



Section 309 Enhancement Area Grant Program

FY 2006-2010

Assessment and Strategy



Office of Planning
Department of Business, Economic Development and Tourism
State of Hawaii

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Table of Contents

Title	Page
Glossary of Acronyms and Terms	1
I. Introduction Section 309, CZM Assessment and Strategy, 2006-2010	3
II. Summary of Hawaii’s CZM Program Efforts from 2001-2005	5
III. Enhancement Area Assessment and Strategy	8
A. Coastal Hazards Assessment and Strategy	8
B. Ocean Resources Assessment and Strategy	18
C. Special Area Management Planning/Marine Protected Area Assessment and Strategy	27
D. Cumulative and Secondary Impacts Assessment and Strategy	31
E. Public Access Assessment and Strategy	40
F. Wetlands Assessment	44
G. Aquaculture Assessment	47
H. Marine Debris Assessment	50
I. Energy and Government Facility Siting Assessment	54
IV. Section 309 5-Year Strategy, Schedule, and Summary of Estimate Costs	55
End Notes	
Tabular Summary # 1	56
Work Plan – Implementation Elements, Schedule and Estimated Costs	
Enhancement Area - Coastal Hazards	
Tabular Summary # 2	57
Work Plan – Implementation Elements, Schedule and Estimated Costs	
Enhancement Area – Cumulative and Secondary Impacts	
Tabular Summary # 3	60
Program Expenditures by Fiscal Year and by Enhancement Area	
2006 –2010	

Glossary of Acronyms and Terms

ADA	Americans with Disabilities Act
ADP	Aquaculture Development Program
AELR	Annual Earthquake Loss Ratio
Ahupua'a	Hawaiian Geographic Area Designation Stretching from Mountains to the Sea
BMP	Best Management Practices
CD	Civil Defense
CIP	Capital Improvement Project
CNPCP	Coastal Nonpoint Pollution Control Program
CRI	Coral Reef Initiative
CSI	Cumulative and Secondary Impacts
CWCS	Comprehensive Wildlife Conservation Strategy (Hawaii)
CZM	Coastal Zone Management
DAR	Division of Aquatic Resources
DLNR	Department of Land and Natural Resources (Hawaii)
DOA	Department of Agriculture (Hawaii)
DOH	Department of Health (Hawaii)
DOT	Department of Transportation (Hawaii)
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (US)
FEMA	Federal Emergency Management Agency
FMA	Fishery Management Area
GIS	Geographic Information System
HAZUS	Hazards, U.S. – a FEMA Computer Program that Estimates Earthquake Losses
HOCC	Hawaii Ocean and Coastal Council
HRS	Hawaii Revised Statutes
IBC	International Building Code
ICC	International Coastal Cleanup
I-Codes	International Codes
IRC	International Residential Code
LID	Low Impact Development
LUC	Land Use Commission
MACZAC	Marine and Coastal Zone Advocacy Council (Hawaii)
MLCD	Marine Life Conservation District

NAR	Natural Area Reserve
NMS	National Marine Sanctuary
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWIHI	Northwest Islands of Hawaii
OCRM	Ocean and Coastal Resource Management
OEQC	Office of Environmental Quality Control
OP	Office of Planning (Hawaii)
ORMP	Ocean Resources Management Plan
SMA	Shoreline Management Area
TMDL	Total Maximum Daily Load
UH	University of Hawaii
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WEC	Waianae Ecological Characterization
WPFMC	Western Pacific Fishery Management Council

I. Introduction Section 309, CZM Assessment and Strategy, 2006-2010

The Office of Planning (OP), Department of Business, Economic Development and Tourism, State of Hawaii, the State's lead agency for the administration of the Coastal Zone Management (CZM) Program in Hawaii (Hawaii's Coastal Zone Management Act of 1977 CZM, 205A, Hawaii Revised Statutes (HRS) and National Coastal Zone Management Act, 1972; herewith submits the Section 309 Assessment and Strategy for the five-year period 2006-2010.

This document is submitted to the federal office of Ocean and Coastal Resource Management (OCRM), National Oceanic and Atmospheric Administration (NOAA), as the qualifying basis for Section 309 Enhancement Grants and will identify:

- (a) **Changes** that have occurred,
- (b) **Problems** that have been addressed,
- (c) **New issues** that have arisen,
- (d) **Changes in the status** of resources, and
- (e) **Priority directions** for continuing actions and improvement of program effectiveness in each of the enhancement areas which include endangered species, special marine areas, and coral reefs.

Hawaii has been a participant in the federal voluntary Section 309 granting process since 1992 and this Assessment and Strategy becomes the fourth such report submitted to describe the progress of the State's active CZM Program. This Assessment and Strategy report was developed on the basis of information gained by survey questionnaires, research, interviews with resource people, public meetings, and written comment.

The format of this 2006-2010 Assessment and Strategy Report conforms to OCRM's Section 309 "Guidance," dated March 2005.

Priority directions for future efforts in Enhancement Areas resulted from analyses of the information gathered through survey questionnaires, interviews, public meetings, written comments, and the nature and direction of current strategies, as well as the evaluation of key personnel experienced in Hawaii's CZM Program. The resulting priority directions are as follows with coastal hazards being the first priority, followed by ocean resources, special area management/marine protected areas, cumulative and secondary impacts (CSI), public access, wetlands, aquaculture, marine debris, and energy sitings. These priorities will be further adjusted by past program momentum, new directional influences, and administrative insights.

While five enhancement areas were deemed as "high priorities" by survey, evaluation of program status and practitioner opinion, OP desires to concentrate resources on two of the selected enhancement areas, coastal hazards and CSI. This approach is founded on (1) the desire

to provide more assurance of success in goal achievement for the five-year period, and (2) the work program items selected for the CSI area also serve to provide improvement programs for the areas of ocean resources and SMA Planning. The updated ORMP for Hawaii, a high priority in the ocean resources enhancement area, is on-schedule for completion under present programming and future priorities in this area will turn to its implementation. Program changes in the CSI area, while pursuing goals specific to this category, are also oriented to implementing elements of Hawaii's ORMP as well as assisting in the enhancement and protection of SMAs. Thus, although concentrating strategies for two enhancement areas, the nature of the proposed CSI work program actually serves to provide program improvements in four enhancement areas, i.e., coastal hazards, CSI, ocean resources, and SMA Planning. Consequently, except to note the connection to the Ocean Resources and Special Area Management Planning areas, strategies will only be provided for Coastal Hazards and CSI.

II. Summary of Hawaii's CZM Program Efforts from 2001-2005

It is not surprising that Hawaii, an Island Archipelago State with over 1,000 miles of tidal shoreline and millions of acres of jurisdictional ocean waters, supports an extensive and comprehensive coastal zone program consisting of progressive enhancement efforts--Hawaii's previous Section 309 Assessment and Strategy (2001-2005), determined priority enhancement areas to be those of Cumulative and Secondary Impacts (CSI), Ocean Resources, Coastal Hazards, Public Access, and Marine Debris.

A summary of the breadth of Hawaii's CZM Program and integrally related actions in the CZM enhancement areas during the five-year period 2001-2005, follows:

Coastal Resources – Protection and Impact Mitigation

The shoreline setback law (205A, HRS) establishing building restrictions and setbacks in coastal areas, continues to be applied by all four Counties in the State of Hawaii. The system has been periodically refined by new legislation, response to problems, and research and innovative applications. Such an innovation has been developed by the County of Maui where the required shoreline setback is now calculated on the basis of a present coastal erosion rate applied for 50 years. The overall Special Management Area (SMA) permit process has been recently evaluated under a 309 grant and recommendations are available for its refinement.

In 2003, the Hawaii State Legislature enacted, and the Governor signed into law, a landmark statute that keeps newly accreted land along the shoreline in public ownership in perpetuity and places it in a conservation district. Previously, a private owner abutting the shoreline could claim and acquire such accreted land.

Ocean Resources – Protection

Updating of the State's Ocean Resources Management Plan (ORMP) has been in progress and the proposed revised plan will be submitted to the 2007 session of the State Legislature.

In December 2000, the President issued an Executive Order establishing a Coral Reef Ecosystem Reserve covering the Northwest Islands of Hawaii (NWIHI), an archipelago of uninhabited islands within the State of Hawaii, extending some 1200 miles north of the Island of Kauai. In September 2005, Governor Linda Lingle signed an Executive Order establishing the Northwest Island region as a State marine refuge and regulating commercial fishing there. In June of 2006, the President designated the Northwest Islands of Hawaii (NWIHI) as a national monument. NOAA and the United States Fish and Wildlife Service (USFWS) in partnership with the State of Hawaii, continue to fund research on coral reefs in the NWIHI chain and in other State of Hawaii waters.

Working jointly with the State's CZM Program, assisted by Section 310 funds and in fulfillment of directives from NOAA and the Environmental Protection Agency (EPA), in the "Final Administrative Changes to the Coastal NonPoint Pollution Control Program Guidance for

Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1998” (October 1998), the State’s Department of Health (DOH) completed *Hawaii’s Implementation Plan for Polluted Runoff Control* (July 2000). DOH also participated with other State and federal agencies¹ under the guidance of EPA and the U.S. Department of Agriculture (USDA)-National Resources Conservation Service in the production of *Hawaii’s Local Action Strategy to Address Land-Based Threats to Coral Reefs* (2004). DOH also continued to annually update its designation of impaired watersheds, conduct stream assessments, and conduct Total Maximum Daily Load (TMDL) studies on streams contributing pollution to the designated impaired water bodies. DOH also has prepared amendments to Hawaii’s water quality standards contained in its administrative rules. The State and local governments continue to comply with and apply the National Pollutant Discharge Elimination System (NPDES) requirements of the Clean Water Act (CWA).

The State Department of Transportation (DOT), Harbors Division has developed and applied *Storm Water Discharge Management Plans* for three harbors on Oahu; Honolulu Harbor, Kaleloa Harbor, and Kewalo Basin. The Aquatic Resources Division of the State Department of Land and Natural Resources (DLNR) has developed administrative rules to effectuate the State’s new law (2000) controlling alien species. DLNR is also undertaking the elimination of 60 large-capacity cesspools presently operating at some State parks and at small boat harbors.

Coastal Hazard Mitigation

As of December 30, 2005, the State of Hawaii and each of its four Counties have Federal Emergency Management Agency (FEMA) approved Multi-Hazard Mitigation Plans in place. The Hawaii CZM Program contributed to the production of these plans through provision of technical and/or financial assistance. These plans cover potential hazards arising from hurricanes, tsunamis, floods, earthquakes, wildfires, volcanic action, erosion, droughts, and landslides. On December 9, 2005, NOAA’s National Weather Service announced that Hawaii was designated as the first “Tsunamiready” (Tsunami Ready) state in the United States.

