. Public awareness of this issue has grown since the *2006 ORMP* making climate change adaptation a primary issue.

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). Changes in precipitation are also expected which impacts the amount of fresh water in Hawaii's watersheds.

While the prevention of global climate change is largely beyond State control, proactive planning to mitigate impacts is vital to the state's economy and the health and safety of Hawaii's 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 increased the ocean's temperature over the past few decades, which will likely increase the frequency and severity of coral bleaching (Barnett 2005).

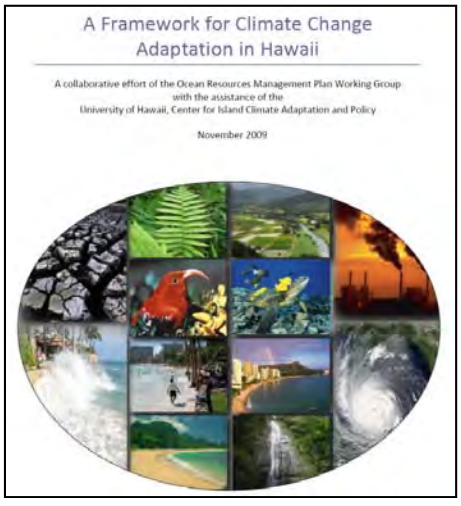
An added threat to coral is the increased levels of carbon dioxide emissions, a greenhouse gas, which is changing the ocean's chemistry. The added carbon dioxide causes a decrease in the pH of the water; in turn, the ocean becomes more acidic, which decreases the rate of calcium carbonate production by coral polyps. Without healthy coral reefs, entire ecosystems are at risk.

The Intergovernmental Panel on Climate Change (IPCC) predicts that the worldwide sea level will rise 1.5 feet over the next 100 years, and has outlined numerous impacts from this rise on coastal communities including: beach erosion, inundation of land, increased flood and storm damage, saltwater intrusion into the freshwater lens aquifer, changes in precipitation, increased levels of land-based pollutants to coastal waters including sediments, nutrients and contaminants, and more frequent, longer, and more powerful El Niño and La Niña events.

The threat of sea level rise has triggered counties to reassess current shoreline setback requirements due to coastal erosion. As coastal development expands, so does the risk to communities and their infrastructure. According to the 2012 U.S. Geological Survey *National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands*, the beaches of Kaua'i, O'ahu, and Maui are eroding at an average long-term rate of -0.11 meters per year. O'ahu lost the greatest total length of beach to erosion (8.7 km), while Maui had the highest percentage of beach loss at 11 percent. Beach management plans have been prepared to combat sea level rise, because the retreat of Hawaii's beaches will impact the residents' quality of life and the visitor industry.

Seawalls and other hardened shoreline structures to protect coastal properties exacerbate coastal erosion and beach loss (Fletcher, e.t al., 1997). Currently, only the Islands of O'ahu, Kaua'i, and Maui have documented erosion rates, and UH SOEST plans to document erosion rates for the other islands in the near future. Management Priority #2 Management of Coastal Hazards contains a goal to complete this erosion rate documentation for the remaining islands.

Figure C-4: Framework for Climate Change Adaptation in Hawai'i



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 always take this changing environment into account.

According to the University of Hawai'i Sea Grant College Program, Center for Island Climate Adaptation and Policy (ICAP) *Hawaii's Changing Climate Briefing Sheet* (2010) while they are heavier rainfalls, there is an overall reduction in rainfall feeding the groundwater, and this is likely tied to decreased rainfall. Hawai'i is getting warmer, with an even greater warming trend at higher elevations, decreasing rainfall.

Rising air temperatures, decreased rainfall, and decreased stream discharge all tie in to the sources of water to the ecosystem, which can affect agriculture, water quantity, and water quality.

In 2009, the ORMP Working Group and ICAP prepared *A Framework for Climate Change Adaptation in Hawaii*. Topics included building a climate change adaptation team, developing and adopting a long-term vision, identifying planning areas and opportunities relevant to climate change, scoping climate change impacts to major planning sectors, conducting a vulnerability assessment, and conducting a risk assessment. Such planning efforts aid in disaster preparedness and build resilient communities.

A core group of ORMP partners drafted climate change policy legislation that became part of the Governor's 2012 Legislative Packet as Senate Bill 2745. This climate change adaptation bill passed the 2012 Legislature and was signed by Governor Neil Abercrombie as Act 286.

Marine Debris

Marine debris is defined as any solid material that is manufactured or processed and directly or indirectly disposed of or abandoned into the marine environment. Debris may enter directly from a ship, or indirectly when washed out to sea from rivers, streams, or storm drains. Marine debris includes a wide variety of items, including plastic bags, glass bottles, rubber slippers, derelict fishing gear, and abandoned or derelict vessels. Activities that create marine debris occur both on land and on the ocean. Marine debris can be categorized as chronic such as derelict fishing gear or episodic such as the Japan Tsunami Marine Debris. The debris ranges in size from microscopic, such as broken pieces of plastic, to items weighing many tons, such as abandoned fishing vessels.

Marine debris is an ongoing problem worldwide, and Hawaii's position in the Pacific Ocean makes it no stranger to the multitude of marine debris washing up on the island's shores, much of it generated from distant shores. Because Hawai'i is at the center of the North Pacific Gyre, the islands become a hotspot for the aggregation of marine debris from across the Pacific.

Marine debris causes habitat damage such as to coral reefs, can transport invasive species, and can cause harm to seabirds and other wildlife that accidentally digest it or become entangled in it. Marine debris can also lower the quality of life for residents and the satisfaction of visitors, as well as impose an economic cost.

According to the National Oceanic and Atmospheric Administration (NOAA), many efforts are underway to prevent, reduce, and research marine debris. NOAA and other federal agencies are working with states and counties to develop protocols for a variety of scenarios to address marine debris hazards to navigation, threat of pollution, and adverse impacts to public safety and health." Invasive species are also a concern, as they can be transported from other areas of the world to Hawai'i by attaching themselves to floating debris or as part of lost cargo. Another threat to the ocean is illegal dumping of solid waste at sea.

According to the *Hawai'i Marine Debris Action Plan* (HI-MDAP) (NOAA, 2013), there is a role for everyone, including federal, state, and county agencies, as well as community members and academia, in prevention of and dealing with marine debris. Beach clean ups are just one way of addressing marine debris, as pictured in Figure C-5.

Figure C-5: Marine Debris Removed from Kanapou, Kahoʻolawe, Before and After Photos

Source: Kahoʻolawe Island Reserve Commission, Kanapou Cleanup

Watershed Management: Water Quality and Water Quantity

There are over 500 watersheds in the State of Hawaiʻi, according to the *Hawaiʻi Watershed Guidance* (Office of Planning 2010). The Department of Land and Natural Resources, the Department of Health, the Office of Planning, and the various county Boards of Water Supply manage most of the state's watersheds; however, many of the watersheds are also in private property. In addition, because of their vast size and limited accessibility, a variety of stakeholders partner in order to manage and improve functionality of the watersheds. Watershed management takes into account the quality as well as quantity of water within a given watershed; furthermore, freshwater flow into streams, estuaries, anchialine ponds, and nearshore waters is as important as the quality of the water.

Sedimentation from rivers, streams, and other runoff can cause changes in water depth and water quality in Hawaii's coastal areas. Large sediment load in some of Hawaii's bays such as Hanalei Bay, Kauai has been attributed to removal of ground cover and surface disturbances by animals and humans in watersheds, which accelerate erosion rates and sediment generation. The Hanalei Watershed Hui has worked to improve the watershed through various partnerships, education, and stakeholder involvement.

The *Hawaiʻi Watershed Guidance* defines impaired waterbodies as those which do not meet Hawaii's water quality standards that support the designated use. Watersheds of particular concern are high-quality waters threatened by changing land uses. Threats to healthy watersheds may be local (new development or change in land use), regional (spread of invasive species), and global (drought or flooding caused by climate change). While there is always going to be a naturally deposited element of high islands in torrential tropic environments eroding to low islands, the human impacts are the greatest (with construction and agriculture the main culprits). Part of the answer for addressing watershed issues is education.

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 coastal water quality. According to the U.S. Environmental Protection Agency, 64% of Hawaii's streams are considered "impaired" by pollutants. 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.

Urban and agricultural lands are major sources of nonpoint source pollution. Genetically modified organism (GMO) crops, pharmaceutical contamination, injection wells, and cesspools were raised at the ORMP Public Listening Sessions (PLS) as anecdotal examples of pollution that is occurring. Stream diversions such as irrigation ditches and wells that affect surface waters have changed the water flow to wetlands, streams, estuaries and nearshore waters. Careful and appropriate use of the land and freshwater is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.

Agricultural Lands

While much of Hawaii's agriculture is beyond the shoreline, agricultural lands throughout the state directly impact the coast and the ocean. Much of Hawaii's agricultural lands at the turn of the 20th century were used for sugar cane and pineapple production. As these uses cease, diversified agriculture has been planted in some of the former plantations. Other lands have been converted to urban use. And much of the public discussion has been centered around GMO crops and their effects on the environment, from possible cross-contamination of nearby crops to labeling of food that has been modified through biotechnology. As discussed in the previous section on Watershed Management, runoff from agricultural lands is seen to affect the coast and ocean.

Irrigation ditches, many left over from the sugar cane plantations, were constructed over one hundred years ago to provide millions of gallons per day of water for irrigation across the state. Many of these irrigation ditches remain and are also a source of fresh water flowing into the ocean, increasing water quantity as well as runoff from former agricultural lands.

The designation of important agricultural lands could slow the conversion of agricultural lands into urban uses. Act 233 of 2008, Act 183 of 2005, and Article XI, Section 3 of the Hawai‘i State Constitution allow such definitions. The Hawai‘i Department of Agriculture (DOA), working with the Department of Taxation and various stakeholders as well as the Office of Planning has been trying to identify incentives for agricultural lands to stay in agricultural use. The 2007 *DOA Final Report to the State Legislature* lists permits, tax credits, administrative rules, and transfers of land as steps in this process. The designation of lands as important agricultural lands provides an opportunity for agencies to make the connections between land and sea.

