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

Introduction

This chapter examines pressures on the ocean and coastal resources as well as issues that need to be addressed. It includes a review of the driving forces that were examined in the *2006 ORMP* as well as emerging issues that affect the ocean and its resources in current day. This chapter references other statewide plans and policies that discuss these emerging issues and gives information on community groups and agencies that are doing work to improve ocean and coastal resources. This chapter was also informed by feedback that OP–CZM received at the Public Listening Sessions, which were held on the islands of Kauaʻi, Oʻahu, Maui, Molokaʻi, Lānaʻi, and the East and West sides of Hawaiʻi Island in spring 2012.

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. The current status of ocean management in the State of Hawaiʻi, as outlined in this chapter, will serve as a benchmark for future measurements of progress and monitoring.

Hawaii's growing population creates demand for houses and vacation homes, and this is a strong driving force to proactive preventative management. Hawaii's landscape is being transformed from working agricultural lands to suburban and urban patterns of living. According to Population and Economic Projections for the State of Hawaiʻi (DBEDT, 2012), 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.

While academia, agencies, and communities have looked at ways to address these issues, 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 has sometimes stalled progress. Since the *2006 ORMP*, additional issues have come to the forefront of statewide concern. The issues discussed in this chapter were derived from plans developed since the *2006 ORMP*, as well as various stakeholder meetings and statewide Public Listening Sessions conducted during the ORMP update process.

This chapter is divided into four sections:

- Section One: *2006 ORMP* Driving Forces
- Section Two: Key Ocean-Related Issues Identified in Other Plans of State and Federal Agencies
- Section Three: Newly Identified Issues Expressed Concerning Ocean Resource Management
- Section Four: Promoting Collaboration and Stewardship

Throughout this chapter, you will see the following symbols:

	To learn more about an issue, this icon will be accompanied with a link to existing information on an issue that has been raised.
	Members of the community have ongoing efforts to improve the quality of life and the natural environment in Hawai‘i. For more information on these efforts, this icon will direct you to their websites.
	To get in touch with an agency that has additional information and/or that is responsible for regulation and enforcement, contact information will be included next to this icon.

Section One: *2006 ORMP* Driving Forces

The *2006 ORMP* identified the following driving forces for change, which had evolved at that time as challenges to management of ocean resources. Many of these driving forces are still relevant today and are listed in the same order as they are found in the *2006 ORMP*:

- Urbanization
- Impacts from Tourism
- Commercial and Recreational Ocean Uses
- Sea Level Rise and other Coastal Hazards
- Marine Debris
- Aquatic Invasive Species

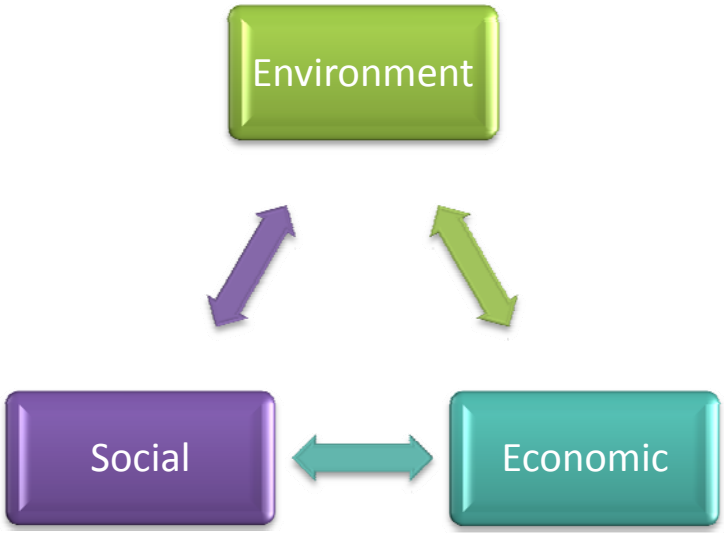
Urbanization

According to the 2010 U.S. Census, the state of Hawai‘i’s total population is 1,360,301 people, with 455,338 households. According to DBEDT, the population is expected to increase 140,000 people every ten years, and with that increase will come an increasing need for more housing, services, and urbanization.

This 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 goals and actions in this ORMP outline strategies to minimize impacts to the coastal environment through support of appropriate development.

Figure 3-1 shows that striking a balance between social needs, economic needs, and needs of the environment is 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.

Figure 3-1: Striking a Balance



Impacts from Tourism

Hawaii's tourism industry is the lifeblood of the state's economy. 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 designed to explore Hawaii's most sensitive and unique natural resources.

The *Hawai'i 2050 Sustainability Plan* notes that tourism generates 20% of all economic activity and 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. The number of visitor arrivals is projected to grow as shown in Table 3-1, in turn creating magnified impacts to Hawaii's natural resources.

Table 3-1: Visitor Forecast to 2030

	2004	Projections				
	(Actual)	2010	2015	2020	2025	2030
Visitor arrivals (in thousands)						
Hawai`i County	1,281.2	1,420	1,570	1,700	1,830	1,980
Honolulu County	4,464.6	5,120	5,610	6,020	6,420	6,860
Kaua`i County	1,020.9	1,230	1,360	1,470	1,580	1,700
Maui County	2,207.8	2,590	2,860	3,090	3,330	3,570
State Total	**6,991.9**	**7,810**	**8,620**	**9,290**	**10,010**	**10,780**

Source: Planning for Sustainable Tourism, DBEDT (2006)

During the 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 would be through education and outreach, which is one of the management priorities in this ORMP.

University of Hawai‘i (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 Hawai‘i’s coastal and ocean resources.

Commercial and Recreational Ocean Uses

Hawaii’s oceans are used extensively 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 undertaken by the University of Hawai‘i Economic Research Organization (UHERO) in conjunction with UH Sea Grant will shortly provide specific data. Whether someone stand up paddles, rides a catamaran, or simply picnics beside the ocean has some intrinsic value to a state completely surrounded by the ocean. Cultural practices, such as *limu* (seaweed) gathering, salt farming, and fishponds are all connected to the ocean and water.