Two major publications were completed and distributed in 2005, with CZM 309 assistance, the *Hawaii Coastal Hazard Mitigation Guidebook*, and *Earthquake Hazards and Estimated Losses in the County of Hawaii*.

Marine Debris

In each year of the period covered by the previous Assessment, the Hawaii portion of the International Coastal Cleanup (ICC), “Get the Drift and Bag It” has been conducted, assisted with CZM 306 funding with satisfying results, and the 2004 success is enumerated in the “Marine Debris” Section of this Assessment. The results of the 2005 cleanup are yet to be tabulated.

¹ See endnotes

Aquaculture

Hawaii was successful in establishing two (its first and second ever) ocean-area leases for aquacultural activities. These activities are directed toward mass-producing of two native fish species, *moi* and *kahala*, which have been depleted by commercial fishing. A Federal Task Force is favorably impressed with the environmental-friendly nature of these “ocean farms” (See page 48 and footnote #19). Geographic Information System (GIS) capability to help search for appropriate sites was enhanced by CZM 306 fund assistance.

Legislation

Additional legislation contributing to the promotion and improvement of Hawaii’s CZM Program in the 2001-2005 period is as follows: controls on alien aquatic organisms imported by shipping, funding for invasive species control, ocean leasing, enforcement of CZM and environmental laws, DLNR authority in all State lands and waters, “safe-harbor” qualifications for landowners participating in conservation measures, and cruise ship sewage control.

Wetlands

State Legislature creates the “Legacy Lands Act” (2005) generating funds to protect watershed lands, coastal lands, habitats, and cultural sites. Oahu’s 1,000-acre Kawai Nui Marsh was designated in 2005 as a Wetland of International Importance, the only such designation in the Pacific region by the Ramsar Convention, an international treaty conservation group.

Public Education and Outreach

The numerous public education and outreach activities conducted during the period 2001-2005 were referenced in the appropriate enhancement area section of this Assessment.

Other

OP reviewed its approach to CZM administration and re-organized approach to make Program administration more efficient and effective. Using 306 program funds, preparations were made to develop a National Coastal Management Performance Measurement System criteria and incorporate criteria into Program administration and reporting.

III. Enhancement Area Assessment and Strategy

A. *Coastal Hazards Assessment and Strategy*

Coastal Hazards Characterization

1. The following chart characterizes the perceived level of risk from the indicated coastal hazards in Hawaii by questionnaire respondents.

Hazard	High Risk	Medium Risk	Low Risk
Hurricanes/Typhoons	●		
Storm Surge	●		
Flooding	●		
Shoreline Erosion		●	
Sea Level Rise			●
Subsidence			●
Earthquake		●	
Tsunami	●		
Volcanic Activity		●	

2. Explanation of changes occurring since the last Assessment and quantitative measures for assessing risks.
 - a. Shoreline erosion (episodic and chronic) has dropped from high to a medium risk assessment. Public awareness about human contributions to erosion (i.e., seawalls, etc.) and regulatory and programmatic promotion of alternatives are beginning to reduce the perceived risks from this coastal event.
 - b. Subsidence has dropped from medium to low risk. This event is perceived to be a relatively infrequent event statewide and therefore considered low risk. Subsidence in Hawaii is also associated with volcanic activity, and volcanic activity is itself a category for risk assessment in this report. However, subsidence is assigned a higher risk level in the County of Hawaii due to experiences there.² Consequently, Hawaii County is studying the historical frequency of subsidence in the Puna District at Kapoho on the southeastern coast with the assistance of CZM 306 funds.

² In December, 2005, Hawaii County experienced a subsidence of some 40 acres of a previous lava flow on the southeastern coastline

- c. Earthquake risk has dropped from high risk to medium risk. Generally, destructive earthquake events are relatively infrequent creating the perception of medium risk. The Island of Hawaii (Hawaii County), however, rates earthquake risk as high. Hawaii County is the third highest county in the nation for earthquake risk according to FEMA's Annual Earthquake Loss Ratio (AELR) approach. (FEMA 366, Sept. 2000)³
- d. Volcanic activity has been added to the list of potential hazards due to the existence of active volcanoes on the Island of Hawaii and the prolonged eruption of Kilauea for 22 years, one of the world's most active volcanoes. The underlying geology of other islands in the State of Hawaii is also volcanic. It is for these reasons that the Multi-Hazard Mitigation Plans in place in the State all contain the category of volcanic hazard.

Discussion of the development of quantitative measures for assessing hazard risks in Hawaii.

- e. The State Civil Defense (CD) Agency, through its Hawaii State Earthquake Advisory Committee, published, *Earthquake Hazard and Estimated Loss in the County of Hawaii*, dated February 2005, which assesses the degree of earthquake risk in the County by estimated future AELR. FEMA's Hazards, U.S. (HAZUS) methodology was adapted for use in Hawaii by customizing the ground motion attenuation, building inventory, and soil types which increased the accuracy of HAZUS in predicting losses in Hawaii County. The Hawaii CZM Program provided technical assistance to this effort as well as 309 program funds.
- f. The Hawaii CZM Program funded an economic study of building code adoption as a hazard mitigation tool in Hawaii County. The study results showed that the economic results yielded a reduction in the Average Annualized Loss for Hawaii County up to 9.4%, and the percent reduction for completely damaged wood buildings was as high as 90%, if the building code was adopted in a timely manner and if the single wall exemption was omitted from the current building code. Timely adoption of each new version of the International Building Code (IBC) was recommended.
- g. The University of Hawaii's (UH) School of Ocean Resource Engineering is engaged in research directed toward assessing impacts and predictability of earthquake-generated tsunamis for the State CD Agency and NOAA⁴. Independent research on potential tsunami generation by local earthquakes is being performed at the Institute for Geophysics at UH.
- h. The East-West Center, an educational and research organization established by the U.S. Congress, is conducting studies on climate change impact on sea levels and the establishment of a Pacific Integrated Ocean Observation System to monitor and predict sea level changes and high waves.

³ *Earthquake Hazards and Estimated Losses in the County of Hawaii*, State of Hawaii Department of Defense, Honolulu, Hawaii, p-1 (February 2005)

⁴ Source: State Civil Defense Agency

3. Discussion of risks from inappropriate development.

The State has taken an extremely significant long-range action to prevent future development from encroaching on seaward-moving shorelines. The 2003 law maintaining accreted coastal land in the public domain in perpetuity, (1) prevents development on the new coastal area (historically, accreted land was developed when privately acquired), (2) a protective buffer to abutting properties is produced by the widening of the beach and the additional vegetation that is supported by it to help diminish the wave energy from storm surges and tsunamis, and (3) the natural resource is preserved and allowed to undergo natural processes and functions such as duning and as species habitat and open space.

4. Synopsis of changes since last assessment:

Multi-Hazard Mitigation Plans: The State of Hawaii and all four Counties within the State have completed and adopted Multi-Hazard Mitigation Plans with CZM technical and 309 program fund assistance. All plans cover potential hazards from hurricanes, earthquakes, tsunamis, flood, wildfires, and lava flows. The lava flow elements of the plan, with particular application to the County of Hawaii which contains an active volcano, benefited from the work of the Lava Flow Mitigation Technical Committee created by the State of Hawaii in 2000, by State CD. In addition, the Counties of Hawaii and Kauai were assisted by the conduct of Risk and Vulnerability Assessments with funding from CZM 309 grants.

Continuing Research: Research activities directed toward assessing the potential impact of tsunamis on the main islands within the State, and toward predicting the probability of tsunami generation from localized earthquakes continues at UH. CZM is working with UH using 309 funds to develop a climatic atlas of tropical cyclones as a forecasting, planning, and emergency management tool. CZM 309 funds are being used to initiate an evaluation of FEMA's HAZUS Multi-Hazard loss estimation model for wind hazards for use in Hawaii, and a wind speed study aimed at providing safety standards for building code revisions.

The East-West Center is also engaged in research to assess the impacts of climate change on ocean conditions (including sea level rise) and weather.

Shoreline Setback: The County of Maui now calculates the required shoreline setback for structures by applying a present coastal erosion rate (determined by 309 grant-assisted aerial photo reconnaissance and analysis) for a 50-year period. In 2004, Maui County also conducted an SMA boundary review with CZM 306 fund assistance. The State DLNR created the new position of "shoreline locator" to make determinations on the location of the shoreline. Continuing discussion is directed at improving the effectiveness of determining shoreline locations. The Marine and Coastal Zone Advocacy Council (MACZAC) has a working group on the subject and the efforts have produced legislative interest in strengthening the statutory definition of "shoreline."

Public Education and Outreach: CZM 309 funds assisted in the production of *The Hawaii Coastal Hazard Mitigation Guidebook*, the *Erosion Control Guidebook*, a revised version of *Tsunami – The Great Wave*, and in conjunction with DLNR, *The Coastal Construction*

Guidebook, all public information documents to help public understanding of coastal hazards. The Hawaii State Earthquake Advisory Committee also published a document, *Earthquake Hazards and Estimated Losses in the County of Hawaii*, with CZM assistance. In addition, a tsunami workshop for the media, hotel security and management, and the Waikiki community, and an Asia-Pacific All Hazards Workshop were conducted in partnership with other agencies and with the assistance of CZM 309 funds.

1. Management Characterization

Category	Change since last Assessment	Significance of Change
Building setbacks/restrictions (Shoreline determination)	SMA process reviewed; basis for revised hazard mitigation standards; new method for setting shoreline on Maui using erosion rate x 50 years. Shoreline now located by State shoreline locator; statutory revision of “shoreline” definition eyed.	Significant ; will help reduce hazard impacts on life and property.
Repair/rebuilding restrictions	See building restrictions.	Significant
Promotion of alternative shoreline protection	All Counties encourage; enforcement continues.	Moderate; prevents additional erosion from “hardened” shoreline.
Renovation of shoreline protection structures	See above	Moderate
Beach/dune protection	Law makes accreted land public in perpetuity; Lanikai beach restoration continues under State program; shoreline location process improved.	Significant ; retention of new beach area and accurate shoreline location provides impact buffer for private property.
Permit compliance	New legislation strengthens enforcement.	Moderate; more effectiveness for regulations.
Inlet management plans	State Harbors Division applies stormwater control standards.	Moderate; helps to control polluted runoff.
Special Area Management Plans	NWIHI declared ecosystem reserve, marine refuge and national monument; new fishery reserve for Hawaii County.	Significant ; staging for designation of NWIHI as marine sanctuary.
Local hazard mitigation planning	Multi-Hazard Mitigation Plans adopted in all 4 Counties. Hawaii County studies earthquake risk.	Significant ; provides state of readiness to mitigate impacts; Hawaii first tsunami-ready state.
Local post-hazard development plans	None	

Real estate sales disclosure requirements	Contained in Board of Realtors Code of Ethics and Statutes, 467, HRS.	Moderate; discloses risks to new owners; heightens public awareness.
Restrictions on publicly funded infrastructure	None	
Public education and outreach	Many forums, workshops, conferences, pamphlets, news releases.	Significant; educates and increases awareness.
Mapping/GIS/tracking of hazard areas	All CD agencies have GIS capability; earthquake areas mapped in Hawaii County; State has GIS layers for Flood Hazard Zones, Lava Flow Hazard Zones, and Tsunami Evacuation Zones; State CD will study historic storm tracks.	Significant; improves ability to plan for, and act to mitigate impacts. Also informs public.