Damage to Coral Reefs

Coral reefs are many times called the "rainforests of the sea" due to their complex and rich biodiversity. According to the *2050 Sustainability Plan*, there are 7,000 known species of coral represented in 410,000 acres of living reef in the main Hawaiian Islands. More than one quarter of these species are only found in Hawai'i. Threats to coral include urban and agricultural runoff, over-fishing, damaging recreational use, coral disease, acidification of ocean water, aquatic invasive species, and bleaching caused by increasing sea water temperature.

Figure C-6: Hawai'i Coral Reef

Source: The Nature Conservancy

Climate change is a threat to coral. Increased levels of carbon dioxide emissions, a greenhouse gas, are changing the ocean's chemistry. The added carbon dioxide causes a decrease in the pH of the water; in turn, the ocean becomes more acidic, which decreases the rate of calcium carbonate production by coral polyps. Additionally, increasing sea water temperature causes coral bleaching. While corals can recover from bleaching if other conditions are good and the high temperatures do not persist over may weeks, climate scientists agree that bleaching conditions will be widespread and regular by the end of the century.

Management Priority #5 Coral Reef addresses ways to improve the sustainability of Hawaii's corals. The depletion of coral reefs decreases biodiversity, which impacts not only the island population's ability to recreate and subsist, but is a loss to the state's chief income producer, tourism.

The Aquatic Invasive Species Response Team (AIS Team) is working on a method to eliminate snowflake coral from the pier at Kauai's Port Allen. Snowflake coral is an invasive soft coral that can overgrow and smother black coral. The Nature Conservancy of Hawai'i and UH developed a large underwater sea vacuum to suction clumps of seaweed from the reef in Kāne'ohe Bay. The sea vacuum, called the "Supersucker" can remove up to 750 pounds of invasive seaweed per hour, removing the large pieces. The smaller particles remain, can re-attach themselves to the reef, and continue growing. DLNR is experimenting with native sea urchins to naturally control re-growth.

The Makai Watch Program was developed to enhance the management of nearshore marine resources by providing community members opportunities for direct involvement in management activities. This program builds community awareness, and encourages compliance though observation, identification, and reporting of illegal activities to DOCARE.

The DLNR is completing a Strategy for the State of Hawaii's Makai Watch Program (2013-2016) to establish statewide standards, formally recognize sites, and improve the overall effectiveness of the program. There are currently eight active Makai Watch Groups throughout the state: Puakō/Kaupulehu and Kukio, on the island of Hawai'i; Ka'anapali/Kahekili on the island of Maui; Pupukea-Waimea, Maunalua Bay, and Waikīkī, on the island of O'ahu; and Hanalei and Hā'ena on the island of Kaua'i.

Endangered Species

One-third of all endangered species in the United States are found in Hawai‘i. Examples of endangered species in the ocean and coastline areas are the Humpback Whale, the Green Sea Turtle, the False Killer Whale, and the Hawaiian Monk Seal. With increasing frequency, other marine species found in Hawai‘i are also being considered for listing. There are also critical estuaries, where fresh and salt water mix together and serve as habitat for endangered birds such as the Hawaiian Moorhen, Hawaiian Stilt, Hawaiian Coot, and Kōloa Duck. Balancing protection of endangered species with other aspects of ocean resource management is critical.

The Hawaiian Islands Humpback Whale National Marine Sanctuary (National Marine Sanctuary) is managed as a partnership between NOAA and the State of Hawai‘i. The National Marine Sanctuary is discussed in Chapter IV as an example of a coordinated approach to the management of ocean resources.

Aquatic Invasive Species

Aquatic invasive species (AIS) are plants and animals introduced into a water body that have the potential to harm the ecosystem, people, and/or the economy. The Hawaiian Archipelago is home to 85% of the country’s coral reefs, and these ecosystems include a multitude of corals, fish, seaweeds, and other marine life, some found nowhere else in the world. Protecting the fragile ecosystems as well as keeping waterways clear and preserving the environment that commerce and tourism are both dependent upon are all important to the State of Hawai‘i. Prevention and early detection are essential in the control of aquatic invasive species.

Aquatic invasive species can be introduced accidentally by sea faring vessels. Ballast water discharges from vessels and biofouling of submerged areas are the major means by which vessels act as a pathway for introduction of marine invasive species.

In response to national concerns, the National Invasive Species Act of 1996 amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. The U.S. Coast Guard (USCG) has established both regulations and guidelines to prevent the introduction and spread of AIS.

Other ways of introduction of AIS are people dumping their non-native aquarium fish or plants into a neighborhood stream or river or AIS could be hitchhikers on marine debris. Not all non-native or introduced species become invasive species as some do not reproduce quickly, spread, or cause harm. An example of an invasive species that clogged a waterway is the floating water fern *Salvinia molesta*, pictured in Figure C-7, which covered Lake Wilson and other waterways on O‘ahu in 2003 and cost over $1 million dollars to eradicate.

Figure C-7: *Salvinia molesta*

Source: Department of Land and Natural Resources

The AIS Team was established in 2005 as part of the *2003 State of Hawai‘i Aquatic Invasive Species Management Plan*. The AIS Team participates in certain cleanup events such as the “Habitattitude Campaign,” which asks the public to turn in unwanted aquarium pets and pond plants to participating pet stores and other drop off locations statewide. This helps to prevent the introduction of non-native species into the state’s waterways.

The AIS Team also had to respond to the apple snail, which is an international invasive species that first originated in South America and pictured at right. It was first documented on the island of Maui in 1989, and there is now an international alert for apple snails. Apple snails present a serious threat to food security for anywhere there is a water-based food producing economy, such as taro cultivation in Hawai‘i. In some lo‘i (taro fields), crop loss can be as high as 20%, and if not controlled, these snails can consume an entire crop including corms, stems, and leaves in just one day. Outreach education to a broad sector of the state's population, in multiple languages and approaches, is key to limiting further spread of this invasive species.

Figure C-8: Apple Snail

Source: Department of Agriculture

Terrestrial Invasive Species

Terrestrial invasive species are similar to AIS, except they occur on land. The introduction of a non-native species can interrupt and damage the land ecosystem. This is important to ocean and coast resource management because what happens at the top of the ridge can affect water quantity and the ocean's water quality.

Management Priority #3 Watershed Management looks at the damage that hoofed animals can do to the watershed. Hoofed animals are also referred to as ungulates and include pigs, goats, deer, and sheep. Some were introduced the islands in the late 1700s, and many became feral. The wild populations graze and root around the native forests, destroying ground cover and causing large swaths of land to erode. These feral ungulates may also promote the spread of invasive plant species while foraging. Ungulate barriers such as fencing have been used in forests and watersheds to conserve the ecosystems. Other terrestrial invasive species such as the brown tree snake are important to keep out of the islands because their introduction would wipe out native bird populations, and affect the biodiversity of the forests.

There are Invasive Species Committees on O‘ahu, Maui, Moloka‘i, Kaua‘i, and Hawai‘i Island that seek to identify and implement appropriate management strategies.

Food Security: Subsistence Fishing, Fisheries, Aquaculture, and Fishpond Restoration

Close to 85-90% of Hawaii's food is imported into the state, mostly as ship cargo. This makes Hawaii's food security particularly vulnerable to natural disasters and global events that could disrupt the food supply. In 2012, the Office of Planning in cooperation with DOA prepared the, *Increased Food Security and Food Self-Sufficiency Strategy*. The three objectives of the strategy are: to increase demand for and access to locally grown foods; increase production of locally grown foods; and provide policy and organizational support to meet food self-sufficiency needs.

The *ORMP* supports the state's goal of increased food security with goals, actions, and metrics for food that comes from the ocean. Supporting restoration of fishponds, providing access to the coastline for gathering and near shore fishing, and working with agencies to increase responsible and sustainable aquaculture are all ways to increase food security. Collaborating with agencies and community groups to increase access to the shoreline and improve ocean water quality for subsistence or "‘ohana" fishing also

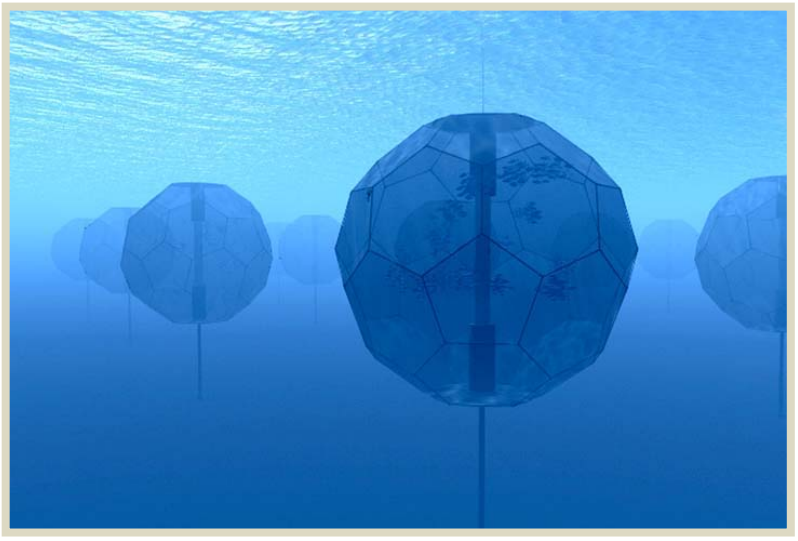
helps support the state's goal. Working with commercial fishermen and agencies in a cooperative manner will also assist in this effort.

Challenges for food security were expressed by residents during two rounds of ORMP Public Listening Sessions held across the State of Hawai'i in 2012. People on all islands expressed frustration about depleting fishstocks and the inability to access fishing areas due to pollution, runoff, national security, or land development. Some commercial fishers attributed the increase in the invasive species ta'ape to declines in their bottomfish catch, and some residents who rely on coral reef species perceived declines in certain species. Those involved in the aquaculture industry would like to see an increase in aquaculture as a way to provide food security to Hawai'i. Their projects in coastal and offshore areas have a 2011 industry value of $40 million annually. Since Hawai'i imports 70% of its seafood, this could be reduced through the expansion of commercial aquaculture.