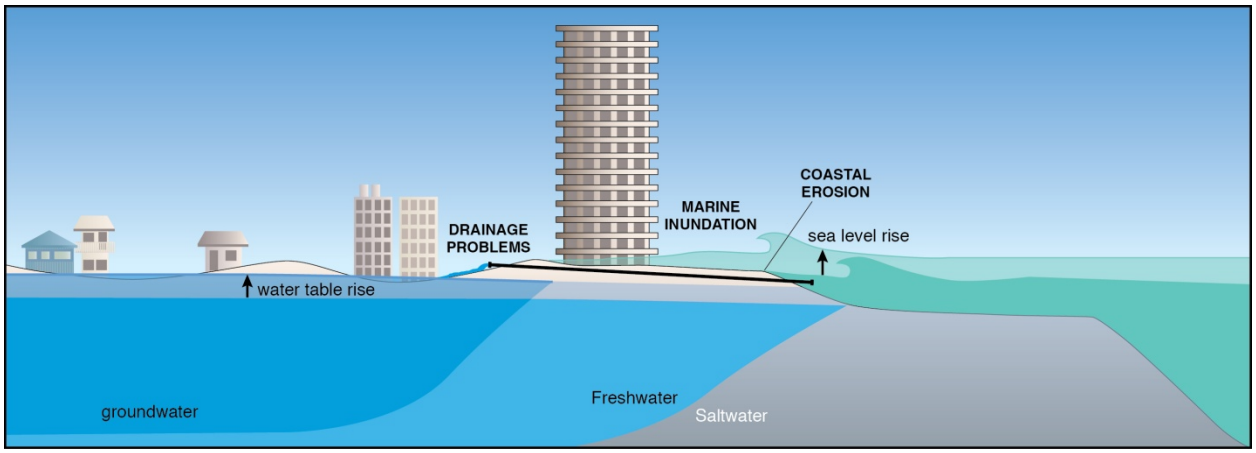
All of these uses of ocean and coastal resources can and do co-exist. One management priority of this updated ORMP is to address conflicting uses through non-judicial means. Another management priority is to create a coastal and marine spatial planning program which can identify map all of the uses of coastal and marine resources.

Sea Level Rise and Other Coastal Hazards

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 3-2 below, from Dr. Chip Fletcher at the UH School of Ocean and Earth Science and Technology (SOEST), illustrates the coastal hazards that can develop from sea level rise.

Figure 3-2: Sea Level Rise and Other Coastal Hazards



Source: Dr. C. Fletcher, 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.

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 alien 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 federal efforts are underway to assess and plan for debris. NOAA and federal agencies are working with states and counties to develop planning guides to establish protocols for a variety of scenarios to address 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, 2010), 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 3-3.

Figure 3-3: Marine Debris Removed from Kanapou, Kahoʻolawe, Before and After Photos

Source: Kahoʻolawe Island Reserve Commission, Kanapou Cleanup

The HI-MDAP identifies four goals to reduce marine debris, each accompanied with strategies to be implemented in the near future. The four goals are:

- 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

The update of HI-MDAP and an approach to Japan tsunami marine debris are discussed in the next section.

Aquatic Invasive Species

Aquatic invasive species (AIS) are non-native plants and animals introduced into a water body with the potential to harm the ecosystem, people, and/or the economy. The *2006 ORMP* discussed AIS, and later in this ORMP there will be a discussion on terrestrial invasive species, which has similar consequences to the environment as relating to watersheds.

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 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 Hawaiʻi. Prevention and early detection are essential in the control of aquatic invasive species.

	For more information on USCG Ballast Water Management, see: http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp

Aquatic invasive species can be introduced accidentally by sea faring vessels, as ballast water used by vessels and biofouling of submerged areas are the major mechanisms by which vessels act as a pathway for introduction of marine alien 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 below, which covered Lake Wilson and other waterways on O'ahu in 2003 and cost over $1 million dollars to eradicate.

Figure 3-4: Salvinia Molesta

Source: Department of Land and Natural Resources

The Aquatic Invasive Species Response Team (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 the introduction of non-native species into the state's waterways.

Another AIS Team response is 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 *loi*, or 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 3-5: Apple Snail

Source: Department of Agriculture

	For more information on Aquatic Invasive Species in Hawai'i, see http://www.hawaiiinvasivespecies.org/cgaps/aquatic.html http://www.state.hi.us/dlnr/dofaw/hortweeds/ http://hawaii.gov/hdoa/pi/ppc/cm_as

Section Two: Key Ocean-Related Issues Identified in Other Plans of State and Federal Agencies

Since completion of the ORMP in 2006, there have been changes and new advancements in the state. For that reason, the ORMP evaluation and update process is conducted every five years to assess current conditions and progress implementation. The ORMP seeks to provide linkages and common goals among state and county plans to assist in implementing initiatives already in place. Since the development of the *2006 ORMP*, the following plans have played a major role in identifying pressures and issues important in Hawai‘i and aims to address them.

Hawai‘i 2050 Sustainability Plan, 2008

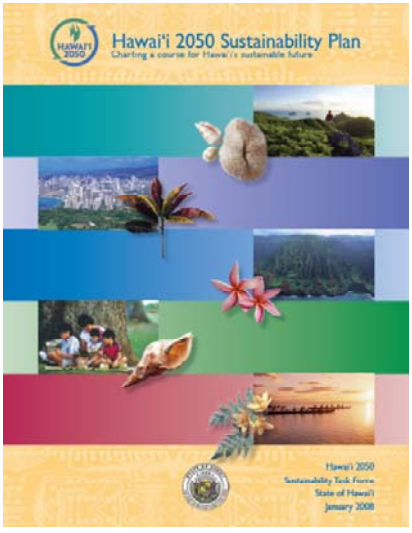
The State Legislature mandated a State Sustainability Plan, and it was completed in 2008. The significance of the *Hawai‘i 2050 Sustainability Plan* is that it provides the State’s first definition of sustainability; a Hawai‘i that achieves the following:

- 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:

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

The strategic actions outlined in the plan serve as a guide implementing the sustainability goals. Once the strategic actions were developed, there was a desire for tangible targets and benchmarks in the form of priority actions and intermediate steps with a target date of 2020. These would serve as indicators of success or failure.