2. **Priority** – Last assessment

Priority – This assessment

High	X	High	X
Medium		Medium	
Low		Low	

Coastal Hazard Strategy

Brief Summary of Coastal Hazards Problem

Injury and loss of life due to natural hazards can be prevented if a community is aware and knowledgeable as to what to do to in the event of a hurricane, flood, earthquake, or tsunami. Property damage resulting from natural hazards can be mitigated by construction in accordance with building codes that incorporate state-of-the-art requirements to protect health, safety, and welfare in the built environment.

In Hawaii, each of the four Counties has adopted various portions of the 1991 or 1997 Uniform Building Code, with the code differing from County to County. In 2000, the Uniform Building Code was replaced by the IBC⁵ as the national standard. Since then, the International Codes (I-Codes)⁶ have become well-accepted throughout the nation. Forty-seven states and the District of Columbia use the IBC and 45 states and the District of Columbia use the International Residential Code (IRC).⁷

⁵ The IBC covers government and commercial buildings and multi-level residential structures (three stories or more).

⁶ There are I-Codes for electrical, plumbing, and many other aspects of design and construction.

⁷ International Code Council, Code Adoptions, <http://www.iccsafe.org/government/adoption.html>

The IBC and its companion IRC⁸ include major improvements in earthquake and hurricane resistant design and construction, as well as flood mitigation design. Such provisions can also increase the capacity of multi-story concrete and steel buildings in coastal areas to survive tsunami inundation without collapse.

The use of the older and inconsistent codes throughout the State of Hawaii is problematic because the codes do not incorporate the latest advances in science and engineering. They also do not provide a uniform and predictable regulatory environment for homeowners and the design, construction, realtor, and insurance industries.

Adoption of the latest codes is not enough. State and County officials and building industry professionals need to be trained in the application and interpretation of these new codes. A large contributor to reducing building losses is the quality of construction. Thus, proper and consistent inspections during construction should take place to control construction quality.⁹ Finally, ongoing public outreach to build awareness and preparedness for natural hazard events is essential.

Identification of Proposed Program Change

- The Hawaii CZM Program proposes as its program change, the adoption of state-of-the-art building codes with customized coastal hazard mitigation standards.
- The code adoption in each County will be followed up with high quality training on interpretation and application of the codes.
- Public outreach and education on natural hazard mitigation will complement this program change throughout the five-year period.

National consensus standards for wind storms, earthquakes, and floods are integrated in the IBC and IRC. These standards also will increase the capacity of multi-story concrete and steel buildings in coastal areas to survive tsunami inundation without collapse.

IBC however, introduces a new topographic factor and wind directionality factor that in their current formulations will not give accurate results in Hawaii. This would lead to a high probability of incorrect design unless wind hazard exposure research specific to Hawaii is conducted and validated. This wind risk assessment work is ongoing in Hawaii. FEMA has funded these wind risk assessments for the City and County of Honolulu and the County of Kauai through its Hazard Mitigation Grants Program. Currently, the Hawaii CZM Program is funding the assessment for the County of Hawaii. Under Years 1 and 2 of this Section 309 Strategy, the Hawaii CZM Program proposes to fund the assessment for the County of Maui (including the Islands of Maui, Molokai, and Lanai). When completed, the State of Hawaii will

(June 13, 2006 update).

⁸ The IRC covers residential structures of one and two stories.

⁹ *HAZUS-99 Economic Analysis of Seismic Retrofit and Improved Building Code Policies as a Hazard Mitigation Tool for Hawaii County*, Martin & Chock, Inc., (December 2004)

have state-of-the-art wind hazard assessments and proposed building code amendments utilizing a uniform, accepted methodology.

Anticipated Effect of the Program Change

The adoption and implementation of these codes will have an immediate and significant effect on mitigating hurricanes, floods, earthquakes, and tsunamis throughout the State of Hawaii.

- *Adoption* of the latest codes is critical in reducing the impacts of natural hazards on the built environment.
- *Training* in the interpretation and application of the codes is an effective way of ensuring that the knowledge and capabilities of those working with the codes are high. State and County officials, design professionals, and the building industry sectors will be notified of and invited to these training sessions. It is likely that trainers will include experts from the International Code Council as well as local experts.
- *Public outreach and education* to increase awareness, understanding of, and preparation for coastal hazards should be continuous.

Appropriateness of the Proposed Program Change

The proposed program change is appropriate for the following reasons:

- The action falls squarely within the federal and State CZM objective of reducing the risks to life and property from coastal hazards. Escalating population growth and development along Hawaii's coastlines, ridgelines, and volcanic slopes puts increasing numbers of people at risk.
- The action advances the State CZM objectives and policies of improving the development review process with respect to coastal hazards and developing and communicating information about coastal hazards.
- Completion of the wind speed assessments is a State priority. Hawaii's FEMA-approved State and County multi-hazard mitigation plans and the Hawaii Geographic Information Coordination Council's I-Plan call for the completion of the wind speed assessments and modeling throughout the State of Hawaii.
- The action addresses all four of the hazards characterized by this assessment as "high risk" (hurricane, storm surge, flooding, and tsunami) and one of the hazards (earthquake) characterized as medium risk. The County of Hawaii is ranked as the County with the third highest earthquake risk in the United States, measured in annual losses per million dollars of building value.¹⁰

¹⁰ *Earthquake Hazards and Estimated Losses in the County of Hawaii*, State of Hawaii Department of Defense, Honolulu, Hawaii, p. 1 (February 2005).

- As a networked agency, the Hawaii CZM Program works in partnership with agencies, committees, and communities with the same goal of reducing the risks of coastal hazards. The Hawaii CZM Program has developed a role in transferring the latest scientific and engineering research results into practical, on-the-ground application in planning and hazard mitigation. This program change reinforces the CZM Program’s role in that arena.
- The action addresses the following Section 309 Programmatic Objectives:
 1. Direct future public and private development and redevelopment away from hazardous areas.
 2. Prevent or minimize threats to existing populations and property from both episodic and chronic coastal hazards.

General Work Plan

The Hawaii CZM Program will procure the services of a qualified firm to conduct the County of Maui wind risk assessment, mapping, and building code amendments. The procurement process and services under the contract combined, will take approximately two years to complete (years 1 and 2).

Throughout the five-year period, the Hawaii CZM Program will support efforts to bring the IBC and IRC to adoption in each County. In collaboration with hazard mitigation partners, the Program will plan training sessions in each County upon adoption of the new building codes. This training will likely bring in experts from the International Code Council on the IBC and IRC aspects of the building codes. Local experts on the customized wind standards may also participate as trainers.

Public outreach and education in conjunction with our hazard mitigation partners will be ongoing throughout the five-year period.

Fiscal Needs

Estimated costs to accomplish the program change are set forth below. The costs include procurement of professional services to conduct the wind speed study, training costs, and development and distribution costs for public outreach and educational materials. This Strategy will be conducted in a similar manner as the prior 309 Coastal Hazard Strategy – in partnership with federal, state, county, and private sources that contribute time and funding to successfully accomplish the goals of this Strategy.

Year 1	\$145,000
Year 2	\$145,000
Year 3	\$ 30,000
Year 4	\$ 30,000
Year 5	\$ 30,000

Technical Needs

Private engineering, scientific, and research capabilities are necessary to accomplish the wind speed studies and building code amendments. These services will be procured in compliance with Hawaii law. Trainers must be experts in the International Codes (I-Codes) and the localized amendments to the I-Codes. Hawaii CZM Program partners will assist with developing training to be undertaken as part of this Strategy, and with development and distribution of outreach and educational materials.

Likelihood of Obtaining the Proposed Change

There is a very strong likelihood of success.

- Adoption of the IBC and IRC is currently being considered by all four Counties. In the City and County of Honolulu, ad hoc review of the IBC and IRC by relevant stakeholders has taken place and there is concurrence on the need for adoption. The draft IBC and IRC, with Oahu-specific wind speed mapping and customized wind design procedures (funded by FEMA), is currently being reviewed by the City Corporation Counsel, the final step to be taken by the Department of Planning and Permitting of the City and County of Honolulu prior to its submittal to the City Council. In the County of Kauai, the final draft of the IBC and IRC is currently being reviewed by the Kauai County Attorney before submittal to the County Council. The Kauai-specific wind speed mapping and customized wind design procedures are being developed under private contract (funded by FEMA).
- The greatest known impediment at this time is that the adoption of building codes involves a political process that is not controlled by the hazard mitigation community. However, the multitude of recent major disasters does make adoption of the new codes more compelling.
- In 2005, a Statewide Building Code Task Force unanimously recommended to the Hawaii State Legislature that a statewide model building code be established.¹¹ The deliberations of the Task Force were a consensus-building effort that included the Building Department Directors of each County, representatives from the State Fire Council, the Building Industry Association of Hawaii, the General Contractors Association of Hawaii, the Hawaii Association of Realtors, the Hawaii Independent Insurance Agents Association, the American Institute of Architects Hawaii State Council, the Structural Engineers Association of Hawaii, appointees of the State Insurance Commissioner, and a licensed architect with expertise in indigenous architecture.
- Wind risk assessments taking into account topography and directionality factors are completed or ongoing in three of the four Counties. Discussions with the County

¹¹ *Uniform Statewide Building Code Task Force Report and Recommendations to the Hawaii Legislature*, State of Hawaii Department of Accounting and General Services, Honolulu, Hawaii, p. 6 (December 2005).

Building Division of the County of Maui clearly indicate that they are eager to be included in this statewide effort.

The Counties will be provided with the customized wind maps and wind amendments (narrative) for adoption. The wind risk assessments being conducted include wind speed maps and building code amendments as final contract deliverables. These maps and code amendments will be in a form ready for introduction as bills for ordinances in each respective County. Thus, the Counties can focus their efforts on conforming amendments to the IBC and IRC and the executive and legislative processes necessary to code adoption.