Open ocean fish farming, or offshore aquaculture, is an emerging approach to raising fish in open ocean waters by utilizing submersible cages or net pens (see Figure C-9). Hawai'i is the first state to have a successfully operating commercial open ocean aquaculture cage in the U.S. The Hawai'i Department of Agriculture believes that this type of aquaculture is sustainable and lowers the risk of disease, provides a more humane and natural growing environment for fish, and greatly reduces environmental impacts due to strong ocean currents that can sweep away feed residues. Open ocean aquaculture technologies will continue to evolve, providing more opportunities for farmers to farm the sea.

One method to diversify food production is to restore Native Hawaiian fishponds. Ongoing efforts to restore existing fishponds are occurring, such as in He'eia, on the island of O'ahu and Project Loko I'a on the island of Moloka'i. These efforts are perceived as an opportunity to address food security, as well as to practice the Native Hawaiian culture for generations to come. The sentiment expressed at the ORMP Public Listening Sessions is that Native Hawaiians thrived using such methods, so carrying on the approach to food production would be a sustainable way of living.

Figure C-9: Open Ocean Fish Cage

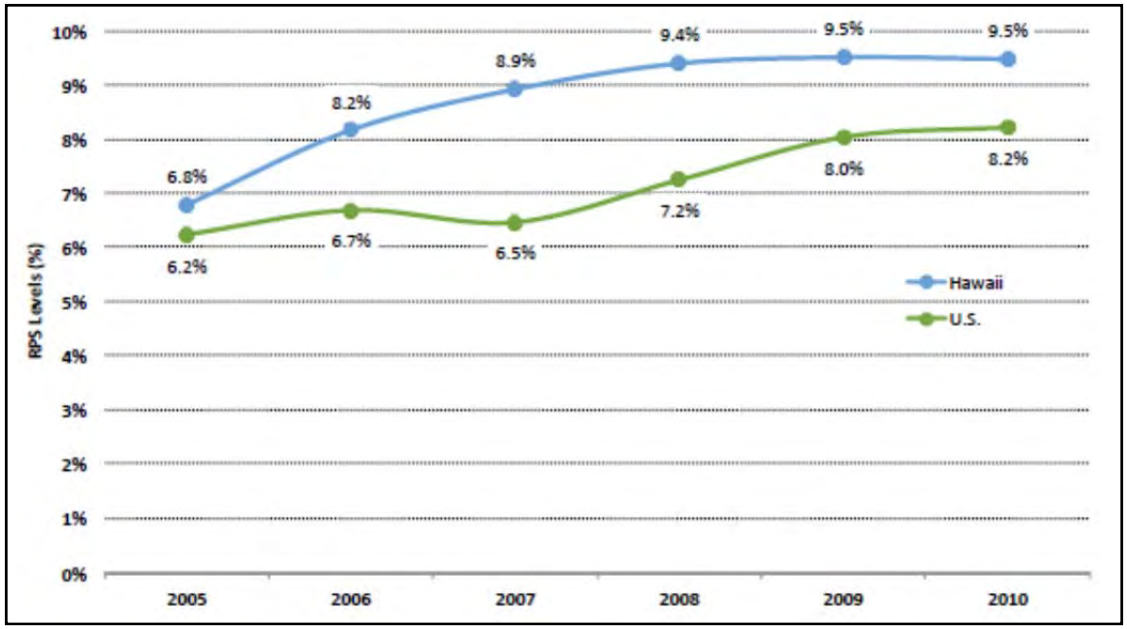


Source: Hawaii Oceanic Technology, Inc.

Alternative Energy

Under the Hawai'i Clean Energy Initiative (HCEI) and subsequent Renewable Portfolio Standards (RPS) mandates, Hawai'i electric utilities must produce at least 15% of the electricity sold by clean energy technologies by 2015. With the projects currently under development or planning, Hawai'i is on target to meet this goal. However, the goals of 25% renewable generation by 2020 and 40% renewable generation by 2030 leave much work to be done. Hawaii's renewable electricity generation as a percentage of total generation is approximately 13.9%, according to annual RPS reports submitted by the electric utilities to the Hawai'i Public Utilities Commission in 2013. In 2010, Hawai'i was at 9.5% of renewable electricity generation, which at the time was approximately 1.8% higher than the rest of the United States as shown in Figure C-10.

Figure C-10: Hawai'i Renewable Energy Generation 2005-2010



Source: State of Hawai'i Energy Resource Coordinator's Annual Report 2011

The *Hawai'i 2050 Sustainability Plan* reported that transportation accounts for nearly half (48%) of Hawaii's energy consumption, compared with industrial (25%), commercial (14%), and residential (13%) uses. The transportation component includes both ground and aviation fuel consumption. According to Governor Abercrombie's *A New Day in Hawai'i Plan (2010)*, Hawaii's most important economic enterprise is to pursue energy independence. This could include wind, solar, hydro, ocean thermal, marine hydrokinetic, biomass and geothermal sources.

To increase the state's RPS percentage and lower the state's dependence on foreign oil imports, over 40 renewable energy projects have been constructed, and another 40 utility-scale projects are currently proposed throughout Hawai'i. Many of these projects will impact the ocean and coastal resources in various ways, including but not limited to: ecologic impacts from marine infrastructure, effluent discharges (tempered and/or processed), visual impacts, and recreational and commercial impacts.

Coupled with the newly formed Hawai‘i Outer Continental Shelf (OCS) Renewable Energy Task Force, the sustainable development of Hawaii’s marine resources is a major component of HCEI.

Proper siting and cumulative planning of renewable energy projects are critical to the sustainable use of our indigenous ocean resources. The Hawai‘i State Energy Office within DBEDT works with impacted stakeholders and regulatory agencies to help ensure individual projects are developed in consideration of local and statewide impacts, both short term and long. Some renewable energy power plants—such as wave energy devices, interisland cables, or offshore wind—would directly impact marine resources because of their location. Even land-based renewable projects, such as geothermal and bioenergy, could affect the ocean through effluent or run-off discharges or if the Hawaiian Islands’ electricity grids are linked by an undersea cable. Hawaii’s present reliance on imported fossil fuels—oil and coal—also can significantly impact the ocean since these fuels are shipped overseas, making the ocean and coasts susceptible to spills and other accidents. The Pacific Ocean is an integral part of Hawaii’s environment, culture, and economy, and has vast potential to support the production of renewable energy. Managing our energy resources sustainably will, at the same time, help to protect our unique ocean resources.

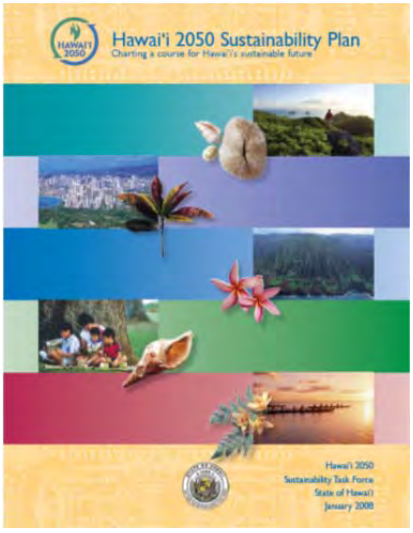
Policy Plans from Other State and Federal Agencies that Impact Ocean Resource Management

There is an interwoven web of plans that create layers of policy in Hawai‘i. Collectively, they play a major role in identifying and addressing pressures and important issues. Many of the Management Priorities in Chapter III use the goals and objectives of these other plans as the ORMP performance measures. In this way, work already being done by an agency can be used to implement the ORMP.

Hawai‘i 2050 Sustainability Plan, 2008

The State Legislature mandated the preparation of a State Sustainability Plan, and it was completed in 2008. One of the significant contributions of the *Hawai‘i 2050 Sustainability Plan* is that it provides the State’s first definition of sustainability, a Hawai‘i that achieves the following:

- Respects the culture, character, beauty, and history of our State’s island communities
- Strikes a balance among economic, social and community, and environmental priorities
- Meets the needs of the present without compromising the ability of future generations to meet their own needs



The *Hawai‘i 2050 Sustainability Plan* has five goals:

- A Way of Life – Living sustainably is part of our daily practice in Hawai‘i;
- The Economy – Our diversified and globally competitive economy enables us to meaningfully live, work , and play in Hawai‘i;
- Environment and Natural resources – Our natural resources are responsibly and respectfully used, replenished, and preserved for our future generations;
- Community and Social Well-Being – Our Community is strong, healthy, vibrant, and nurturing, providing safety nets for those in need;
- Kanaka Maoli and Island Values – Our Kanaka Maoli and island cultures and values are thriving and perpetuated.

A New Day in Hawai‘i, 2010

The *New Day Plan* is a policy document serves as the public policy roadmap for the current State Administration.

The New Day Plan is a policy document that guides actions on: Economy, Education, Energy, Environment and Natural Resources, Food and Agriculture, and Technology and Innovation. Ocean resources management crosses several if not all of these activity areas.

The *New Day Plan* stresses making improvements through collaboration and cooperation. This parallels the ORMP's *Perspective 3: Promoting Collaborative Governance and Stewardship*. The State Office of Planning participates in and assists with implementation of the *New Day Plan* in the areas of Climate Change, Agricultural Renaissance, Energy Independent Hawai‘i, and Sustainability. These responsibilities connect with the Management Priorities in the *2013 ORMP* that involve improving coastal water quality, ocean sustainability, ocean resource protection, and addressing invasive species.

2014-2017 University of Hawai‘i Sea Grant Strategic Plan, 2013

The University of Hawai‘i Sea Grant College Program (Sea Grant) supports and conducts an innovative program of research, education, and extension services toward the improved understanding of coastal and marine resources of the state, region, and nation.

UH Sea Grant College Program is one of 33 Sea Grant programs nationwide that comprise a functional network within our nation's universities and colleges promoting enhanced understanding, conservation, and use of coastal and marine resources. Sea Grant was designated as one of five founding Sea Grant College Programs in 1972. As part of the University of Hawaii's School of Ocean and Earth Science and Technology (SOEST), UH Sea Grant College Program partners with NOAA to provide links among academia, federal, state, and local government, industry, and the community.