Goal 1 states that in order to be successful in living sustainably, the goal needs to be a collective action by all. Young people need to be engaged and education; furthermore, expanding public awareness.

Goal 2 identifies diversification as a means to safeguard our economy in the unpredictable future, making Hawaii’s economy more resilient.

Goal 3 is most directly connected to the ORMP as it deals with the environment and natural resources. 88.78% of Hawaii’s energy comes from petroleum, yet the U.S. Department of Energy indicates Hawai‘i is one of the best positioned states for renewable energy potential, with abundant wind, solar, geothermal, and other resources. Secondary impacts caused by the use of petroleum for energy include global warming and climate change, which are

anticipated to produce sea level rise and more intense and frequent storms, impacting coastal communities.

Goal 4 states, "*We have the makings of a community that when determined can achieve great things*." The main focus of this goal relates to the community as a resource as well as community resilience.

Goal 5 acknowledges that Hawai'i is the most ethnically diverse state in the nation, yet is not appreciated or described through data. There is a need to build on the ethnic diversity which significantly contributes to making Hawai'i unique.

The following *Sustainability Plan* strategic actions and suggested benchmarks are directly related to the Perspectives and Management Goals outlined in the *2006 ORMP*:

- Reduce reliance on fossil fuels (Goal 3, Strategic Action 1): Pursuant to Act 95 (SLH 2004), Hawaii's existing renewable portfolio standard goal was replaced with an enforceable standard. Under the new standard, called the Hawai'i Clean Energy Initiative (HCEI, 2008), Hawai'i will achieve 70% clean energy by 2030, with 30% from efficiency measures and 40% of electricity locally generated from renewable resources.
- Develop a sustainability ethic (Goal 1, Strategic Action 1): 85% of Hawai'i residents consider sustainability to be a "critically important" issue to our state. The *2050 Sustainability Plan* also suggests setting benchmarks on various aspects of consumer behavior, including per capita water consumption; per capita alternate energy consumed; use of solar water heating sources; and participation rate in recycling programs.
- Preserve and perpetuate our Kanaka Maoli and island culture values (Goal 5, Strategic Actions 1 and 2): Hawai'i residents attend a cultural event at least once a quarter.

The "Triple Bottom Line" approach, outlined in the plan, is where economic, community, and environmental goals are balanced.

To learn more about the *Hawai'i 2050 Sustainability Plan*, visit: www.hawaii2050.org

A New Day in Hawai'i, 2010

The *New Day Plan* functioned as the platform for Governor Neil Abercrombie's campaign in 2010 and now serves as the public policy roadmap for the State Administration. New projects and programs are now called "New Day" throughout the Administration if they fit within the contents of this document.

The New Day Plan includes sections on: Economy, Education, Energy, Environment and Natural Resources, Food and Agriculture, and Technology and Innovation. The ORMP is a policy document guiding New Day actions that relate to ocean resources.

Ideals of rebuilding the economy are focused around increasing self-reliance and protection of Hawaii's resources by providing our own energy, growing our own food, and advancing sustainable tourism and development. The UH system has been an underutilized resource in Hawai'i and the *New Day Plan* seeks to put UH in a leadership role for each element of the comprehensive plan, in turn, advancing technology and innovation. Energy as an economic enterprise will create "green" jobs and grow local businesses, and money will be retained in the state rather than investing in imported oil.

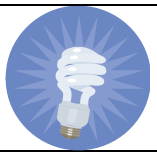
Consumption of the state's natural resources must be sustainable over time with proper stewardship. Improvements to prevention, management, and response to invasive species are required. The state must prepare for impacts of climate change. A statewide integrated plan for solid waste needs to be developed.

Preservation of agricultural lands for growing food will allow Hawai‘i to be more secure against disruptions in food supply.

The *New Day Plan* states that all of these issues can be improved through collaboration and cooperation, which is identical to the ORMP's *Perspective 3: Promoting Collaborative Governance and Stewardship*. The State Office of Planning participates 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 Goals in the *2006 ORMP* that involve improving coastal water quality, ocean sustainability, ocean resource protection, and addressing invasive species.

Figure 3-6: Kalo Production in Hanalei Watershed

Source: Office of Planning



To learn more about A New Day in Hawai‘i, visit: www.hawaii.gov/gov/about/a-new-day

2009-2013 University of Hawai‘i Sea Grant Strategic Plan, 2010

The *2009-2013 University of Hawai‘i Sea Grant Strategic Plan* was completed in 2010. This Strategic Plan establishes a five-year work plan, and it is the first *UH Sea Grant Strategic Plan*.

UH Sea Grant is part of a national network of 32 university-based programs that promote better understanding, conservation, and use of coastal resources. UH Sea Grant is part of SOEST. They partner with NOAA's Coastal Services Center, the Office of Ocean and Coastal Resource Management, and the National Centers for Coastal Ocean Science, among others. UH Sea Grant was designated as one of five founding Sea Grant College Programs in 1972.

The *Sea Grant Strategic Plan* is aligned with the *NOAA National Sea Grant College Program Strategic Plan 2009-2013: Meeting the Challenge.* This Strategic Plan was also guided by the *University of Hawai‘i at Mānoa Strategic Plan* and the *University of Hawai‘i at Mānoa Institutional Proposal.* UH Sea Grant will concentrate their efforts in five areas:

1. Healthy coastal ecosystems
2. Sustainable coastal development
3. Safe and sustainable seafood supply
4. Hazard resilience in coastal communities
5. Sustainable coastal tourism

Figure 3-7: Instilling Principles of Coastal Tourism at Hanauma Bay Education Center

These five areas of concentration are the basis for the *Strategic Plan* Goals, which are each tied into several strategies, outcomes, and associated measurable objectives. The ORMP helped to inform the *2009-2013 UH Sea Grant Strategic Plan.* All of the Strategic Plan Goals are very similar to the Management Goals/Strategic Actions in the ORMP.