B. Ocean Resources Assessment and Strategy

Resource Characterization:

1. Characterize ocean resources and uses of State concern and specify existing and future threats or conflicts (**bold type indicates new category**).

Resource/Use	Existing Threat or Conflict	Threat level High/Medium /Low	Future Threat or Conflict
<p>Ocean Recreation</p> <p>(State has GIS map layer for Ocean Recreation Areas and Boating Facilities)</p>	<p>a. Over-saturation/use; exceed carrying capacity of resource and/or geographic portions of it.</p> <p>b. User conflicts, includes commercial, individual and cultural</p> <p>c. Inadequate enforcement of regulated activities</p> <p>d. Lack of awareness of regulations by residents and visitors</p>	<p>a. High</p> <p>b. High</p> <p>c. High</p> <p>d. Medium</p>	<p>a. Severe degradation of resource requiring extreme remedial measures</p> <p>b. Loss of resource value</p> <p>c. Usurpation of resource by few</p> <p>d. Overstress on enforcement</p>
<p>Harbors/ marinas</p>	<p>a. Inadequate maintenance of small boat harbors/marinas and launching ramps</p> <p>b. Live-aboards</p> <p>c. Enforcement</p>	<p>a. Medium</p> <p>b. High</p> <p>c. High</p>	<p>a. Continuing degradation of nearshore waters</p> <p>b. Pollution from sewage and waste disposal</p> <p>c. Low priority function</p>

<p>Aquatic Life (Including fish as an ocean food source)</p>	<p>a. Depletion of inshore fish stocks</p> <p>b. Depletion of bottom fish stocks</p> <p>c. Depletion of exotic species for aquariums</p> <p>d. Introduction of alien species</p> <p>e. Degradation of coral reefs</p> <p>f. Marine protection 1. Public interaction 2. Submarine sonar testing</p>	<p>a. High</p> <p>b. High</p> <p>c. High</p> <p>d. High</p> <p>e. High</p> <p>f.1 Medium f.2 High</p>	<p>a. Loss of food source and degradation of marine habitat</p> <p>b. Loss of food source and degradation of marine habitat</p> <p>c. Degradation of marine environment and habitat</p> <p>d. Native species habitat and ecosystem destroyed</p> <p>e. Destruction of coral reef habitat and ecosystem for marine life</p> <p>f.1 Mammal life threatened f.2 Mammal life threatened</p>
<p>Future food sources (excluding fish)</p>	<p>a. Pollution restricts ability to develop and use new ocean food sources</p> <p>b. Environmental impacts from aquaculture</p>	<p>a. High</p> <p>b. Medium</p>	<p>a. Elimination of possible food source</p> <p>b. Degradation of ocean environment</p>
<p>Coral Reef Ecosystems (State has GIS map layer for Coral Reefs)</p>	<p>a. Degradation from pollution and sediments from land-based runoff.</p> <p>b. Invasive species importation</p>	<p>a. High</p> <p>b. High</p>	<p>a. Loss of habitat and coastal protection</p> <p>b. Loss of reef habitat and coastal protection</p>

	c. Human disturbance	c. Medium	c. Permanent degradation of reef
Beaches and Tidal Interface (State has GIS map layer for Beach Erosion)	<p>a. Loss of public access</p> <p>b. Loss of public ownership</p> <p>c. Coastal erosion</p> <p>d. Storm surge and flooding</p> <p>e. Water quality degradation</p> <p>f. Encroachment by development on shoreline</p> <p>g. “Hardening” of shoreline</p>	<p>a. Low</p> <p>b. Medium</p> <p>c. High</p> <p>d. Medium</p> <p>e. High</p> <p>f. High</p> <p>g. High</p>	<p>a. Relaxation of continuing efforts to gain additional access</p> <p>b. Possible court action to overturn new accretion-ownership law</p> <p>c. Property damage, loss of lateral access</p> <p>d. Loss of lateral access, relaxation of development control measures</p> <p>e. Restriction of public use</p> <p>f. Exposure to coastal hazard damage</p> <p>g. Resource loss, loss of lateral access</p>
Source of energy and cooling water	<p>a. Conflicts with other ocean uses</p> <p>b. Environmental impacts from such uses</p>	<p>a. Medium</p> <p>b. Medium</p>	<p>a. Increase in demand for such uses</p> <p>b. Degradation of ocean environment</p>

Water Quality (State has GIS map layer of water quality monitoring sites)	<p>a. Pollution from ocean uses – cruise ship waste: oil spills, recreational uses</p> <p>b. Polluted runoff from land-based sources – stormwater, sewage outfalls, and emergency discharges</p>	<p>a. High</p> <p>b. Medium to High</p>	<p>a. Degradation of ocean environment</p> <p>b. Degradation of ocean environment. Untreated sewage spills in emergency situations continues to impact ocean resources</p>
Marine Minerals	<p>a. Environmental impacts from “mining” minerals</p> <p>b. Jurisdictional conflicts</p>	<p>a. Low</p> <p>b. Low</p>	<p>a. Degradation of ocean environment</p> <p>b. Ineffective management</p>
Research and Development Uses	<p>a. Conflicts with other uses</p> <p>b. Environmental impacts</p>	<p>a. Medium</p> <p>b. Low</p>	<p>a. Loss of public use</p> <p>b. Degradation of ocean environment</p>
“Life-line” shipping supply for Hawaii	Over-regulation and increased costs	Medium	Reduced supply capability. Increased costs and deprivation of vital sustenance.

2. Changes in resources or relative conflicts/threats to resource since previous assessment.

Changes are as follows: (a) Administrative: Nomenclature - “marinas” has been added to the “Harbors” category; “Fisheries” has been broadened to “Aquatic Life”; “Beaches and Coastal Erosion” has become “Beaches and Tidal Interface”; “Aquaculture” has been incorporated under the new category of “Future Food Sources”; “Marine Ecosystems” and “Waste Management” have been discontinued and concerns covered in remaining categories, primarily “Water Quality,” a new category; “Life-line Shipping” has been added as a new category of an ocean resource of critical

importance to Hawaii; “Coral Reef Ecosystems” has been added as a new category and (b) Substantive Changes – Ocean spills of untreated sewage in emergency situations continues to negatively impact our ocean resources. These spills are primarily the product of urbanization and a straining of the capability of sewer systems established to support that urbanization. As such, they occur mostly around Oahu. In the area of beach and reef protection, marine conservation and research and development, positive momentums are occurring in Hawaii which signal successful results in the area of ocean resources for CZM initiatives, programs, and projects.

Management Characterization

1. Status of significant state ocean management programs/initiatives since previous assessment.

Program	Status	Significance
Comprehensive ocean management statute	In place since 1977	Directs stewardship of this natural resource
Statewide ocean resources management plan	Updating of existing plan in progress, CZM driven and funded by 309 grants	Foundation for stewardship needs, directions and programs
Statewide ocean resource planning/working groups	Existing MACZAC – Hawaii Ocean and Coastal Council (HOCC) created by Governor Executive Order	Provides “grass-roots” base and is statement of executive priority
Regional ocean resources planning efforts	Continuous, CZM driven	All Counties involved
Ocean resources mapping/information systems	Continuous - CZM driven and funded under Section 306	GIS capability added and refined
Dredged material management planning	Regulations revised	Existing regulations improved
Habitat research, assessment, monitoring	Continuous – some CZM 306 assisted	Adds knowledge on how to preserve and protect habitats

Public education and outreach programs	Continuous – CZM driven and funded with 309 grants	Increases awareness and individual stewardship
Coral reef protection – Designation of NWHI Coral Reef Ecosystem Reserve	CZM related, NOAA funded coral reef initiative (CRI) begun; research initiated	Adds knowledge about coral reefs stewardship
State regulations designating NWHI as marine refuge	Recent initiative by Governor; CZM driven	Progress toward national marine sanctuary (NMS) designation
Two, first ever, ocean leases granted by State for aquaculture/fish stock replenishment	Just underway – CZM assisted under Section 306	First, open-ocean leases in Hawaii – goal = fish stock replenishment
Single purpose statute for ocean resource protection making accreted beach land, public in perpetuity	Signed into law by Governor, 2003	Preserves natural ocean resource, buffers upland from storm and wave impacts

2. Description of program achievements since last assessment:

Ocean Resources Management Plan (ORMP): Hawaii’s initial ORMP was adopted by the State Legislature in 1994. In order to reflect changed conditions, new technology, new directions, and new potentials, the plan is being updated. Work on the plan update began in 2003, and the revision process and guidelines finalized in 2005. The revised plan will be submitted to the state legislature in December, 2006. Once approved, plan implementation will begin in 2007.

Ocean Resource Planning/Working Groups: In 2001, Hawaii’s comprehensive ocean management statute, 205A, HRS, was amended to create a public advisory group for Hawaii’s CZM program and its lead agency, OP. The resulting group, MACZAC, a citizen body of twelve members, created sub-working groups within its structure. One such group, the ORMP group¹² is devoted to ocean resources planning. In 2005, the Governor created HOCC consisting of 30 members representing local, State, and federal government agencies, and public interest groups. MACZAC is also a member of HOCC. In response to a request, HOCC submitted draft goals for the updating of the ORMP, complementing those submitted by MACZAC to OP in October 2005.

¹² Other MACZAC working groups are: Cultural Resources Management; Shoreline Certification; Water Quality, Ocean Resources Management, Coastal Erosion, Coastal Parking, and Legislative

Single Purpose Statutes Related to Ocean Resources:

2000 – Prohibited and controlled the import of alien aquatic organisms (HRS, 187A).

Established the endangered species trust fund (HRS, 195D).

2001 – Strengthened penalties for violations of statutes and rules governing.

Hawaii’s Natural Area Reserves (NAR) (HRS, 195).

2002 – Amended State authority for the enabling of ocean leases (HRS, 190D).

Broadened scope of landowners who can qualify for “safe-harbor” status when participating in conservation and preservation agreements (HRS, 195D).

2003 – Revised the State’s “accretion” law to make all newly accreted beach land public land in perpetuity (HRS, 501-33).

2004 – Prevented statutory waivers and reduction of penalties for small businesses from applying to environmental law violations (HRS, 201).

Expanded State land agency’s enforcement authority to all State land and waters (HRS, 6K, 171, 174C, 1990).

2005 – Designated Miloli’i, an area off the South Kona coast as a traditional Hawaiian fishing village, Fishery Management Area (FMA) (HRS, 188).

Prohibited the discharge of untreated sewage from cruise ships in waters under the jurisdiction of the State of Hawaii (342D, HRS), minimize coastal light pollution (Act 224).

Established land conservation fund to provide stable funding for the State’s NARs and grants to Counties, State agencies and non-profit land conservation organizations for acquisition of conservation areas and protection of endangered species (Act 156).