Figure C-11: Instilling Principles of Coastal Tourism at Hanauma Bay Education Center

Sea Grant strategies will concentrate on:

- Healthy coastal ecosystems
- Sustainable coastal development
- Safe and sustainable seafood supply
- Hazard resilience in coastal communities
- Sustainable coastal tourism

Source: UH Sea Grant College Program Center for Sustainable Coastal Tourism

Hawai‘i Marine Debris Action Plan, 2013

The *Hawai‘i Marine Debris Action Plan* (HI-MDAP) was prepared in 2010 by the NOAA Office of Response and Restoration, Marine Debris Program in 2010 and updated in 2013. This is the nation's first State Marine Debris Action Plan. While published by a federal agency, it is not a Federal plan. Rather, it is a cooperative effort for agencies in Hawai‘i, encompassing Hawaii's marine debris community, which

includes Federal, State and County government agencies, nongovernmental organizations, academic institutions, private businesses, and industry.

The overall goal of the HI-MDAP is to reduce ecological, health and safety, and economic impacts of marine debris in Hawai‘i by 2020. The HI-MDAP four goals to reduce marine debris address:

- Goal 1 – Backlog of Marine Debris at Sea Reduced;
- Goal 2 – Introduction of Solid Waste and Fishing Gear at Sea Decreased;
- Goal 3 – Number of Abandoned and Derelict Vessels Decreased; and
- Goal 4 – Land-based Debris in Waterways Reduced

Figure C-12: Marine Life Entanglement and Marine Debris

Source: Hawai‘i Marine Debris Action Plan

Since the *Marine Debris Plan* was written more than two years before the Sendai Earthquake and Japanese Tsunami (March 2011), it was updated in 2013 to reflect JTMD and other recent issues. Tsunami debris was just beginning to wash up on the northwestern tip of the U.S. and Alaska in 2012. It is predicted that 1.5 million tons of debris remained afloat soon after the tsunami from what was washed into the ocean, including everything from ghost ships, pieces of buildings, personal belongings, to smaller pieces of flotsam and jetsam. NOAA computer models predicted the high-floating debris would reach waters off of the Pacific Northwest Coast as early as winter 2011-2012 and that Hawai‘i might see the debris starting in mid-2012. Federal, state, and local agencies are coordinating to effectively address the tsunami debris from Japan for Hawai‘i.

Hawai‘i Coral Reef Strategy (2010)

The *Hawaii Coral Reef Strategy* (HCRS) includes priorities from Hawaii’s six Local Action Strategies and other program priorities. It was created after multiple interviews and workshops with resource managers, biologists, advisory groups, reviews of plans, and studies of comments from public meetings held around the state. The HCRS is the guiding document used by the Division of Aquatic Resources for coral reef stewardship activities, many supported by NOAA's Coral Reef Conservation Program. Strategy implementation projects include critical planning efforts, community action, awareness-raising activities, and scientific research with direct management applications. Key outcomes of this work include greater capacity to enforce coral reef protections, increased understanding of the key threats to reef ecosystems at priority sites, and substantial progress towards implementing objectives of the HCRS including the Local Action Strategies. The goals for the HCRS are:

- Coral reefs undamaged by pollution, invasive species, marine construction, and marine debris
- Productive and sustainable coral reef fisheries and habitat
- Coral reef ecosystems resilient to climate change, invasive species, and marine debris
- Increased public stewardship of coral reef ecosystems

Hawaiian Islands Humpback Whale National Marine Sanctuary Management Plan

The Hawaiian Islands Humpback Whale National Marine Sanctuary (National Marine Sanctuary) was designated by Congress in 1992 for the following purposes:

1) protect humpback whales and their habitat in the area described in section 2305(b) of the Act;
2) educate and interpret for the public the relationship of humpback whales to the Hawaiian Islands marine environment;
3) manage such human uses of the Sanctuary consistent with this subtitle and title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended by this Act; and
4) provide for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary designated in section 2305(a).

As stipulated in a compact agreement (1998), NOAA and the State of Hawai'i "shall manage the Sanctuary through a cooperative partnership and consult on all management activities throughout the Sanctuary."

In accordance with the agreement, the Governor designated a State Co-Manager to work in consultation with the Sanctuary Superintendent as an equal partner in the oversight of National Marine Sanctuary operations. NOAA and the State of Hawai'i determined that co-managing a National Marine Sanctuary would provide additional resources and expertise to enhance the protection of humpback whales and their habitat. The National Marine Sanctuary is the only state-federal partnership that co-manages areas of the marine environment in the main Hawaiian Islands with twenty three percent of state waters being included within the National Marine Sanctuary. National Marine Sanctuary staff work to improve upon existing marine conservation and management efforts of state and federal agencies by providing inter-agency coordination and comprehensive protection through education, science, and outreach support.

The National Marine Sanctuaries Act requires periodic updating of sanctuary management plans to reevaluate site-specific goals and to develop management activities to ensure that the National Marine Sanctuary properly conserves Hawaii's natural, cultural, and historic resources. At the time of publication, the National Marine Sanctuary was in the process of updating the 2002 *Management Plan* to address priority issues raised during the 2010 public comment period.

OP-CZM coordinated with the National Marine Sanctuary during the public scoping meetings to ensure that the comments received could also be used to inform the update of the *ORMP*.

Priority issues that were raised during the 2010 comment period include:

- Climate Change
- Ecosystem Protections – Species and Habitats
- Enforcement
- Humpback Whale Protections
- Management Effectiveness
- Marine Animal Assessment and Response
- Maritime Heritage
- Native Hawaiian Culture
- Ocean Literacy
- Offshore Development
- Water Quality

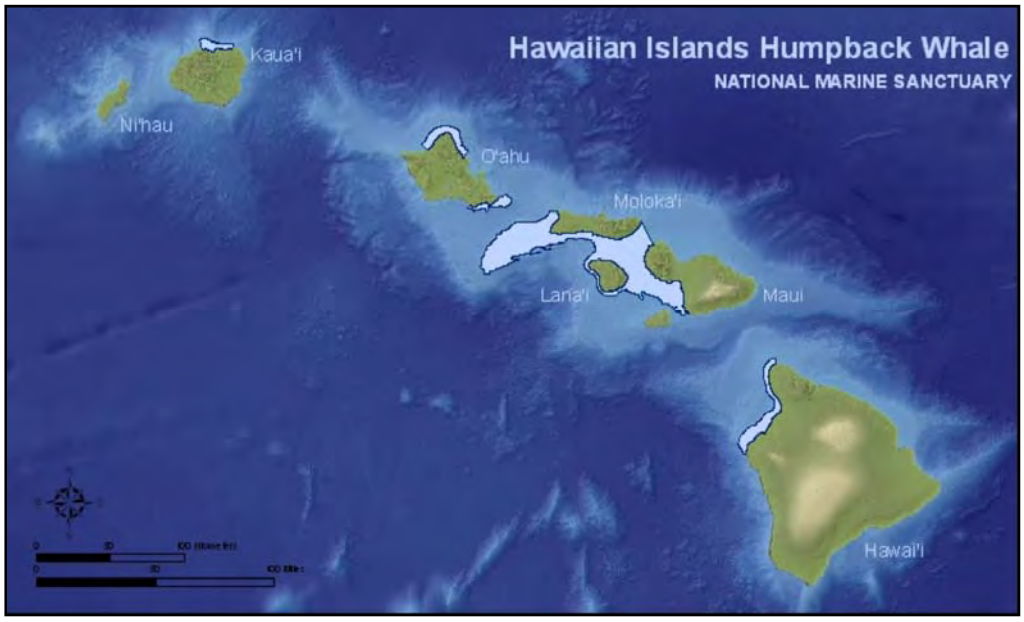
Working groups were formed by the community-based Sanctuary Advisory Council to address the priority issues. As part of this process, working group participants also took into account several

overarching considerations identified during the public scoping period as fundamental to marine resource conservation and management in Hawai‘i. These include:

- Community Engagement
- Environmental Impacts
- Native Hawaiian Traditional Perspectives
- Socioeconomic-Fishing-Ocean Uses-Livelihoods-Access

The National Marine Sanctuary continues to engage with the public, as well as agency and non-governmental partners, as they write the new management plan. A draft management plan, as well as an Environmental Impact Statement that meets the requirements of both state and federal laws, is expected to be available for public review and comment by 2014.

Figure C-13: Hawaiian Island Humpback Whale National Marine Sanctuary Boundaries



Source: Hawaiian Islands Humpback Whale National Marine Sanctuary

Honolulu Board of Water Supply Watershed Management Plans

The State of Hawai‘i Water Code (HRS Chapter 174C) and City and County of Honolulu Revised Ordinances of Honolulu (ROH Chapter 30) both require preparation of county water use and water management plans. O‘ahu has eight watershed regions designated as Development Plan (DP) areas under the City and County of Honolulu planning system. Watershed management plans are being completed for each DP area by the Honolulu Board of Water Supply (BWS). The goal of these plans is to provide short-, mid-, and long-range guidance for the watershed in keeping with the BWS’s mission statement “Water for life – Ka Wai Ola.”

The *Atlas of Hawaiian Watersheds and their Aquatic Resources* (2008) was prepared as joint effort between DLNR Division of Aquatic Resources (DAR) and Bishop Museum, providing place-based information useful for watershed plans. This resource is available online and is a helpful tool to understand watersheds in general. The Atlas is linked to the DAR Aquatic Surveys Database so that it can be updated as new information becomes available. The complete Atlas is over 4,500 pages and represents massive data sets that can be quickly available to decision-makers, scientists, students, and anyone seeking for information on watersheds and streams in Hawai‘i.

2005-2015 Hawai‘i Tourism Strategic Plan, 2003

Figure C-14: Cruise Ship at Honolulu Harbor

Source: 2005-2015 Hawai‘i Tourism Strategic Plan

Hawaii’s economy is dependent on tourism, which in turn depends on the State’s ocean resources. The *Hawai‘i Tourism Strategic Plan* vision is to move towards a sustainable and responsible tourism industry for the State.

The implementation framework for tourism includes the overall management plan, development of action plans, implementation of action plans, and county tourism strategic plans. Measures of success are based on resident sentiments, state and county tax receipts, visitor spending, and visitor satisfaction.

Appendix D: Agency Roles

State, Local and Federal Agencies: Who Does What?