UH Sea Grant is currently updating their Strategic Plan for release sometime in 2013.

Source: UH Sea Grant's Center for Sustainable Coastal Tourism

Hawai'i Marine Debris Action Plan, 2010

The *Hawai'i Marine Debris Action Plan* (HI-MDAP) was published in 2010 by the NOAA Office of Response and Restoration, Marine Debris Program. This is the nation's first ever State Marine Debris Action Plan and it is a federal plan

HI-MDAP builds upon the significant ongoing and past efforts of Hawaii's marine debris community, including government agencies, nongovernmental organizations, academic institutions, and private entities.

The purpose of the HI-MDAP is to establish a comprehensive framework for strategic action to reduce the ecological, health, safety, and economic impacts of marine debris in Hawai'i by 2020. HI-MDAP recognizes that the marine debris issue is complex, and there is a role for everyone in the implementation of the plan.

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. To accomplish this, the plans set forth four goals:

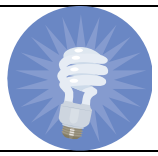
1. Reduce the backlog of marine debris
2. Decrease the introduction of solid waste and fishing gear at sea and coastal areas
3. Decrease the number of abandoned and derelict vessels
4. Reduce land-based debris in waterways

Figure 3-8: Marine Life Entanglement and Marine Debris

Source: Hawai'i Marine Debris Action Plan

Any sightings of Japan Tsunami Marine Debris (JTMD) can be reported to contact DLNR at dlnr@hawaii.gov with a detailed description, any photos available, and date and location of JTMD.
Or JTMD sightings can be reported to NOAA at disasterdebris@NOAA.org

This Marine Debris plan was written more than two years before the Sendai Earthquake and Japanese Tsunami (March 2011). In 2012, tsunami debris is just beginning to wash up on the northwestern tip of the U.S. and Alaska. It is predicted that 1.5 million tons of debris will reach North American shores, including everything from ghost ships, pieces of buildings, personal belongings, to smaller pieces of flotsam and jetsam. NOAA predicts debris will hit the Northern Hawaiian Islands in 2012, then move slowly onto Alaska, Canada, and the U.S. West Coast before circling back to Hawai'i again. The *Hawai'i Marine Debris Action Plan* is currently being updated to address these issues for release in October 2012. Within the updated HI-MDAP, NOAA is coordinating federal, state, and local agencies as well as nongovernmental organizations to address the tsunami debris from Japan for Hawai'i.



To learn more about the Hawai'i Marine Debris Action Plan, visit: www.marinedebris.noaa.gov/projects/himdap.html

The state agencies that will implement the *Hawai'i Marine Debris Action Plan* are DLNR, including the Kaho'olawe Island Reserve Council, DOT Harbors Division, DOH Clean Water Branch and Environmental Health Administration, and the Office of Planning CZM Program. County agencies that will need to partner with the state include the Public Works and Environmental Services divisions that handle solid waste.

Hawaiian Islands Humpback Whale National Marine Sanctuary Plan Review Process

The Hawaiian Islands Humpback Whale National Marine Sanctuary (Sanctuary) was designated by an act of Congress in 1992 as a single-species sanctuary to protect humpback whales and their habitat. As stipulated in a compact agreement signed in 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 Sanctuary operations. NOAA and the State of Hawai'i determined that co-managing a Sanctuary would provide additional resources and expertise to enhance the protection of humpback whales and their habitat. The 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 Sanctuary. Sanctuary staff works 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 purposes and policies of the National Marine Sanctuaries Act (NMSA, 16 U.S.C. 1434(e)) requires NOAA to periodically review and evaluate the implementation of management plans and goals for each national marine sanctuary. Accordingly, NOAA must revise management plans and regulations as necessary to ensure that national marine sanctuaries continue to best conserve, protect, and enhance nationally significant living and cultural resources. Currently the primary purpose of the Sanctuary is to protect humpback whales and their habitat within the Hawaiian Islands. However, the Sanctuary was mandated by Congress in the 1992 Hawaiian Islands National Marine Sanctuary Act to identify and evaluate additional resources and ecosystems of national significance. During the last review of the

Sanctuary's management plan in 2002, numerous public comments requested the Sanctuary to increase its scope to include the conservation and management of other marine resources and species.

To learn more about the Hawaiian Island Humpback Whale National Marine Sanctuary and the management plan review process, visit: www.hawaiihumpbackwhale.noaa.gov

The current management plan review (MPR) began in 2010, and this process will result in a new management plan for the Sanctuary. The MPR process helps to evaluate gaps in existing marine conservation efforts in Hawai'i and identify potential roles for the Sanctuary in future management. No final decisions have been made, and there continues to be many opportunities for public engagement.

There has been a high level of community engagement in the Sanctuary management plan review process. In the spring of 2010, statewide informational meetings were held to ensure that the public was aware of the opportunity to participate in the sanctuary public scoping process. A 90-day public scoping period held in the summer and fall of 2010 included 10 statewide public meetings and generated over 12,300 submissions.

The Office of Planning coordinated with the Sanctuary during the public scoping meetings to ensure that the comments received could be used to inform the update of the ORMP. Prior to each of the public scoping meetings, a letter from the Director of the State Office of Planning, addressed to meeting participants care of the Sanctuary, stated "The Sanctuary's management plan review coincides with our upcoming update of the ORMP, and the Sanctuary has graciously agreed to share the input they received from the public so that it can be used to inform our future update. In this manner, your concerns, comments, and suggestions will help influence several management efforts within the state."