Habitat Research, Assessment, Monitoring: CRI, a partnership of UH, the State land and water agency, DLNR, and NOAA surveyed near-shore reefs around the main Hawaiian Islands for non-indigenous and invasive species found there, as well as alien algae and reported on their findings (2001 to 2005). Some CZM 306 funds have been used in this area.

Protection of Threatened and Endangered Species: State and County CD agencies are parties to oil spill and hazardous material responses where the USCG, EPA, Department of the Interior, USFWS, and NOAA operate under a Memorandum of Understanding that requires protection of endangered species in such situations.

Shoreline Determination: During 2002 and 2004, MACZAC conducted three video conferences dealing with problems stemming from, and solutions for, properly determining the location of the shoreline. The annual conference of the Hawaii Congress of Planning Officials also featured a workshop on the issue of shoreline determination.

Public Education and Outreach: OP, the lead CZM agency in Hawaii, sponsored an All-Islands CZM Managers' Meeting in 2005, with 306 funds, and in October 2005, sponsored the ORMP Workshop in Honolulu as an element in the preparation for revising Hawaii's ORMP.

Alien Species Control: In response to the 2000 legislation prohibiting the import of alien aquatic organisms, the Division of Aquatic Resources (DAR) of the State's DLNR in 2003, prepared an *Aquatic Invasive Species Management Plan* and administrative rule amendments to govern the administration of the law and the implementation of the plan. The rules establish a system to monitor the nature and discharge control of the ballast water from ships arriving in Hawaiian ports. The monitoring and enforcement activities in this area will be conducted in close cooperation with the USCG which also receives ship ballast water reports and has a federal responsibility for the transport of alien species. The rules are pending final adoption. CZM assists this effort with 306 funds.

Beach Restoration: In 2005, the State DLNR issued a contract for the replenishment of sand on Kuhio Beach at Waikiki, Oahu and in conjunction with the United States Army Corps of Engineers, is participating in a beach restoration and erosion control project at Lanikai Beach on Oahu. Other beach restoration projects are pending at Paia and Lahaina, Maui, and Poipu, Kauai.

Water Quality: Cesspools at State parks are systematically being replaced with more efficient sewage disposal methods.

Coastal Land Conservation Program: In 2004, a Coastal Estuarine Land Conservation Program was begun using 306 funds to set parameters for agencies involved in such areas and their constituencies.

Conclusion: Programs, efforts, and activities in the ocean resources area have produced significant progress toward revision of the Hawaii ORMP; preservation of beach resources by legislating accreted lands to be public in perpetuity; ocean-farm leasing to replenish fish stocks; designation of NWIHI as marine protected area and movement toward designation as NMS; new single-purpose statutes increasing powers of stewardship and enforcement; and the administrative creation of a new ocean resources working group, HOCC.

1. **Priority Needs** in this area include: completion of the ORMP update, the establishment of the NWIHI archipelago as a NMS, public education and outreach, and continuing research on coral reef ecosystems to complement the stewardship of the NWIHI coral reef ecosystem.

2. **Priority** – Last assessment

Priority – This assessment

High	X	High	X
Medium		Medium	
Low		Low	

Ocean Resource Strategies

CZM Strategic Objectives: To promote long-range planning for the use, care, and enhancement of ocean resources, developing regulatory, intra-governmental coordination, and educational mechanisms for ocean resource management.

C. Special Area Management Planning/Marine Protected Area Assessment and Strategy

1. Resource Characterization:

Area	Major Conflicts
Ahupua'a/Watersheds	Urbanization, no jurisdictional focus, no management structure, property rights
Marine Protected Areas	Multiple governmental jurisdiction, ocean recreation, commercial fishing, pollution
Coral Reefs	Multiple governmental jurisdiction, ocean recreation, aquarium fishing, pollution
Heritage Rivers	Recreation, tourism, property rights
Fishery Management Areas	User conflicts, commercial fishing, pollution
Fisheries Replenishment Areas	User conflicts, commercial fishing, pollution
Natural Area Reserves	User conflicts, recreation, tourism
Wildlife Sanctuaries	User conflicts, recreation, tourism

Management Characterization:

1. Areas of the coast that are being addressed by a special plan since last assessment¹³

Area	Type of Management
11 State MLCDs ¹⁴ (2 districts added in last 5 years)	Conservation/controlled use/ protection of threatened and endangered species

¹³ Several Areas existed prior to 2001 but have not been noted in prior 309 Assessments

2 Wildlife Sanctuaries (Coconut Island-Oahu) (Paiko Lagoon-Oahu)	Preservation/controlled use/ protection of threatened and endangered species
28 FMAs (9 of which are replenishment areas)	Resource allocation
4 NARs (Kaho’olawe, Ahihi-Kiinau, National Humpback Whale Sanctuary waters, S. Kona opelu fishing area)	Preservation/conservation/ protection of threatened and endangered species
Miloli’i traditional Hawaiian fishing village (2005)	Fishery allocation
NWIHI Marine Refuge (State designation, 2005; designated national monument, 2006)	Preservation/conservation/ protection of threatened and endangered species
Bottomfish Restricted Areas	Fishery conservation/ allocation

2. Significant changes since previous assessment.

Ahupua’a/watersheds: All of the previously reported watershed partnerships continue to function and to seek the ahupua’a management concept in their operation.¹⁵ In addition, Watershed Alliances exist for all major Islands and Soil and Water Conservation Districts exist on all Islands, allied through the Hawaii Association of Conservation Districts. The Kailua Bay Advisory Council has prepared a draft Master Plan for the Ko’olaupoko Watershed on the windward side of Oahu. In 2002, the Hilo Bay Watershed Advisory Group was formed applying the ahupua’a management approach to the area. Partners include the Planning Department, Hawaii County, UH Environmental Center, and citizen stakeholders. The group has prepared the Hilo Bay Watershed-Based Restoration Plan. Many management plans prepared by these groups involve stream restorations.

NWIHI Marine Refuge: In December 2000, the U.S. President created the NWIHI Coral Reef Ecosystem Reserve by Executive Order and in June 2006, the area was given national monument status. In 2004, the Western Pacific Fishery Management Council (WPFMC) submitted draft fishing regulations for the Reserve to NOAA. NOAA rejected the draft as not meeting the goals and objectives of the Reserve. In September 2005, Hawaii’s Governor signed regulations establishing the NWIHI Marine Refuge. Both actions are elements of the move to establish the NWIHI as a NMS. In November 2005, two fishing clubs in Hawaii asked the U. S. Department of Commerce to investigate the actions and directions of the WPFMC.

Hawaii’s Comprehensive Wildlife Conservation Strategy (CWCS) was completed utilizing State wildlife grants by USFWS in October of 2005 and submitted for review at the federal level. The State Fish and Wildlife and DAR collaborated on the preparation of the

¹⁴ Oahu-Pupakea, Waikiki, Hanauma Bay; Maui-Honolua-Mokuleia Bay; Molokini shoal; Lanai-Manele-Hulopoe; Hawaii- Lapakahi, Waialea Bay, Old Kona Airport, Kealakekua Bay, Waipoe

¹⁵ See endnote 2

CWCS which addresses the needs of marine life and habitat conservation in all of the designated special areas included in this section.

MLCDs, FMAs, Wildlife Sanctuaries and NARs: Although most of these areas in Hawaii were designated prior to 2000, some FMAs were designated, others amended in 2002, and one NAR was created in 2005. They are all included in this Assessment in order to note their existence. The existence of these areas is indicative of the strong State commitment to preservation/conservation of coastal resources. They all are subject to potential cumulative and secondary pollution impacts from land-based runoff and need continuing management to protect them. Consequently, they are proper candidates for CZM attention as SMA approaches. In January 2005, the State DLNR prepared its policy document for managing marine protected areas, *Framework for Marine Protected Areas*. State has GIS map layers for marine managed areas, MLCDs, marine NARs, and whale sanctuary boundaries.

Public Education and Outreach: In the process of developing policy and/or actions, i.e., *Comprehensive Wildlife Conservation Strategy*, *Framework for Marine Protected Areas*, the latter funded by a CZM 310 technical grant, the public is asked for input and commentary. In addition, CZM 310 technical grants funded a *Tourist Use Impact Assessment In Marine Protected Areas*. Each division of the State DLNR maintains a website available to the public (www.hawaii.gov/dlnr) and Hawaii CZM maintains an umbrella website on the subject (www.hawaii.gov/dbedt/czm).

Conclusion:

Through the concentrations on, and work products from the ahupua'a/watershed projects, CWCS directions, NWIHI initiatives, and the State's creation of many SMAs, this enhancement area has produced meaningful results and significant potentials. Consequently, it is gaining increased priority attention in Hawaii.

1. **Priority Needs:** Include implementation of the potential seen in the ahupua'a/watershed type special management area; pursuit of the designation of NWIHI as a NMS; creation of new SMAs; and improved management and enforcement capability in existing areas. Other priorities include the creation of additional SMAs and improved management and enforcement efforts for existing special management areas. The development and application of performance indicators to measure effectiveness also looms as a new priority.

2. **Priority** – Last assessment Priority – This assessment

High		High	X
Medium	X	Medium	
Low		Low	

Special Area Management Plan Strategies

Strategic Objectives: The planning and implementing of measures to protect, preserve, and enhance coastal and ocean areas of importance, and which contain endangered species, special habitats, and significant natural resources.

(See “Strategy” outlined in the Introduction.)

D. Cumulative and Secondary Impacts Assessment and Strategy

Resource Characterization

1. Identify areas in the coastal zone where rapid growth or changes in land use require improved CSI management.

Estimated Change in Acreage in State Land Use Districts, 2000-2004

District	Acreage in 2000	Acreage in 2004	Change
Urban District	194,556	196,991	+ 2435
Conservation District	1,974,106	1,973,636	- 470
Agricultural District	1,933,687	1,931,378	- 2309
Rural District	10,039	10,383	+ 344

Source: Hawaii State Data Book, 2004

Analysis of the district changes by Counties shows that half of the increase in the urban district occurred in the City and County of Honolulu with the other half about equally divided between Maui and Hawaii Counties. One half of the corresponding decrease in the agricultural district occurred in Honolulu and almost all of the other 50% occurred in Maui.