Many government agencies and authorities participate in the management of ocean and coastal resources. While there are overlaps in interest, each governmental agency has its own roles and responsibilities. The OP-CZM Program recently published *Sustainable Management of the Islands* (December 2011), which describes the network of resource agencies for coastal zone management and ocean resource protection. Agencies involved in ocean resource and coastal zone management are shown in Table D-1 for State government, Table D-2 for local agencies, and Table D-3 for Federal agencies.

Table D-1: State Agencies involved in ocean resource and coastal zone management

State Agency	Responsibilities for Ocean Resource and Coastal Zone Management
Office of Planning, Coastal Zone Management Program	• CZM Program • Build capacity for community participation in natural and cultural resources management • Develop community-based frameworks and practices for identifying and mitigating ocean recreational use conflicts • Develop legislative and administrative proposals to improve management of natural resources • Monitor and evaluate Ocean Resource Management Plan implementation • Conduct a baseline study of ocean recreation and tourism • Coastal Nonpoint Pollution Control Program (CNPCP) in partnership with DOH • Coastal Access • Development of a territorial sea plan • Identify channelized streams within DLNR Watershed Partnerships for restoration and revitalization of wetland and estuarine habitats • Training on CZM and Special Management Area (SMA) laws and regulations for County Planning Department Staff and Planning Commissions
Department of Health, Environmental Health, Clean Water Branch	• Improve coastal water quality • Reduce pollutant loads from resident, agricultural, and commercial land uses • National Pollutant Discharge Elimination System (NPDES) permits • Implement watershed implementation plans, total maximum daily load implementation plans
Department of Agriculture, Aquaculture Development Program	• Minimize the spread of marine alien and invasive species into and throughout archipelagic waters through inspection and enforcement • Develop ecosystem-based approaches for nearshore fisheries management • Establish and institutionalize approaches for restoring, operating, and preserving ancient Hawaiian coastal fishponds and salt ponds • Plan and develop sustainable commercial aquaculture • Enhance the conservation of Hawaii's marine protected species, unique habitats and biological diversity
Department of Transportation, Harbors Division	• Improve coastal water quality by reducing marine sources of pollution • Provide appropriate waste management infrastructure to support commercial marine facilities • Minimize introduction and spread of alien species

State Agency	Responsibilities for Ocean Resource and Coastal Zone Management
Office of Hawaiian Affairs	• Assess the policies and practices of other agencies impacting native Hawaiians and Hawaiians, including impacts on traditional and customary practices as well as on natural and cultural resources as they relate to the ocean and shoreline area • Conduct advocacy efforts for native Hawaiians and Hawaiians, including their interests in the natural and cultural resources of the ocean and shoreline area • Facilitate the performance, development, and coordination of programs and activities relating to native Hawaiians and Hawaiians, such as fishpond restoration and maintenance activities
Hawaii Department of Land and Natural Resources (DLNR)	• Jointly manage the Hawaiian Islands Humpback Whale National Marine Sanctuary with National Oceanic and Atmospheric Administration (NOAA) • Jointly manage the Papahānaumokuākea Marine National Monument with NOAA, U.S. Fish and Wildlife Service (FWS), and the Office of Hawaiian Affairs (OHA) in the Northwestern Hawaiian Islands
DLNR, Division of Aquatic Resources (DAR)	• Manage the marine, estuarine or anchialine resources in Marine Managed Areas that have been established by statute or administrative rule • Protect coral reefs through implementation of the Coral Reef Strategy through work with the Coral Reef Working Group • Regulate certain marine and freshwater fishing areas of the state through state laws and Hawaii Administrative Rules, and work with DOCARE on enforcement • Issue various licenses and permits for fishing, selling aquatic life, and other activities involving aquatic resources • Protect the state from the impacts of aquatic invasive species, which includes prevention, ongoing management and control, and emergency response activities.
DLNR, Division of Ocean Boating and Ocean Recreation (DOBOR)	• Perform facility development, management, operation, and repair of small boat harbors, ramps, moorings, landings, public shorelines, wharves, and deep draft harbors • Regulate and enforce state legislation and administrative rules regarding boating facilities and recreational use of waters of the state • Provide appropriate waste management infrastructure to support recreational marine facilities • Issue permits for commercial and recreational use of DOBOR facilities • Manage vessel registration for 15,000 recreation and small commercial vessels in the State • Perform boating accident investigation and reporting • Provide boating safety education
DLNR, Commission on Water Resource Management (CWRM)	• Administer State Water Code (HRS Chapter 174C, 1987) through the Commission on Water Resource Management • Implement and enforce CWRM policies, procedures, and rules on water development and usage established in conformance with the State Water Code. • Designate water management areas • Permit water uses • Establish criteria to determine water availability and sustainable yield analyses for aquifers and watersheds • Develop comprehensive and long-range plans for the protection, conservation, and management of the state's water resources • Develop and adopt drought management plans • Implement Commission policies, procedures, and rules on stream protection and instream flow standards, water development, and usage established in conformance with the State Water Code

State Agency	Responsibilities for Ocean Resource and Coastal Zone Management
DLNR, Division of Conservation and Resources Enforcement (DOCARE)	• Improve enforcement capacity and voluntary compliance with existing rules and regulations for ocean resource protection • Develop community-based frameworks and practices for identifying ocean recreational use conflicts
DLNR, Division of Forestry and Wildlife (DOFAW)	• Reduce soil erosion from upland forest ecosystems and conservation lands • Perpetuate programs that enhance the conservation of Hawaii's marine protected species, unique habitats and biological diversity • Support the Natural Area Reserves System • Formalize Watershed Partnerships
DLNR, Office of Conservation and Coastal Lands (OCCL)	• Oversee approximately 2 million acres of private and public lands that lie within the State Land Use Conservation District • Oversee beach and marine lands within State's jurisdiction • Develop public education programs and distribute information and guidelines on the best management, erosion control, and construction practices for Hawaii's coastal areas • Develop programs for beach nourishment • Streamline the beach nourishment regulatory process • Beach Access • Public-private partnerships for beach restoration Hawaiian fishpond reconstruction and fishpond repair programmatic permit • OCCL aquaculture permitting, including management guidelines • Administer Conservation District Use Applications • *Hawai'i Shoreline Management Plan* • DLNR *Coastal Erosion Management Plan* (COEMAP) • OCCL Small Scale Beach Nourishment Program (SSBN) • DLNR Comprehensive Coastal Policy • *Coastal Hazard Mitigation Guidebook* • *Beach Vulnerability Rating Project (BVR)* • *Historical Shoreline Erosion Studies (Kaua'i, O'ahu, Maui)* • Enforce removal of unauthorized coastal structures • Enforce Act 160 (encroaching vegetation)

University of Hawai'i
• UH Economic Research Organization (UHERO)
• School of Ocean and Earth Science and Technology (SOEST)
• Pacific Islands Ocean Observation System (PacIOOS)
• Sea Grant
  • Sea Grant College Program, Center for Island Climate Adaptation & Policy (ICAP)/Loli Aniau, Makaala Aniau (Cllimate Change, Climate Alert) (LAMA)
  • Richardson School of Law, Coastal Resilience Networks Project (CRest)
  • East-West Center, Pacific Regional Integrated Sciences and Assessments (Pacific RISA)
	• Work with OP-CZM on economic studies
	• Work with OP-CZM on water quality monitoring, climate change, shoreline erosion, beach loss mitigation, marine invasive species, educational curriculum on coastal and ocean resources
	• *Coastal Hazard Mitigation Guidebook*
	• *Historical Shoreline Erosion Studies (Kaua'i, O'ahu, Maui)*
	• Implement National ocean observation network
	• Data management, data archive, and data visualization
	• Provide decision-making support tools
	• Support Pacific island and coastal communities to mitigate and adapt to the impacts of climate variability and climate change.

Table D-2: County Agencies involved in ocean resource and coastal zone management

County Agency	Responsibilities for Ocean Resource and Coastal Zone Management
Department of Planning and Permitting, City & County of Honolulu (O'ahu) Department of Planning (Maui, Kaua'i, Hawai'i)	• Enforcement of building codes (DPP, C&C of Honolulu only) • Issuance of building permits (DPP, C&C of Honolulu only) • Issuance of Special Management Area (SMA) permits • Best Management Practices (BMPs) • Land Use or Zoning Ordinances as tool for land-ocean connection, includes SMA and subdivision ordinances • Coastal erosion studies • Enforcement of public beach/shoreline access • Partnerships for beach restoration projects
Board of Water Supply (BWS)	• Watershed management plans • Watershed partnerships/watershed protection and restoration projects and programs
Environmental Services Department, O'ahu Department of Environmental Management, Wastewater Division, Maui Wastewater Department or Public Works Departments (Kaua'i, Hawai'i)	• Water quality monitoring (On Maui, only during sewer discharges into ocean or a storm drain or ditch that reaches the ocean) • Oversight of county-owned sewer system, including repair, maintenance and construction • Replacement of cesspools (O'ahu only) • Inventory of individual wastewater disposal systems in coastal areas (O'ahu only) • Develop appropriately scaled wastewater treatment systems in coastal areas with planned growth (does not include Maui) • Review/Comment and/or Approve as appropriate properly sized wastewater treatment/disposal systems (Maui only) • Enforcement of storm-water discharges (does not include Maui)
County of Maui, Department of Public Works, Development Services Administration	• Regulate storm-water discharges • Enforcement of storm-water discharges • Enforcement of Building Codes • Issuance of Building Permits

Table D-3: Federal Agencies involved in ocean resource and coastal zone management