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

1. Climate Change
2. Ecosystem Protections – Species and Habitats
3. Enforcement
4. Humpback Whale Protections
5. Management Effectiveness
6. Marine Animal Assessment and Response
7. Maritime Heritage
8. Native Hawaiian Culture
9. Ocean Literacy
10. Offshore Development
11. Water Quality

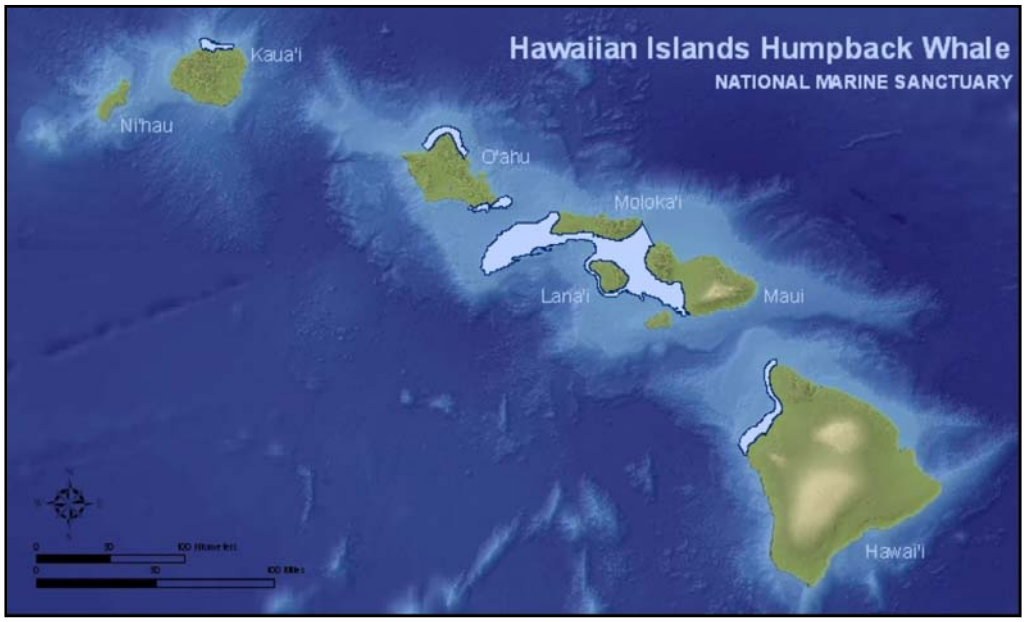
To learn more about The Sanctuary working group reports: www.hawaiihumpbackwhale.noaa.gov/management/working_group_reports.html

Working groups were formed by the community-based Sanctuary Advisory Council (council) to address the priority issues. In 2011, council working group participants contributed over 2,000 hours of service. Working groups were comprised of council members, cultural advisors, local stakeholders, technical experts, and state and federal agency representatives. The groups identified gaps in current resource protection efforts and possible roles the sanctuary could play in future management efforts and developed management recommendations. Working group reports were presented at an open public meeting to the full council for their review and approval in January 2012. The reports contain over 150 management recommendations including shifting from a single-species to

an ecosystem-based sanctuary. The council forwarded all recommendation reports to Sanctuary management to be considered for inclusion in the draft revised management plan. The recommendations do not necessarily reflect the views of the Sanctuary, the State of Hawai'i, or the National Oceanic and Atmospheric Administration.

These priority issues raised during the public comment period and addressed in the council management recommendation reports are also of interest to OP-CZM. OP has a non-voting member on the Sanctuary advisory council and Sanctuary staff participates on both the ORMP Working Group and Policy Group to improve coordination between the two programs.

Figure 3-9: Hawaiian Island Humpback Whale National Marine Sanctuary Boundaries



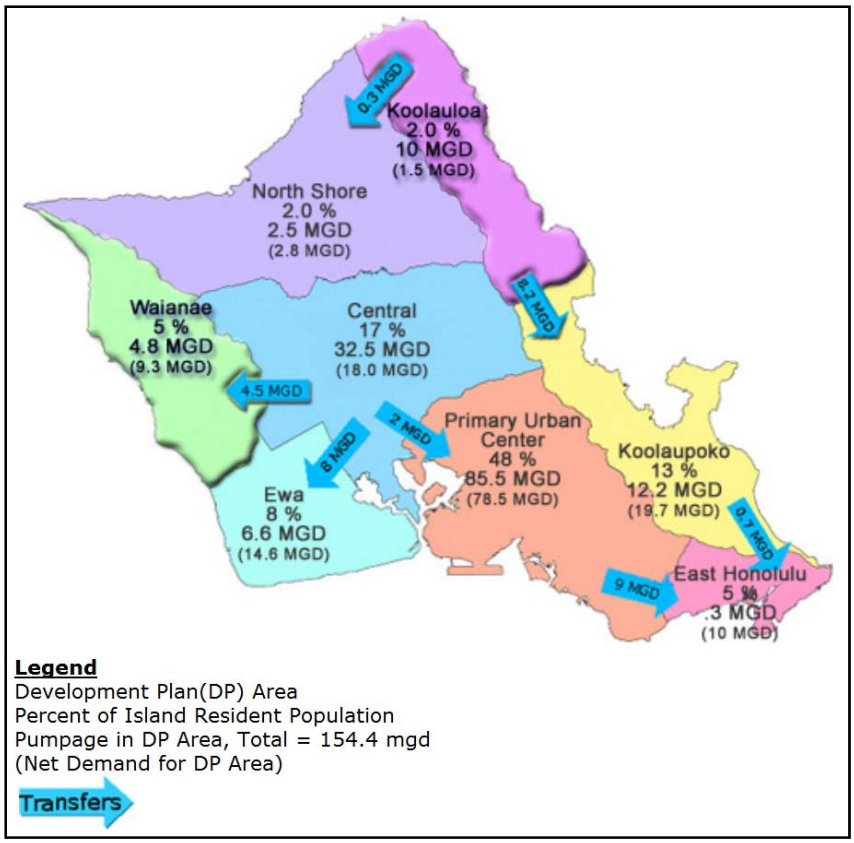
Source: Hawaiian Islands Humpback Whale National Marine Sanctuary

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, as shown in Figure 3-10 and designated as Development Plan (DP) areas under the City and County of Honolulu Department of Planning and Permitting (DPP). 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."