Coastline Urbanization:

Island	Percentage of Land Mass in Conservation, Agriculture, Rural State Land Use Districts	Percentage of Developed Coastline
Kauai	96	50
Oahu	74	75
Maui	95	40
Molokai	98	25
Lanai	96	30
Hawaii	97	50

Source: Hawaii State Data Book, 2004

Population Growth, 2000-2005

State/County	Population, 2000	Population, 2005	Change	Percent Change
State of Hawaii	1,211,537	1,275,468	63,931	5.2
Honolulu	876,156	908,580	32,424	3.7
Maui	128,094	139,595	11,504	8.7
Kauai	58,463	62,501	4,028	6.9
Hawaii	148,677	164,599	15,922	10.7

Source: Hawaii State Data Book, 2004

Visitor Impacts on Population

State/County	Daily Visitor Census, 2001	% Population	Daily Visitor Census, 2004	% Population
State of Hawaii	158,243	13	171,480	13.5
Honolulu	79,699	9	83,718	9.3
Maui	38,723	29.5	45,517	32
Hawaii	21,064	13.8	23,376	14
Kauai	16,830	28.5	18,869	30.5

Source: Hawaii State data Book, 2004

- Population growth: Urbanization and visitor counts in the daily census, all are impacting the Counties of Maui and Kauai, and to a lesser extent Hawaii County at a pace greater than that of the State as a whole and that found in Honolulu. However, from the standpoint of absolute numbers, Honolulu County poses a greater impact on coastal zone resources from the CSI of polluted runoff than the other Counties combined. The circumstances require attention to remedial mitigation approaches for Honolulu County (Oahu) while preventive measures are more applicable to the other Counties.

Tourism Carrying-Capacity Study: State statutes require a study to assess the tourism “carrying capacity” of the State and its update every 5 years.¹⁶ The results of the first such study are scheduled to be presented to the State Legislature when completed.

Status of Coastal Nonpoint Pollution Control Program (CNPCP): Progress has been made in satisfying all conditions specified by NOAA for approval of Hawaii’s CNPCP. Hawaii has submitted all final draft measures to EPA/NOAA and awaits a response. Hawaii will address all remaining concerns promptly and is committed to obtaining final approval as soon as possible. CNPCP programs and activities are financed by Section 6217 CZM funds. In addition, a Low Impact Development (LID) instructional initiative was undertaken in 2004 (funded by a CZM

¹⁶ 225M, HRS

310 grant). Related programs included a review of rules and regulations relevant to LID applications, an analysis of the extent to which land use aerates impervious ground cover, and subject workshops in four Counties in conjunction with State DOT and DOH.

Drainage Regulations and Best Management Practices (BMP): In the meantime, the City and County of Honolulu has revised its grading and drainage regulations, the County of Maui is in the course of amending its drainage regulations, and the Counties of Hawaii and Kauai are preparing proposed ordinance amendments to reduce runoff from developments. All Counties require the application of BMPs for construction projects. These efforts were assisted by CZM 310 grants.

Water Quality Standards: The State DOH has prepared an amendment to Hawaii's water quality standards to raise gradient salinity standards for surface waters from the shoreline to the 3-mile limit to a depth of 100'. The amendment is presently in the public comment stage.

Stream Assessments: Following *Hawaii's Implementation Plan for Polluted Runoff Control*, the Environmental Planning Branch of DOH conducted visual and bio-assessments of 46 streams to monitor and update its list of impaired watersheds within the State.

TMDL Studies: Implementing the plan for polluted runoff control, DOH also conducted TMDL studies for two impaired water bodies (Kawa stream and the Ala Wai watershed on Oahu). Four others are underway (Kiikii stream – Oahu, Waialua and Alenaio streams – Hawaii, and the Hanalei River estuary on Kauai). A TMDL study for Waimanalo stream on Oahu was completed earlier. These TMDLs bring Hawaii one step closer to implementing an actual decrease in the pollutant load carried by these streams and watersheds into the ocean.

Other Actions: DOH also produced its *Hawaii's Local Action Strategy to Assess Land-Based Pollution Threats to Coral Reefs* in 2004, and DLNR produced a public education and outreach document in 2005 entitled, *Getting Involved in Caring for Hawaii's Coastal Resources: A Community Guidebook*. A Marine Docent Program was established, using CZM 310 funds, to educate people, involve them in marine ecosystem activities, and raise public awareness in this area.

Wai'anae Ecological Characterization (WEC) and Wai'anae Moku Management

Framework: These two projects, funded by 309 grants, are aimed at establishing a working structure to manage the ecology of a traditional Hawaiian land district (Moku) comprised of several ahupua'a or watersheds to lessen impacts on natural resources. The WEC was completed in 2005, and the structure created continues to operate. The final phases of the Waianae Moku Management Framework are presently in progress.

Rural and LID: In 2005, OP initiated discussions on low impact development standards which might be experienced in rural areas with various constituencies, utilizing CZM 306 funds.

Downtown Hilo Visionary Project: Downtown Hilo in Hawaii County lies in the coastal plain and historically has been subject to devastating tsunami damage. This project is oriented to

analyzing what physical changes in the urban pattern might help reduce tsunami, flood and hurricane impacts in the downtown area.

Conclusion:

The WEC and Moku Management Framework, coupled with LID initiatives, lay the groundwork for incisive progress in producing ahupua’a/watershed management structures directed at land and water resource management and polluted runoff reduction.

1. **Priority Needs:** include establishment of watershed/ahupua’a management structures with LID applications and the principles to guide such structures, mitigation/restoration plans, application of BMPs; water quality standards, drainage, grading, and stormwater regulation upgrading; TMDL studies for all water bodies listed as “impaired”; enhanced enforcement measures, and development of performance measures.

2. **Priority** – Last assessment Priority – This assessment

High	X	High	X
Medium		Medium	
Low		Low	

This enhancement area continues to receive a high priority due to the realization that land-based activities of the resident and visitor population is the primary source of pollution threats to the natural resources of the coastal zone. Major commitments are needed to effect remedial and mitigation measures, protect resources over a long-range period, and to develop and apply performance measure indicators, thus making it an area of priority concentrated effort.

Cumulative and Secondary Impact Strategies

Strategic Objectives: The development and adoption of procedures to assess, consider, and control CSI of coastal development on coastal resources.

Identification of Proposed Program Change

- A. 1. The Hawaii CZM Program proposes a program change in the CSI enhancement area to develop, implement, and institutionalize an integrated planning approach to assess and manage CSI on the basis of a traditional Hawaiian ahupua’a/watershed structure.

2. Amend statutes, State and County rules, and administrative policies to incorporate the approach and establish and activate ahupua’a management structures.

3. Public education and outreach activities will accompany the institutionalization of this program change throughout the ensuing five-year period.

This ancient Hawaiian concept of resource stewardship and management is uniquely suited to producing community involvement in better managing environmental impacts stemming from land-based activities that eventually affect eco-systems, fresh and sea water quality, and the host residents quality of life. It is most analogous to a watershed management structure.

Statutes: Hawaii's Planning and Zoning Enabling Statute, HRS, 46-4, amended to require that any County sectional planning areas (i.e., Development Plan, Sustainable Community Plan, Community Plan areas) be configured to consist of combinations of ahupua'a.

Ordinances: County revisions of existing Development Plans, Sustainable Community Plans, Community Plans, etc. to recognize specialized ahupua'a needs and considerations. (Revisions are implemented as ordinances.)

County zoning laws (ordinances) amended to orient use regulations, heights, setbacks, densities, etc. to specialized ahupua'a and coastal needs and considerations.

County subdivision regulations amended to reflect specialized ahupua'a, coastline and ocean resource needs.

Rules: State Conservation District Use Permits (DLNR) to reflect specialized ahupua'a, coastline and ocean resource needs.

State Boating and Outdoor Recreation regulations to reflect specialized ahupua'a, coastline and ocean resource needs. (DOBOR)

Also, DOBOR regulations governing marinas.

State natural resource enforcement regulations (Conservation and Resources Enforcement Division).

State Park regulations.

County Park regulations.

State and County sand mining, quarrying and erosion control regulations.

All regulations streamlined to encourage actions helpful to the coastal environment, i.e., beach and fishpond restoration, erosion control, runoff prevention, etc.

Ahupua'a/moku management frameworks established by the performance of this program change will also be affected generically by other regulatory applications and the actual establishment of specific cumulative and secondary controls for

ahupua'a may well produce the impetus for change in additional regulatory areas. The following are examples of such possible areas: sewage dumping and effluent control by DOH; new TMDL enforcement procedures promulgated by EPA and administered by DOH; storm water and contaminated substance control at harbors by DOH; pesticide and nutrient runoff control by the Department of Agriculture (DOA) and DOH; and ship hull paint contaminant control by DOA.

- B. 1. The Hawaii CZM Program proposes an additional program change in the CSI Enhancement Area to develop and incorporate into governmental rules and regulations methodologies for assessing and evaluating surface water runoff and erosion impacts of a development project cumulatively on a region.
- 2. Amend rules and regulations, i.e., State LUC rules, Environmental Impact Statement (EIS) rules and Conservation District rules to accomplish more control over CSI on coastal and ocean resources by requiring applications/EIS for proposed developments to include findings produced by a methodology for assessing surface water runoff, and erosion impacts of the development project and impacts on the surrounding region.

Anticipated Effect of Program Changes:

- A. Hawaii is confronted with serious environmental and resource preservation issues stemming from large populations on small land masses. The ahupua'a concept and approach will provide a community-based involvement and decision-making structure to promote living quality and better control polluted runoff.

The nature of the ahupua'a concept and its embodiment in history will serve to re-instill the revered relationship that ancient Hawaiian people had for the land and the natural environment.

Provide an integrated planning and implementation web covering the entire State.

Provide a meaningful and effective structure for collaboration between community regions and government actions.

As a sustainable model, the ahupua'a is a resources management system that should be given serious attention. Prior to European contact, there were conservatively 800,000 Hawaiians living in the islands with little to none of the environmental and resource issues that we face today. Presently, Hawaii's population of 1.2 million is confronted with serious environmental and resource issues. As such, the ahupua'a will serve as a model for community-based decision-making to promote the community's quality of life.

In basic terms, the ahupua'a is an ancient land division that runs from the top of the mountain to the sea. However, the ahupua'a means much more. The ahupua'a embodies a unique relationship between the Hawaiian people and the land as well as the practical and rational approaches applied to insure the sustainability of the natural environment from over exploitation, pollution and extinction.

The ahupua'a concept is a practical and rational approach to resources management that conforms with existing geography and its resources rather than altering them for human convenience.

Ahupua'a in practice is really about (1) instilling appropriate values that allow people to make the right choices not only for themselves but for society; (2) community-based efforts that involve ahupua'a tenants or people with localized knowledge in the decision-making process and who have a personal stake in their ahupua'a; (3) creation of partnerships and the involvement of stakeholders that united can begin to examine existing west governmental and legal structures in order to weave the ahupua'a principles throughout; and (4) the perpetuation of this practice from generation to generation.

Developing and implementing an integrated planning approach that embodies the ahupua'a as a sustainable model will help to ensure that the CSI are assessed, evaluated, and managed in a comprehensive manner while bringing together State, County and federal agencies with the community.