Federal Agency	Responsibilities for Ocean Resource and Coastal Zone Management
Office of The White House	• National Ocean Council • National Ocean Policy
Department of Homeland Security, U.S. Coast Guard (USCG)	• Lighthouses • Protection of US Exclusive Economic Zone from foreign encroachment (200 nautical miles from shore) • Enforcing domestic fisheries law • Works in collaboration with Fisheries Management Councils and NOAA Fisheries • Marine Protected Species, Endangered Species Act
U.S. Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS)	• Conservation Innovation Grants • Conservation technical assistance • Healthy Forests Reserve Program • Healthy Watersheds Initiative • Watershed Protection and Flood Prevention Program • Agricultural Water Enhancement Program • Wetlands Reserve Program • Water management
U.S. Department of Agriculture, Cooperative Extension Service	• Partners with UH Cooperative Extension Service, College of Tropical Agriculture and Human Resources (UH CTAHR) • Soil Management Collaborative Research Support Program • Invasive species and pest control • Aquaculture
U.S. Department of Agriculture (USDA), U.S. Forest Service	• Healthy Forest Initiative • Wildland Fire Management
U.S. Army Corps of Engineers (USACE) Civil and Public Works Branch Regulatory Branch	• Development and management of the nation's water resources • Supporting marine transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs, and recreation • Protection and management of the natural environment through the evaluation of permit applications for essentially all construction activities that occur in the nations' waters, including streams, wetlands, estuaries, and all coastal waters • Restoration of aquatic ecosystems • Flood risk and emergency management including coastal storm damage recution • Engineering and technical services in an environmentally sustainable, economic, and technically sound manner with a focus on public safety and collaborative partnerships.
U.S. Geological Survey, Department of the Interior	• Historical streamflow data • Groundwater levels • Water quality data • Water use data • National Climate Change and Wildlife Science Center
U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service	• Ocean partnerships • Coastal and marine spatial planning funding for ROPs • National Marine Sanctuaries

Federal Agency	Responsibilities for Ocean Resource and Coastal Zone Management
NOAA Office of National Marine Sanctuaries	• Jointly manage the Papahānaumokuākea Marine National Monument with DLNR, U.S. FWS, and OHA in the Northwestern Hawaiian Islands • Jointly manage the Hawaiian Islands Humpback Whale National Marine Sanctuary with DLNR
NOAA Ocean & Coastal Resource Management	• Coastal Zone Management • National Estuarine Research Reserve System (NERRS) • Coastal and Estuarine Land Conservation Program • National Marine Protected Areas Center • Coastal Nonpoint Pollution Control Program • Ocean Thermal Energy Conversion
NOAA Coral Reef Conservation Program	• Preservation and sustainability of coral reefs • Partnerships with NOAA Line Offices to work on coral reef issues
NOAA Marine Debris Program	• Marine debris • Japan Tsunami Marine Debris
NOAA National Marine Fisheries Service	• Aquaculture • Habitat conservation • Protected species management and enforcement (e.g., Hawaiian Monk Seal, Green Sea Turtle, False Killer Whale) • Seafood inspection • Marine aquaculture • Sustainable fisheries management and enforcement • Pacific Islands regional connections
Department of the Interior, U.S. Fish & Wildlife Service (DOI, USFWS)	• Critical habitats • Endangered species • Wildlife refuges • Invasive species • Jointly manage the Papahānaumokuākea Marine National Monument with NOAA, DLNR and OHA in the Northwestern Hawaiian Islands
DOI, Bureau of Ocean Energy Management	• Offshore energy leasing (renewable and oil) • Offshore minerals permitting
Western Pacific Regional Fishery Management Council (WPRFMC)	• Management responsibilities for fisheries beyond the state's jurisdiction

Appendix E: Scientific and Ocean Research Activities Taking Place in Hawai‘i

The University of Hawai‘i is currently involved with scientific and research activities in a number of fields.

University of Hawai‘i, School of Ocean & Earth Science & Technology (SOEST) at UH Mānoa is one of the nation's premier academic institutions for ocean-related research. SOEST faculty and staff conduct research in a broad disciplinary range, including but not limited to:

- The Hawai‘i Institute of Marine Biology (HIMB) situated on Coconut Island in Kāne‘ohe Bay;
- Hawai‘i Undersea Research Laboratory, established by National Oceanic Atmospheric Administration (NOAA) and UH to study deep water marine processes in the Pacific Ocean;
- International Pacific Research Center, conceived under US-Japan Common Agenda for Cooperation in Global Perspective, focuses on understanding climate variation and predictability in the Asia-Pacific region, including regional aspects of global environmental change. The Asia-Pacific Data Research Center provides easy access to climate data and research products. Specific projects include oceanic modeling, Hawai‘i Regional Forecast, monsoon monitoring, precipitation prediction, and other research;
- Joint Institute for Marine and Atmospheric Research was established to pursue the common research interest of NOAA and the UH in oceanic, atmospheric, and geophysical research, including climate and global change, equatorial oceanography, tsunamis and fishers oceanography; and
- Center for Microbial Oceanography: Research and Education (C-MORE) facilitates a greater understanding of microorganisms in the sea, ranging from the genetic basis of marine microbial life to their ecological place in the marine environment.

Pacific Islands Ocean Observing System (PacIOOS) is based within SOEST and is the Pacific Islands regional component of the U.S. Integrated Ocean Observing System (IOOS®). PacIOOS is a partnership of data providers and users working together to enhance ocean observations and develop, disseminate, evaluate, and apply ocean data and information products designed to address the environmental, economic and public safety needs of stakeholders who call the Pacific Islands home. The organization's major goal is to generate and serve ocean and coastal data in a user-friendly manner for researchers, resource managers, and the public. Within Hawai‘i, PacIOOS research and development includes:

- A system of models that assimilate direct observations in order to produce a comprehensive ocean state prediction for the main Hawaiian Islands:
    - **Circulation Models**: Ocean circulation and current forecasts are made daily using the Regional Ocean Modeling System (ROMS) for the Main Hawaiian Islands, with increased resolution for O‘ahu.
    - **Wave Modeling**: Ocean waves are forecast daily using WaveWatch III (WW III) and Simulating Waves Nearshore (SWAN) models with domains that extend throughout the entire Pacific with increasing resolution for each of the main Hawaiian Islands, the Mariana Islands, and the Samoan Islands.

    - **Atmospheric Modeling**: The Weather Research and Forecasting (WRF) model produces daily atmospheric forecasts covering all of the Hawaiian Islands as well as detailed forecasts for each of the main Hawaiian Islands.
- A sensor network measuring water quality (conductivity/salinity, temperature, pressure, chlorophyll, turbidity and in some locations, also pH, dissolved oxygen, CO_2).
- An array of wave buoys measuring height, direction and period throughout Hawai‘i.
- An array of sensors conducting biological monitoring (satellite tags and passive and acoustic instrumentation) to track the behavior, movement and population dynamics of marine mammals, reef fish, and pelagics such as sharks and tuna.
- An array of High Frequency Radio systems to monitor surface currents real-time along the south shore of O‘ahu. Expanding to include the leeward coast of O‘ahu and Hilo on Hawai‘i Island as well.
- Operational products that forecast wave inundation, high sea levels, coastal erosion, nearshore wave and current hazards, and impacts of sea-level rise in low-lying communities.
- Integration projects that present data and information collected through the system above into user-friendly tools and services:
    - PacIOOS Website (www.pacioos.org) includes data servers where users can access and download data for free and store data long term.
    - PacIOOS Voyager (www.pacioos.org/voyager) is an interactive online mapping platform that uses Google Maps as a foundation for data overlays. Data are incorporated directly from PacIOOS servers as well as from other data providers. Historical, current, and forecast data are available, as are dynamic and static data layers. Users can access Voyager for free to visualize, save, embed, download, and combine thousands of data layers in an easy-to-use platform.
    - PacIOOS Explorer (www.pacioos.org/geoexplorer) is a free data service providing GIS or map-based information. This web mapping service (WMS) and geospatial database is a unique service of PacIOOS and acts to fulfill a more robust demand for geospatial cataloging, computations, and analysis. The WMS allows users to directly query the database, then make, save, and print maps and overlays as well as conduct geospatial analyses.

University of Hawai‘i, Sea Grant College Program (UH Sea Grant) works in collaboration with SOEST and NOAA. Sea Grant is dedicated to improving the understanding and stewardship of marine and coastal resources in the state and region. UH Sea Grant includes centers for Sustainable Aquaculture, Marine Science Education, and Island Climate Adaptation and Policy. Recent publications include “Research Priorities in the Insular Pacific: Transforming Research into Regional Management.”

UH Sea Grant is hosting the NOAA Coastal Storms Program (CSP) to foster community resilience to coastal hazards. The CSP utilizes funds and resources in the US Pacific Island coastal communities to help reduce and mitigate the risk from coastal storm and weather hazards and climate change. To enhance community resilience, the program provides an array of tools, products and services, including improved observing systems, forecast models, decision support tools, assessments, community best practices and guidance, socioeconomic information, training and outreach/extension activities.

Specific programs include:

- Coastal inundation mapping, including storm surge and hurricane inundation mapping
- Developing Pacific storms climatology, Pacific Climate Information System (PaCIS), Climate Extremes in the Pacific Integrated Case Studies (EPICS) to support vulnerability assessment and adaptation planning
- Developing a Pacific Region Global Positioning Satellite (GPS) Met Network
- Improving the national spatial reference system in the Pacific Islands
- Assessing land-based toxic runoff and coral reef ecosystem resilience in the Pacific Islands

The Pacific Regional Integrated Sciences and Assessments (Pacific RISA) program supports Pacific Island and coastal communities to mitigate and adapt to the impacts of climate variability and change. The agency conducts research in water resources, management, coastal impacts and disaster risk management.

The Pacific Islands Regional Climate Assessment (PIRCA) is a collaborative effort aimed at assessing the state of climate knowledge, impacts, and adaptive capacity in Hawai‘i and the U.S. affiliated Pacific Islands. PIRCA provides information to federal, state and local government agencies, non-governmental agencies, businesses, and community groups. Their priority focus is on preserving freshwater resources and minimizing the impacts of drought, fostering community resilience to the impacts of sea-level rise, coastal inundation and extreme weather, and sustaining marine, freshwater, and terrestrial ecosystems. Research topics involve:

- Climate variability and change science, including historical observations, trends, and climatology,
- Freshwater resource sustainability, flow trends, groundwater recharge, demographic stresses
- Sea level rise and coastal inundation projections and scenarios, current and projected coastal hazards and impacts,
- Ecosystem assessments including climate effects on ocean acidification and coral health, SLR impacts on ecosystems, saltwater intrusion, and species/habitat responses to precipitation and temperature changes.