	To learn more about the Honolulu Board of Water Supply Watershed Management Plans, visit: www.hbws.org/cssweb/display.cfm?sid=1406

Figure 3-10: O‘ahu Development Plan Areas



Source: Honolulu Board of Water Supply

The Wai‘anae and Ko‘olau Loa Watershed Management Plans (WMPs) were adopted by the Honolulu City Council in August 2010 as Bills 9 and 10, respectively, revising Chapter 30 of the Revised Ordinances of Honolulu (ROH). The State Commission on Water Resource Management (CWRM) subsequently adopted the plans in March 2011. The Ko‘olaupoko WMP was adopted in early 2012, and the North Shore WMP has been initiated.

The *Ko‘olau Loa WMP* identifies the following critical issues and principles:

1. Sustaining rural lifestyle of Ko‘olau Loa – ohana-centered, rural open spaces, limited growth;
2. Cultural and traditional water uses – watershed places, access, plants, stream water taro, fish;
3. Natural resources and watershed ecology (holistic view) – stream waters, biotas, riparian habitat, shoreline, ocean;
4. Healthy and plentiful water supply for community (*waiwai*) – source protection, limited future inter-district transfers;
5. Preserving agricultural uses and water supply – allocation for farming uses, future growth in agriculture; and
6. Watershed management responsibilities – *kuleana (*responsibility*)*, access, community stewards.

The following issues were identified in the Koʻolau Loa Watershed by stakeholders in the community:

1. Relationship of Watershed Plan to Koʻolau Loa Land Use;
2. Traditional and Cultural Water Uses;
3. Koʻolau Loa Ground Water Quantities and Yield Potential;
4. Policy Effects on Private Lands, Water Sources, and Systems;
5. Water Uses and Allocation;
6. Punaluʻu Watershed Alliance Model;
7. In-Stream Flow Standards, Species, and Protected Habitat;
8. Flooding Issues in Koʻolau Loa Watersheds;
9. Kahuku Training Area – Stryker Brigade;
10. Polluted Runoff Control and Ocean Protection;
11. Policy Limits on Future Source Development in Koʻolau Loa; and
12. Forestry Management.

2005-2015 Hawaiʻi Tourism Strategic Plan, 2003

Figure 3-11: Cruise Ship at Honolulu Harbor

Source: 2005-2015 Hawaiʻi Tourism Strategic Plan

The *Hawaiʻi Tourism Strategic Plan* has been in effect during the *2006 ORMP* Demonstration Phase. Hawaii's economy is dependent on tourism which in turn depends on the State's ocean resources. The plan's vision is to move towards a sustainable and responsible tourism industry for the State, and more specifically, "By 2015, tourism in Hawaiʻi will: honor Hawaii's people and heritage; value and perpetuate Hawaii's natural and cultural resources; engender natural respect among all stakeholders; support a vital and sustainable economy; and provide a unique, memorable and enriching visitor experience."

The plan's strategic initiative on natural resources outlines the following goals:

- Respect, enhance, and perpetuate Hawaii's natural resources to ensure a high level of satisfaction for residents and visitors. This goal has the following issues:
  - There are competing demands for decreasing financial resources.
  - Improved coordination and collaboration are needed to leverage resources.
  - Increasing usage of sensitive natural resource sites is a cause for concern.
  - There are increasing numbers of tour activities in natural resource areas.

- To perform collaborative research and planning for use in the development of programs, policies, and plans that will positively contribute to the state's economy, benefit the community and sustain Hawaii's resources. This goal has the following issues:
  - Ever-changing events and trends impact tourism.
  - Tourism research is conducted by various entities but not often coordinated or shared.
  - Current methods do not always capture true public opinion.
  - County-specific strategic plans to address the visitor industry are not available.

The implementation framework 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. Such measurements provide indicators of the health of Hawaii's visitor industry.

To learn more about the *2005-2015 Hawai'i Tourism Strategic Plan*, visit: www.hawaiitourismauthority.org/default/assets/File/about/tsp2005_2015_final.pdf

While other government agencies identified key issues as they relate to ocean and coastal resource management, the process for this ORMP update helped to identify new and emerging issues expressed by community members and government agencies. These issues are discussed in the next section.

Section Three: Newly Identified Issues Expressed Concerning Ocean Resource Management

Since the publication of the *2006 ORMP*, newly identified issues concerning ocean resource management have become additional driving forces for change. These newly identified issues were expressed by members of the community and ocean resource management agencies through the ORMP update process. Some of these issues are long term, such as climate change adaptation, while others have come to the forefront of the discussions on sustainability, such as food security.

Climate Change Adaptation: Disaster Preparedness & Community Resilience, Flooding, and Coastal Erosion & Sedimentation

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 corals 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, making the ocean more acidic which decreases the rate of calcium carbonate by coral polyps. Without healthy coral reefs, entire ecosystems are at risk.

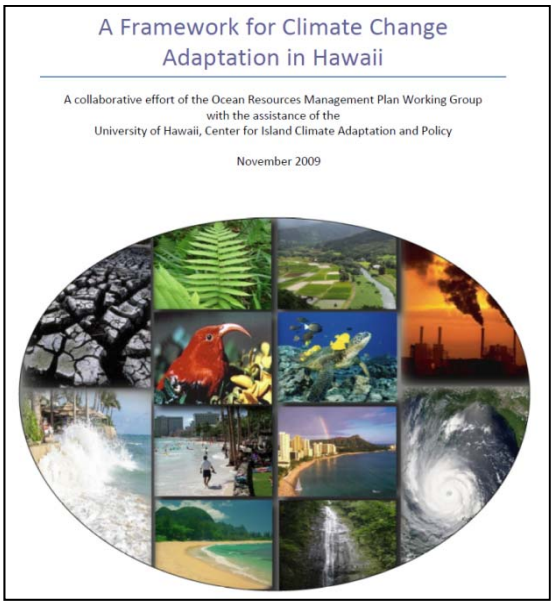
The Intergovernmental Panel on Climate Change (IPCC) predicts that worldwide sea level will rise 1.5 feet over the next 100 years, and has outlined numerous impacts from this rise on coastal communities including: beach erosion, inundation of land, increased flood and storm damage, saltwater intrusion 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 expends, 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 Island,* the beaches of Kaua'i, O'ahu, and Maui are eroding at an average long-term rate of -0.11 meters per year. 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.