- B.** Hawaii is experiencing significant development pressure as its economic growth continues fueled by the visitor and construction industry. Much development occurs along the coast and may threaten coastal water quality. In addition, there is increasing pressure to develop single-family homes on steep-sloped areas in the Conservation District and such development threatens to increase erosion and degradation of water quality.

Each development proposal contributes to the CSI of erosion and water quality degradation within a region. Decision-makers need additional information to evaluate development proposals in terms of these impacts. Information on existing and post development surface water runoff and erosion will assist decision-makers in evaluating what mitigating measures should be required if the development is to be approved. To some degree, applications and/or EIS already describe post-development runoff conditions. However, the information varies in scope and degree and is not consistent. Moreover, decision-makers often do not know how to evaluate and apply the information.

This project will develop a methodology by which to assess pre- and post-development surface water runoff and erosion conditions and determine impacts on the surrounding region. The use of this methodology will be required in governmental rules and regulations. For example, LUC may require that such an assessment be included in a land use district boundary amendment application. The Office of Environmental Quality Control (OEQC) could require that such an assessment be included in the EIS. The Board of Land and Natural Resources may require such an assessment be included in a conservation district use application.

The methodology will also assess cumulative impacts on a region so that appropriate mitigating measures may be applied. For example, standard procedure may be to require a development to capture 80% of its potential runoff on-site. However, if the development is located near critical resources and the cumulative impact of the development and other development will impair the resources, then a higher standard should be required.

The information provided will be uniform in scope and degree because it will be based on a common methodology. The results of this information will help decision-makers in controlling CSI on future water quality in the region.

The proposed project also includes training for decision-makers so they will be better able to interpret and use the results of the assessment methodology.

The proposed project will likely result in program changes affecting the administrative rules of the State LUC, the administrative rules of DLNR pertaining to the conservation district, and the administrative rules of OEQC.

Appropriateness of Proposed Program Change

- A.** The concept and approach is founded in over a thousand years of Hawaiian history; ahupua'a and watersheds share many common elements. Geographically, ahupua'a are small collections of watersheds or may be one large watershed and are consistent with watershed boundaries.

In Hawaii, the ahupua'a/watershed concept has begun to bring communities together in the spirit of cooperation to address complex issues. We must continue to build on these efforts to establish an island-wide integrated resources management system.

- B.** The proposed change pertains to the control of CSI of coastal development on coastal and ocean resources. It will provide better tools for assessing surface water runoff and erosion conditions and resulting impacts from a development on the surrounding region.

Addressing the problem of CSI poses a formidable long-range task. The proposed program changes hold promise as effective approaches to that problem since they serve to also positively affect SMAs and ocean resources in general, carrying out the goals of the ORMP.

General Work Plan and Schedule

The activities proposed to carry out these program changes and their scheduling are as outlined in Tabular Summary #2.

Likelihood of Attaining the Proposed Program Change Goal

The likelihood of achieving the program goals is high. A foundation for the achievement for Part A has been put in place by pilot programs, in place with use of CZM 309 funds. The WEC and the Wai'anae Moku Management Framework are both oriented to the ahupua'a/watershed concept and approach. The Ecological Characterization was completed in 2005, and the final phases of the Moku Management Framework are in progress presently. For Part B, attainment prospects are high also due to the foundation laid already by previous CZM programs, NPDES activities, expressed willingness on the part of other involved State agencies to participate, and increased public awareness created by past activity.

Attainment prospects are also enhanced by the Hawaii strategy of concentrating its resources on a few areas of involvement rather than spreading those resources thinly over many areas.

Fiscal Needs

Estimated budget costs for each of the proposed five-year program actions are as follows:

Year 1	-	A - \$29,000		
Year 2	-	A - \$30,000		
Year 3	-	A - \$50,000	B - \$95,000	
Year 4	-	A - \$60,000	B - \$85,000	
Year 5	-	A - \$55,000	B - \$90,000	Total funding = \$494,000

Technical Needs

Community meetings and workshops will be conducted as an integral part of the program and facilitators will be needed. Staff support services including computer and GIS input will be needed as will technical people from other Departments and consultants.

E. Public Access Assessment and Strategy

Resource Characterization:

1. The quantitative and qualitative adequacy of public access to Hawaii’s shoreline and coastal resources is considered to be very high and local and State governments continue routinely with efforts to maintain and enhance such access. These “routine” efforts include: new access gained through the SMA permitting process, other permitting processes, systematic Capital Improvement Project (CIP) appropriations for acquisition, and the long-range planning function.

2. Overall demand has peaked as the adequacy of opportunities improved with time. However, on the basis of expressions of community desires, low-level demand occurs for specialized improvement.

3. The one outstanding impediment to providing improved access is the issue of automobile/bus parking for pedestrian access points. Such installations are not only costly and impact on private property, but inherently contain conflict with other resource management objectives such as preservation of natural aesthetics, permeability of land, polluted runoff control, and air pollution

4. Inventory

Access Type	Current Numbers	Change Since Last Assessment
National/State/County Parks	7 National Parks - 365,830 acres 69 State Parks - 27,116 acres 649 County Parks - 11,440 acres	+ 116,830 acres* + 301 acres* + 22 parks - 2,974 acres*
Beach/Shoreline Access	184.9 miles of sandy shoreline; 1600 surfing sites; beaches in Hawaii are public, seaward of the vegetation line	Public ownership of beach land, lateral access protected by 2003 law making all accreted land public in perpetuity
Recreational Boat Access	21 small boat harbors, 54 boat ramps 13 offshore mooring facilities	
Scenic Vistas/Overlook Points	20 formal overlook points, most of coastline served by major highways offering routine scenic ocean vistas to drivers	Vista point added for whale watching on Oahu

Public Perpendicular Rights-of-Way	There are many existing perpendicular public pathways in the State. There are also many incidental access points, public but not “formalized.”	New ones are added via SMA permits and acquisition
Fishing Points	23 public fishing piers exist throughout the State	New ones added by “routine” County activities
Coastal Trails	Na Ala Hele, the State’s trail system maintains 112 trails on 6 Islands. Most of the trails are mountain trails but offer ocean and coastline vistas.	Trails are maintained and improved systematically
ADA Compliant Access	Most beach park accesses are now Americans with Disabilities Act (ADA) compliant	New ADA facilities installed systematically
Public Beaches – with water quality monitoring and public notice of conditions	141 public beach parks exist in the State on 6 Islands. Water quality is monitored at various park locations and in 2004, covered 76 of these park sites. Monitoring alternates each year amongst all the parks.	2 new beach parks have been added Monitoring coverage increased from 50 parks/year in 2001
Other Beaches	Beaches and open shoreline exist at other points along the coastline where views and physical access to the ocean is afforded by proximity to a road or highway.	
Public Access Enhanced		ADA improvements added. Signage installed in Hawaii County with 306 funds. Lateral access insured by new law making accretion public land in perpetuity

5. The State has a website for State parks, www.state.hi.us/dlnr/dsp and for the coastal trail program, www.dofaw.net. Beach park locations are well known to residents, are listed in street-map guides, are shown on phone directory maps, and in-guide books for visitors. The County of Hawaii is planning a website to show public access points.

- * The increase in National Park acreage occurred in 2003 by an addition to Hawaii Volcanoes National Park.
- * This amount was added to the Heeia Kea State Park by the acquisition of the Heeia Kea wetland.
- * The previous Assessment should have reported 627 County parks in 2000 with an acreage of 8,466. The large increase in acreage is attributed to the acquisition of 5 nature preserves on Oahu.

Management Characterization:

Management Category	Nature of Change	Effect	Funding
Statutory, Regulatory, Legal ¹⁷	New statute rendering newly accreted beach land as public land in perpetuity. Some SMA permits require new access.	Guarantees lateral access; new access gained	N/A
Acquisition Programs	New beach parks acquired; County of Hawaii sets up public access, open space and resources preservation fund. State Legislature enacts “Legacy Land Act” in 2005	Access increased; funding for future access created. Creates fund for watershed and habitat protection	CZM driven County funds State funds
Access Management	Database of public access points developed by Hawaii County in the GIS system. Maui County inventories access points in 2003	Information flyers, maps, and website will be produced	<i>CZM driven and 306 fund assisted</i>
Operation/ Maintenance	State and counties have systematic maintenance for parks and public pathways	Always in good condition	Budget process
Education and Outreach	Native Hawaiian Access Rights Project has public meetings; private group (Public Shoreline Access Hawaii) holds vigil at hotel as reminder that public access is available on underlying State land	Augment awareness; Prevents sale of land to hotel	CZM 309 Private

¹⁷ Existing Statutes protect landowners that allow public access for recreational purposes over private land from adverse possession claims, 520, HRS.

F. Wetlands Assessment

Resource Characterization:

1. Extent of coastal wetlands.

Wetland Type	Extent (acres and data year)	Trends
Tidal	15,474 (1990)	See # 2 below
Non-Tidal/Freshwater	95,326 (1990)	
Publicly Acquired Wetlands	2,000*	Increasing interest and activity
Restored Wetlands	3 (2005)	Several other proposals pending
Created Wetlands	N/A	
Other - Anchialine Pools	148	

*Estimate

2. Although the USFWS now has a GIS map inventory of wetlands for the State of Hawaii, the base date of the information is unclear. The numbers extrapolated from the USFWS inventory are similar to the numbers provided above. In addition, they are consistent with inventory numbers provided for Oahu only by, *Ecologically Sensitive Wetlands on O'ahu*, UH Environmental Center, 1989. Consequently, the figures remain generally the same and cannot be measured against previous data to determine statistical trends. Anecdotal trends are quite positive. Public knowledge of wetland functions and interest in their preservation has undoubtedly increased. Most watershed plans, and the number of such plans is expanding, contain proposals for stream and/or wetland restoration. Large or otherwise significant wetlands command citizen support groups, e.g., Kawai Nui Heritage Foundation, Friends of Heeia Kea, North Pu'u Olai Wetland Management Association. Many school classes have embraced wetland study and fieldwork projects. A large wetland (391.6 acres) on Oahu was deeded to the State in 2002 and at least one major restoration project is pending (Ukoa Pond, 144.2 acres). These interests have resulted in more governmental interest and action in Hawaii, producing legislated fund structures for acquisition of wetlands and other areas for conservation.