The University of Hawai‘i has recently committed to a collaborative Sustainability Initiative for the campus, involving new staff clustered around the statewide program. UH Sea Grant competed with other departments across the University of Hawai‘i system and won funding for this important and groundbreaking initiative. The cluster includes five new tenured staff in the fields and schools of economy, engineering, oceanography, architecture, planning, Hawaiian Studies, and ocean agriculture. The program will be focused on the three areas of water, energy and transportation, and while each staff member is housed in one of the five schools, they are also required to dedicate 25% of their time to collaborative work in the Sustainability Initiative.

Appendix F: Community and Place-Based Ocean Management Projects

A primary mission of OP-CZM is to coordinate the implementation of the *ORMP* by promoting collaborative governance and stewardship. During the ORMP Demonstration Phase, several community groups were able to implement projects with the assistance of funds from OP-CZM. Six ORMP implementation projects were funded that involved state or county government partners working with a community-based organization partner. Six other community projects were funded through the leveraging of other funds. The twelve projects described provide important information and lessons from the ORMP Demonstration Phase.

OP-CZM Direct Funded Partnership Projects

Māhuahua ʻAi o Hoi (Oʻahu)

The Hawaiʻi Community Development Authority (HDCA) worked with community partners Kākoʻo ʻŌiwi and the Koʻolaupoko Hawaiian Civic Club and received $96,395.00 of OP-CZM funds to support Māhuahua ʻAi o Hoi. The project site is on Oʻahu's windward coast at the Heʻeia wetlands (Hoi), which currently lay fallow and are covered with dense vegetation. Mangrove overgrowth that was hampering the flow of the Heʻeia Stream was removed. In order to restore the Heʻeia wetlands and reduce non-point source pollution at the shoreline, the partners are incorporating a traditional Hawaiian *ahupuaʻa* concept of land management through the interconnections of the Heʻeia wetlands to the Heʻeia shoreline. The *Heʻeia Wetland Restoration Strategic Plan 2010-2015* outlines plans, partnerships, and actions to be undertaken in the next few years. The planning and training phase of the project embodies all three perspectives of the *ORMP* and serves as a model demonstration project.

This project is considered highly successful and has since been chosen as a NOAA Sentinel Site. A NOAA Sentinel Site must be place-based, issue-driven, and collaborative, and in a coastal and marine environment that has the capacity for intensive study and sustained observations. NOAA chose this site based on its unique blend of characteristics: a dynamic physical setting, an ecologically diverse environment, and a rich culture of historical significance.

Honu‘apo Estuary (Hawai‘i Island)

This project is a partnership between the County of Hawai‘i and the community group Ka ‘Ohana O Honu‘apo. The partners are implementing the Coastal Nonpoint Pollution Control Program (CNPCP) Wetlands Management Measure for Restoration of Wetland and Riparian Areas in Wetlands. A Best Management Practice they are implementing is for restoration of a naturally occurring aquatic ecosystem. OP-CZM granted $25,000 to the County of Hawai‘i, and the County invested over $300,000 for this project in the County’s Honu‘apo Park.

Hilo Bay Watershed Advisory Group Web Site Project (Hawai‘i Island)

The Hilo Bay Watershed Advisory Group mission is to “bring the community together to understand and protect the ecology of the Hilo Bay Watershed.” This project is a partnership between the County of Hawai‘i Planning Department, Hilo Bay Watershed Advisory Group, and the Big Island Resource Conservation & Development Council. This project involved the design, development, implementation, and administration of a professional-quality interactive website, and OP-CZM awarded $5,000 to this project.

Hilo Bay Watershed Advisory Group Water Quality Monitoring Program (Hawai‘i Island)

This project is a partnership between the County of Hawai‘i Planning Department, Hilo Bay Watershed Advisory Group, Big Island Resource Conservation & Development Council, DOH Clean Water Branch, and the Pacific Aquaculture & Coastal Resources Center. OP-CZM awarded $5,020 to this project, which identifies pollutants that may need application of Best Management Practices to bring suspect waters into compliance with current water quality standards.

Tsunami Education, Preparation & Recovery Plan for Downtown Hilo (Hawai‘i Island)

The lead partners for this project are County of Hawai‘i Planning Department and the Pacific Tsunami Museum. This project addresses the risk that the Downtown Hilo business community faces from tsunami inundation, including storm surge and coastal flooding. OP-CZM awarded $24,700 to this project, which resulted in *Tsunami Education: A Blueprint for Coastal Communities* (January 2009).

Baseline Monitoring at High-yield Watershed Units C and D (Hawai‘i Island)

To prevent the degradation of streams and coastal waters from sediment loads carried from disturbed upland forest habitats, Best Management Practices will be followed by fencing Watershed Units C and D in the Pu‘u O Umi Natural Area Reserve and the Kohala Forest Reserve.

The Pu‘u O Umi Natural Reserve is 10,142 acres and was established in 1987. It includes 13 natural communities, including 2 rare communities. In addition, there are 124 total native plants and 7 total native animals, several of which are rare. A six-acre ungulate-free unit has been constructed on and above the narrow windward sea cliffs.

The Kohala Forest Reserve is one of 22 reserves on the Island of Hawai‘i, and is adjacent to the Kohala Watershed and Pololu Valley. The lead partners for this project are the DLNR Division of Forestry & Wildlife and the Kohala Watershed Partnership. OP-CZM awarded $50,000 for this effort.

Leveraged Projects

The first six projects described in this Appendix were funded by OP-CZM through direct grants. These next six projects were funded by leveraging funds from one or more ORMP partners, working in collaboration with OP-CZM. The following six projects occurred during the ORMP Demonstration Phase.

Mālama Maunalua at Maunalua Bay (O‘ahu)

This ORMP Demonstration Project is named “E Mālama I Nā ‘Āina Kumu Wai O Maunalua: Caring for the watersheds of Maunalua.” UH Sea Grant partnered with a community non-profit group, Mālama Maunalua, and created a *Watershed Handbook for the Residents of Maunalua* to illustrate how low impact development and easy community tools can to reduce nonpoint source pollution. Mālama Maunalua also partnered with schools and other volunteer groups to pull over 3 million pounds of invasive algae from Maunalua Bay, freeing up 23 acres of ocean. Mālama Maunalua worked with government agencies at the federal, state, and local levels to reduce runoff, while doing small community-based projects with residents and businesses to reduce the siltation into Maunalua Bay. This project was funded under the Coastal Nonpoint Pollution Control Program (CNPCP) through OP and was written in cooperation with UH Sea Grant. This funding was provided through a portion of a NOAA stimulus award worth $3.4 million. This project is an excellent example of building community capacity through education and outreach to address land-based pollution.

Kawainui Marsh Levee Certification Project (O‘ahu)

OP-CZM contracted with the City and County of Honolulu to assist in the certification of the Kawainui Marsh Levee. The U.S. Army Corps of Engineers (USACE) had constructed the original Kawainui Flood Control Project in 1966, with modifications made in 1997. The project protects the town of Kailua against flood events while perpetuating the 830-acre Kawainui Marsh as the largest wetland in the State of Hawai‘i. The Kawainui Marsh Environmental Restoration Project broke ground in June 2012 and is in the process of creating 11 wetland pond cells within 37 acres at the mauka end of Kawainui Marsh. The project restores wetland habitat for several endangered birds: Ae‘o Kukuluao (Hawaiian Stilt), ‘Alae ‘Ula (Hawaiian Gallinule), ‘Alae Ke‘oke‘o (Hawaiian Coot), and Kōloa (Hawaiian Duck). The project will provide increased public access to Kawainui Marsh while helping to protect the neighboring urban area, Coconut Grove, from flooding.

West Maui Mountains Watershed Partnership (Maui)

The West Maui Mountains Watershed Partnership (WMMWP) is a voluntary collaboration of public and private landowners to preserve and protect nearly 50,000 acres of the forested core of West Maui or 10% of the island of Maui. The WMMWP's efforts are concentrated in the West Maui Mountains, also known as Mauna Kahalawai, where elevations range from the summit at 5,788 feet to near sea level. The WMMWP includes several private landowners and DLNR. WMMWP crews have installed fences to protect against Axis Deer in the watershed while also monitoring and controlling weeds. Since 1998, they have built 17 miles of fences to protect 17,989 acres of land.

West Maui Ridge 2 Reef Initiative

The West Maui Ridge 2 Reef Initiative is an all-encompassing approach across multiple agencies and organizations to address adverse impacts to coral reefs in West Maui. This initiative covers covers five watersheds: Wahikuli, Honokowai, Kahana, Honokohua, and Honolua. Many individuals from the community are working closely with lead agencies including: DLNR, DOH, NOAA, EPA, National Fish and Wildlife Foundation (NFWF), USDA-NRCS, DOI-FWS, United States Geological Survey (USGS), and USACE.

US Army Corps of Engineers (USACE) Silver Jackets Initiative (Statewide)

Through its Silver Jackets Initiative, the USACE Honolulu District funded a collaborative project to reduce risk in the Pacific that could affect or impair holistic water management. The ORMP Policy and Working Groups were invited to partner with the USACE and the Pacific Risk Management Ohana (PRiMO) to support the continued development of synergies between agencies to help reduce risk associated with an array of issues, including environmental degradation, natural disasters, and climate change. One of these projects was the *Hawai‘i 2060: Visioning Hawaii’s Adaptation to Climate Change*, which is a report of the Alternative Futures Exercise at the 2011 Planning Meeting with ORMP partners.

Appendix G: Resources for Communities in Coastal and Marine Stewardship

Throughout the process of updating the ORMP, communities across the island state have asked how they can access more assistance for their projects. From Anahola, Kaua‘i where community members are rebuilding the ancient Hawaiian fishpond at their shoreline to the fishponds of Moloka‘i, from water quality monitoring concerns at Hulupoe Bay on Lāna‘i to runoff issues at Kawaihae Harbor on Hawai‘i Island, communities wanted to sustain their ocean resources, but they needed assistance. Some knew what had to be done but needed help with Federal and State permitting processes. Others had a vision for how their group could improve their resource but needed technical assistance for grant applications. And others had worked for decades on projects that had not come to fruition and could not prevail over their years of frustration.