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.

Figure 3-12: Impacts on Hawaii's Resources from Climate Change



Source: A Framework for Climate Change Adaptation in Hawai'i

In 2009, the ORMP Working Group and the University of Hawaii's Center for Island Climate Adaptation and Policy (ICAP) prepared *A Framework for Climate Change Adaptation in Hawai'i.* 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 aids 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 SB 2745. This climate change adaptation bill passed the 2012 Legislature and was signed by Governor Neil Abercrombie as Act 286.

To learn more about *A Framework for Climate Change Adaptation in Hawai'i*, visit: www.hawaii.gov/dbedt/czm/ormp/reports/climate_change_adaptation_framework_final.pdf

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 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.

Another issue facing Hawaii's coastal areas is sedimentation from rivers, streams, and other runoff which cause changes in water depth and water quality. 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.

	Hanalei Watershed Hui, Kauai www.hanaleiwatershedhui.org/

The *Hawai'i 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. 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 SOEST plans to document erosion rates for the other islands in the near future.

Urban and agricultural lands are major sources of nonpoint source pollution. Genetically Modified Organism (GMO) crops, pharmaceutical contamination, injection wells, and cesspools were raised as examples of pollution that is occurring. Stream diversions 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.

Shoreline Access & Conflicting Uses

Shoreline access is a right guaranteed in the state constitution (Constitution of the State of Hawai'i, Article 12, Section 7, "Traditional and Customary Rights"). The landmark 1995 Hawai'i State Supreme Court case referred to as PASH or Public Access Shoreline Hawai'i reaffirmed these rights, and 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.

Yet some feel that access is being limited, either through restriction of parking, unavailability of public access in areas that are land locked, or the restriction of protected Native Hawaiian gathering rights. 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 3-13: Recreation at Hanalei Bay, Kaua‘i

Source: Office of Planning

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 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.

Several threats to coral are urban and agricultural runoff, the acidification of oceans, and aquatic invasive species. Many of the Management Priorities in this ORMP address ways to improve the sustainability of Hawai‘i’s corals. The AIS Team discussed earlier 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 AIS Team is using an innovative technique to wrap pier pilings with industrial plastic, smothering the invasive coral. The Nature Conservancy of Hawai‘i and UH are using 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, and this removes the large pieces. The smaller particles remain and can re-attach themselves to the reef and continuing growing, and the next step is to experiment with native seaweed eaters such as sea urchins to control the re-growth.

Figure 3-14: Hawai‘i Coral Reef

Source: The Nature Conservancy

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, monitors biological and human use, and encourages compliance. As of 2011, there are currently a total of eight Makai Watch Groups recognized by DLNR: Puako, 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 in Hawai‘i. Endangered species are federally listed which allows for federal regulation in state waters; furthermore, limiting what is allowed to be done on the local level.

Other protected and endangered species in the marine environment such as the Humpback Whale and the Hawaiian Monk Seal are discussed elsewhere in this report. Many of the same issues, such as user conflicts, recovering populations, and competing for resources apply.

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.

There are Invasive Species Committees on O‘ahu, Maui, Moloka‘i, Kaua‘i, and Hawai‘i Island. For more information on these committees, see: www.hawaiianinvasivespecies.org/iscs/

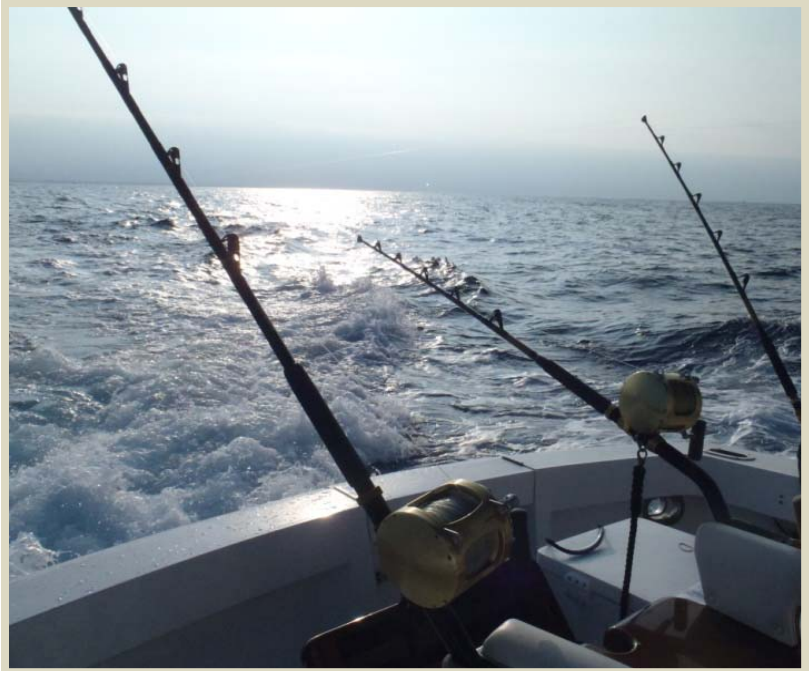
An issue discussed in Chapter VI, Management Priorities, is the damage that hoofed animals can do to the watershed. Hoofed animals are also referred to as ungulates and include pigs, goats, deer, and sheep. Some were introduced the islands in the late

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 introduce invasive species. Ungulate barriers such as fencing have been used in forest and watershed to conserve the watershed and forests. Other terrestrial invasive species such as the brown treesnake are important to keep out of the islands because their introduction would wipe out native bird populations, and affect the biodiversity of the forests.

Food Security: Aquaculture and Fishpond Restoration

Those who rely on subsistence fishing note that fish stocks are not as plentiful as they once were. Issues contributing to the dwindling supply include sedimentation, competition with invasive species, and aquarium fish collection. Invasive species such as Ta‘ape and non-native seaweed are pushing out native species that residents rely on as a food source. In addition, the depletion of coral reefs in turn causes a loss of biodiversity which impacts not only the island population’s ability to recreate and subsist, but loss to state’s chief income producer, tourism. It is also an indicator of land based pollution that is infiltrating the marine coastal waters system.

Figure 3-15: Commercial Fishing off Kona Coast



Source: Office of Planning

The debate on open ocean and nearshore aquaculture is a contentious topic as new aquaculture facilities are being proposed. Industries in place or being considered include ahi, clams, oysters, moi, and sea bass. Aquaculture is anticipated to help address the food security issue. Some opposing views see aquaculture as a potential source of pollution and creating competition for local fishers.

One method to diversify food production is Native Hawaiian Fishpond Restoration. Ongoing efforts to restore existing fishponds are occurring, such as in He‘eia, on the island of O‘ahu and on the island of Moloka‘i. These efforts are looked at as an opportunity to address food security, as well as instill the Native Hawaiian culture for generations to

	He‘eia Fishpond Restoration, O‘ahu http://www.paepaeoheeia.org/

come. The sentiment is that Native Hawaiians thrived using such methods, so carrying on the approach to food production would be a sustainable way of living.

Military Use of Lands

The military presence is an integral part of Hawaii's history and present as well as a major driver of the state's economy. National and homeland security requires that access to certain shorelines, such as at Pearl Harbor, are off limits to the general public, pre-empting state laws. 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 bases 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 and well as 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 leftover 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 Kaho'olawe, which was used as a U.S. Navy training facility 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.

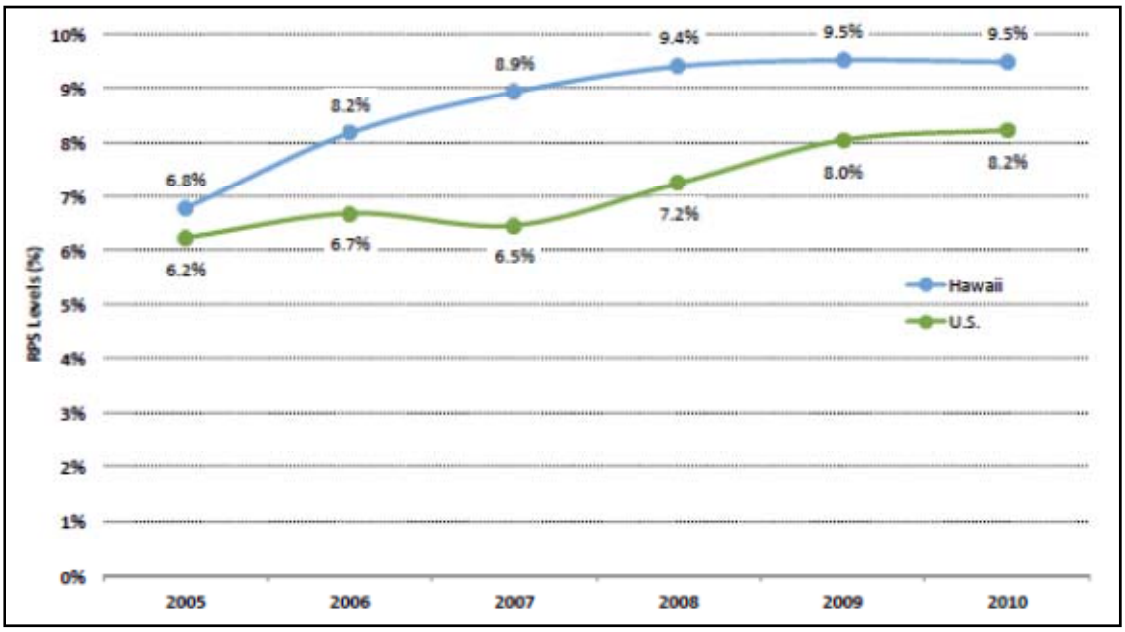
Alternative Energy

Under the Hawai'i Clean Energy Initiative (HCEI) and subsequent 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 40% leave much work to be done. Hawaii's renewable electricity generation as a percentage of total generation is approximately 11-12%, according to annual Renewable Portfolio Standards (RPS) reports submitted by the electric utilities to the Hawai'i Public Utilities Commission. 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 3-16 on the following page.

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. This 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 Renewable Portfolio Standards percentage and lower the state's dependence on foreign oil imports, over 75 renewable energy projects have been 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) Task Force, the sustainable development of Hawaii's marine resources is a major component of HCEI.

Figure 3-16: Hawai'i Renewable Energy Generation 2005-2010



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

Proper siting and cumulative planning of renewable energy projects is 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 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 via 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.

Section Four: Promoting Collaboration and Stewardship

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

Many issues also present multi-jurisdictional challenges, which can be overcome with the kind of collaboration exhibited at the ORMP Policy Group and ORMP Working Group. For example, the State's ocean resources constitute three miles seaward of the coastline. Within that three mile boundary, there are other federal agencies that have jurisdiction such as the Sanctuary, the U.S. Navy for military operations, and the U.S. Coast Guard for rescue and enforcement.

Federal agencies are more and more deeply involved and in general, they have greater financial resources than state and county agencies. Partnering with federal agencies will enable the State of Hawai'i to stretch its dollars and resources to accomplish many of the new ORMP Management Priorities outlined in Chapter VI.

Partnering with county planning agencies enables the ORMP partnering groups to understand and incorporate the plans of individual counties. Many non-governmental agencies have also become partners in collaboration and stewardship, helping to further the ORMP Three Perspectives through their collective actions.