There are many funding opportunities for communities doing work that matches the framework in the ORMP Three Perspectives: Connecting Land and Sea; Preserving Our Ocean Heritage; and Promoting Collaboration and Stewardship. These include:

National Oceanic and Atmospheric Administration Community-based Restoration Program

NOAA’s Community-Based Restoration Program (CRP), which is part of the Habitat Conservation of the National Marine Fisheries Service, supports priority projects in Hawai‘i that can address threats to the coastal ecosystem. CRP partners with grassroots organizations to encourage hands-on community participation in restoration projects. CRP delivers technical support along with funds for projects in order to help ensure restoration success.

Examples of funded programs are the Okelehao Trail Erosion Control Restoration and the Waipa Fishpond and Estuarine Habitat Restoration Project, both located in Hanalei on the island of Kaua‘i and both implemented by The Hanalei Watershed Hui.

Funding opportunities, guidelines, and proposal applications can be accessed here:
http://www.habitat.noaa.gov/funding/southwest.html

NOAA Marine Debris Program

NOAA supports several grant opportunities for removal of marine debris. The first is in partnership with NOAA CRP mentioned above, and the second is a public-private partnership called Fishing for Energy.

The NOAA CRP grants typically open each summer with proposals due in either late October or early November. Funding of up to $2,000,000 is expected to be available for Community-based Marine Debris Removal Project Grants in fiscal year 2012.

The Fishing for Energy Small Grants Fund is administered in partnership with the NOAA Marine Debris Program, Covanta Energy Corporation, Schnitzer Steel Industries, and the National Fish and Wildlife Foundation. This grant provides funding to Fishing for Energy Partnership ports, their partners, or other commercial fishing ports for disposal of old, abandoned, or derelict fishing gear.

Funding opportunities, guidelines, and proposal applications can be accessed here:
http://marinedebris.noaa.gov/funding/welcome.html

Hawai'i Conservation Alliance

The Hawai'i Conservation Alliance is a cooperative collaboration of conservation leaders representing government, education, and non-profit organizations. The purpose of the HCA is to work together to continue stewardship and promote preservation, to increase diversity of native species, and to ensure continued maintenance of Hawaii's biodiversity. The nineteen organizations currently in HCA are many of the same organizations represented formally in the ORMP Working Group, and will be many of the same organizations represented in the Hawai'i Sub-ROP. This alliance fits within all Three Perspectives.

HCA holds an Annual Hawai'i Conservation Conference, which celebrated its 20th Anniversary in 2012. HCA also aggregates many different funding opportunities on its website. Further information can be accessed here:
http://hawaiiconservation.org/resources/grants

Harold K. L. Castle Foundation

The Castle Foundation provides annual grants to nonprofit organizations serving Hawai'i if they have been approved as Internal Revenue Service Code Sections 501(c) (3) and 509(a) public charity status. The Castle Foundation also provides grants to Hawai'i public schools. The funding cannot be used for ongoing operating expenses unless it is a new project or new organization seeking start-up funding.

The categories for funding include: Public Education Redesign and Enhancement; Nearshore Marine Resource Conservation; Strengthening the Communities of Windward O'ahu; and Other Investments. The grants relating to Nearshore Marine Resource Conservation fit with Perspective Two: Preserving Our Ocean Heritage and Perspective Three: Promoting Collaboration and Stewardship.

Information about the Castle Foundation grants and resources for grant seekers is available here:
http://www.castlefoundation.org/grantseeker-resources.htm

Hawai'i Alliance of Nonprofit Organizations

The Hawai'i Alliance of Nonprofit Organizations (HANO) provides leadership, advocacy, research information, communications, professional development, and products and services for the nonprofit sector in Hawai'i. For community organizations seeking to become a formal non-profit, HANO provides several website links in Hawai'i and in the Unites States to complete this process. Links to resources for nonprofits and those starting a nonprofit can be found here:
http://hano-hawaii.org/resources/

Hawai'i Tourism Authority Natural Resources Program

The Hawai'i Tourism Authority (HTA) developed the *Hawai'i Tourism Strategic Plan: 2005-2015*, and one of the nine tourism strategic initiatives identified as necessary to achieve the vision of the plan is the Natural Resources Initiative. Funding is applied for annually via a Request for Proposals process. In the past, a variety of projects have been funded including efforts to remove alien species, re-planting of native plants, trash removal from natural resources areas, and installation of interpretative signage to educate visitors about environmental assets. Links to resources and the annual application can be found at:
www.hawaiitourismauthority.org

Makai Watch

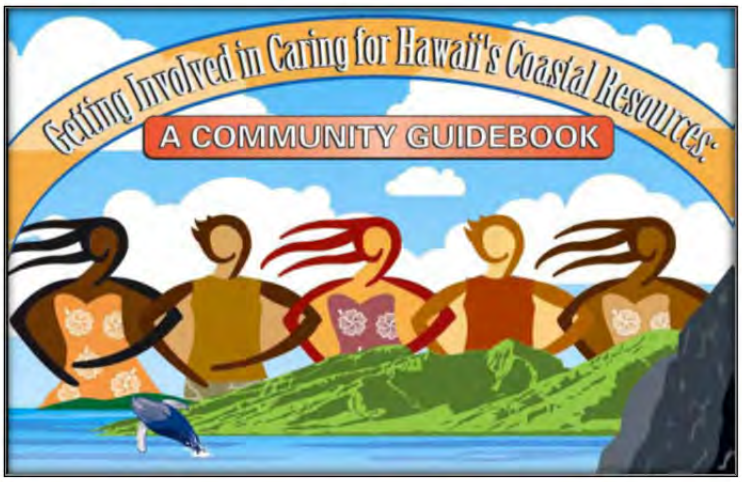
DLNR partners with community groups and Non-Government Organizations as part of the Makai Watch Program. Makai Watch focuses on near-shore marine resources and community-based participation. The Makai Watch Program consists of three main components: 1) Building Community Awareness and Outreach; 2) Biological and Human Use Monitoring; and 3) Incident Observation and Encouraging Compliance

The nine DLNR-recognized Makai Watch groups operating are:

1) Puakō, Hawai‘i
2) Ka‘ūpūlehu and Kūkio, Hawai‘i
3) Kā‘anapali/Kahekili, Maui
4) ‘Āhihi-Kīna‘u Natural Area Reserve, Maui
5) Pūpūkea-Waimea, O‘ahu
6) Maunalua Bay, O‘ahu
7) Waikīkī, O‘ahu
8) Hanalei, Kaua‘i
9) Hā‘ena, Kaua‘i

Anyone can get involved by contacting the Makai Watch Coordinator on their island:
http://www.hawaiicoralreefstrategy.com/index.php/makai-watch-on-going

Getting Involved in Caring for Hawaii's Coastal Resources



DLNR's Division of Aquatic Resources distributes a community guidebook with support from NOAA's Coral Reef Management Grant. The guide gives advice on how to start a community-based project, develop an action plan, prioritize projects, and find funding. Related activities, additional resources, and contact information is also provided.

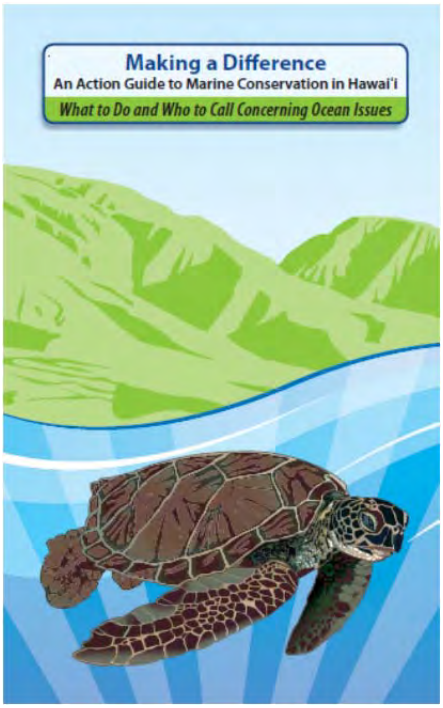
http://coralreef.noaa.gov/education/educators/resourcecd/guides/resources/hi_resources_g.pdf

Project S.E.A.-Link

Project S.E.A.-Link is a nonprofit organization based on Maui and founded in 1999. This nonprofit works with volunteers on all islands to implement community-based coral reef monitoring. A volunteer can conduct reef fish surveys or participate in the ReefWatchers program to collect information on the impact humans have on the reef itself. There are also educational, science, and awareness links available.

http://projectsealink.org/index.html

Making a Difference Action Guide



OP-CZM Program, in cooperation with Project S.E.A.-Link and NOAA, distributes *an Action Guide to Marine Conservation in Hawai‘i.* The guide was designed as a tool to provide communities with key information, guidelines, and contact information for ocean users to participate in marine conservation.

Included in the contact information are the myriad of agencies at all levels of government in a handy marine enforcement phone book.

http://www.hawaiicoralreefstrategy.com/PDFs/14_Makai_Watch_Ongoing/EntireGuideBook.pdf

Hawai‘i Community Stewardship Directory

The OP-CZM Program developed the *Hawai‘i Community Stewardship Directory* to help community groups and organizations involved in natural and cultural resources management connect with each other, share their experiences, and exchange lessons learned. OP-CZM updates this directory periodically as one element of the ORMP. To date, 114 organizations across Hawai‘i have requested inclusion in this directory.

http://files.hawaii.gov/dbedt/op/czm/initiative/community_based/May2010_HawaiiCommunityStewardshipDirectory.pdf

Marine and Coastal Zone Advocacy Council (MACZAC)

Chapter 205A-3.5 of the Hawaii Revised Statutes clarifies the Office of Planning’s responsibility to maintain a public advisory body (MACZAC). The body is composed of twelve advisory members recruited from the Islands of Kaua‘i, O‘ahu, Maui, Moloka‘i, Lāna‘i, and Hawai‘i, who have diverse backgrounds in business, environment, native Hawaiian practices, terrestrial and marine commerce, recreation, research, and tourism. MACZAC’s mission statement is: “Advocate for a comprehensive management system which restores, preserves, and protects Hawaii’s marine and coastal environment.” MACZAC is an integral part of the ORMP.

http://planning.hawaii.gov/czm/maczac/