3. Direct and indirect threats to coastal wetlands, both natural and man-made.

Threat	Threat Level	Trends
Development/fill	Medium	More controls available
Hydrologic Alteration	Medium	Greater awareness and control
Erosion	High	Greater awareness and controls
Pollution	High	More controls being applied
Channelization	Low	Governmental avoidance being practiced
Nuisance/Exotic Species	Medium	Greater awareness, controls, and enforcement
Freshwater Input	Medium	Greater awareness of habitat and ecosystem concerns
Sea Level Rise	Medium	Research activities heightened

Management Characterization

Management Category	Significant Change since last Assessment
Regulatory	Kawai Nui Marsh on Oahu designated Wetland of International Importance by Ramsar Convention. Offered for consideration as National Park
Wetlands Protection Policies/Standards	All Oahu Development Plans adopted since 2000 contain wetland protection policies
Assessment Methodologies	Increased in scope and extent
Impact Analysis	Cultural and ahupua'a associations with wetlands now required to be addressed in environmental analysis
Restoration Programs	Many watershed plans pose wetland and Hawaiian fishpond restorations. Ukoa Pond restoration pending; Maluaka wetland on Maui restored (2006)
Special Area Management Plans	Watershed partnerships in State, some 22 in number plan protection and restoration projects

G. Aquaculture Assessment

1. Hawaii is an ideal location for aquaculture, the farming of plants and animals in water. From the mountains to the ocean, water abounds providing a myriad of environments to raise a wide variety of seafood. Shrimp, abalone, seaweed, microalgae, tilapia and various organisms for the aquarium trade are among the many opportunities on all the tropical Islands of the State.

Commercial production is estimated to have grown from \$25.2M in 2002 to \$27.7M in 2003, a 10% increase in wholesale value. Research and technology is estimated to have contributed another \$12M from variety of local and overseas projects. Therefore, the Hawaii industry value for 2003 was estimated at \$39.7M.

Employment in the Production and Services Sectors increased slightly in 2003 to 942 people from 880.

Over 30 different species of plants and animals are raised in Hawaii. These are grouped in four categories: Algae (ogo seaweed (*Gracilaria*), *Spirulina* and other microalgae); Shellfish (marine shrimp, freshwater prawns, crayfish, lobsters, oysters, clams, snails, abalone); Finfish (Japanese flounder, Chinese catfish, tilapia, carp, mullet, *moi* - Pacific threadfin, *awa* - milkfish, amberjack); and Other (aquarium animals and plants, pearl oysters, shellfish, finfish "baby" (seedstock), and "parent" animals (broodstock)).

Farm-gate and retail prices for cultured products are uniformly high, as demand for aquacultured products exceeds the supply for most species. Algae (microalgae and ogo seaweed) continues to be Hawaii's most valuable aquaculture crop encompassing both local and export sales.

New commercial species and new technologies provided opportunities for industry diversification. *Moi*, or the Pacific threadfin, was a local fish introduced in 1997 by farmers. Several farms began *moi* production with assistance from the Oceanic Institute and DLNR's Anuenue Fisheries Research Center. In 2002, large-scale offshore cage culture of *moi* began under State leases of the open ocean. A variety of freshwater aquarium fish, crawfish, snails, abalone and black-lip pearl oysters continued to be developed for their commercial appeal. Other species used in research or pilot-scale projects included white and Russian sturgeon, *kahala* (amberjack), *papio* (blue trevally), and various high value marine aquarium animals.

The year 2003 saw continued growth in the aquarium fish industry, primarily freshwater aquarium fish. Many small backyard "hobbyists" increased their output and existing aquafarms diversified into aquarium fish culture. The USDA continued to fund aquarium industry development projects which have assisted both existing aquarium producers, as well as developed new farmer interests. Further expansion of this segment of the industry can be expected.

In 2001, using the State's newly amended ocean-leasing laws, the Aquaculture Development Program (ADP) of the State DOA produced the first commercial open-ocean farm in the

United States. Cates International was granted a lease of approximately 28 acres of open ocean under Hawaii’s jurisdiction (about 2 miles off the southern coast of Oahu) for an aquafarm to produce moi. In 2002, Hawaii granted a second open-ocean lease of approximately 90 acres off the southern coast of the County of Hawaii (located within the Hawaiian Islands Humpback Whale NMS), to Kona Blue Water Farms for the purpose of producing another variety of fish known in Hawaii as kahala. In January 2006, a federal Marine Aquaculture Task Force¹⁹ observed Hawaii’s operating “ocean farms.” The Task Force will make recommendations to Congress and NOAA regarding desirable environmental standards to govern aquaculture.

Hawaii is positioned to be a source of education, training and technical expertise in the pacific region for the long-term. The State’s experience in this area includes setbacks as well as success. In 2005, Ceatech USA, which began a shrimp farming operation using 20 ponds on Kauai in 1997, declared bankruptcy. Ceatech shut down its operations with debts of \$10 - 41 million. Ceatech struggled from the start requesting large infusions of State loans (most of which were denied) and in early 2005, experienced diseased products causing a destruction of 20 million shrimp. It is estimated their operation suffered losses of \$10.7 million in its 8-year history.

2. Environmental concerns about aquacultural activities include biophysical impacts, i.e., specie-introduction, threats to indigenous species; economic, i.e., competition for resource use; socio-cultural, i.e., competition for resource impacts on traditional practices and recreational desires.

Management Characterization:

1. Identify significant changes in the State’s ability to plan and locate aquaculture facilities since the last Assessment.

Significant Changes in Ability to Plan and Site Aquaculture Facilities	Scope of Change	Successes/Impediments
Ocean leasing laws and Hawaii Administrative Rules amended	Authorizes conditional ocean leases; environmental assessment required	2 ocean leases granted, subject to environmental controls
Experimental project preceding lease	Tested cage viability and release of baby fish	Helped insure mitigation of environmental impacts
ADP, DOA develops prototype GIS-based ocean mapping system	Helps to find locations for ocean aquaculture	Will help to produce tools for managing use conflicts

¹⁹ A nine-member, science-based group created in 2005 to provide recommendations for proper standards to control the environmental impacts of aquaculture, Honolulu Star Bulletin, 1/22/2006

H. Marine Debris Assessment

1. Characterization and extent of marine debris resulting from the 2004 ICC in Hawaii²⁰ (Top Ten Items)

Type of Debris on Land (54% of Total)	Amount (% of Total = extent of impact also)	Type of Impact
Cigarettes/filters	34.9	Trashy environment; degrades natural soils and sea life habitat
Container lids	11.5	Trashy environment; residue degrades soils and habitat
Food wrappers /containers	10.1	See above
Glass Bottles	8.3	See above + potential hazard
Beverage Cans	5.0	Trashy environment; residue degrades soil and habitat
Plastic cups, plates, utensils	3.8	See above
Plastic bottles	3.8	See above
Bags	3.7	See above
Straws/Stirrers	2.7	See above
Building Materials	1.0	Trashy environment; may be hazardous

Coastal land debris comprised 54 % of all debris cleaned up. This type of debris obviously originates as human litter discarded by people on or near the coastline and/or discarded in nearshore waters and washed ashore.

Type of Debris	Amount (% of total = extent of impact also)	Type of Impact
Fishing Line	31.8	Causes entanglement of sea life; 5 animals found entangled
Glass Bottles	18.0	Residue degrades ocean habitat; potential hazard, damage to reef

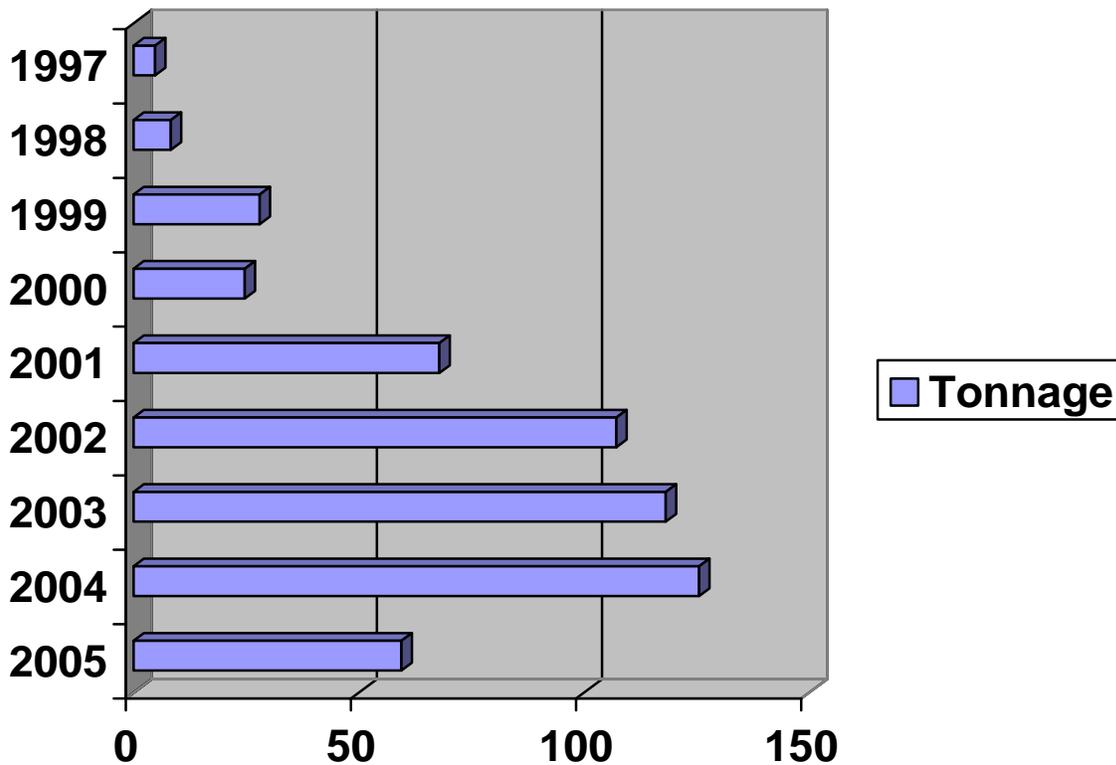
²⁰ The Hawaii CZM 306 sponsored ICC (Get the Drift and Bag It) that occurred in September 2004, involved 2,458 volunteers, including 105 divers, and cleaned 27.3 tons of debris from 109 miles of coastal area and 4 miles of underwater area.

Cars/Car Parts	9.2	See above
Fishing Lures/Light Sticks	7.7	See above
Cigarettes/Filters	6.7	Trashes ocean environment; residue degrades same
Container Lids	4.6	See above
Beverage Cans	4.6	See above
Food Wrappers/Containers	3.6	See above
Batteries	2.6	See above + chemically toxic to sea life
Fishing Nets	2.1	Causes entanglement of sea life

Characterization of top ten items of marine debris cleaned up from underwater areas during the 2004 ICC in Hawaii is shown below:

Additional debris types include: medical waste and rubber. This type of debris also originated from people discarding litter and used items in coastal waters.

NWIHI Under a collaborative arrangement with the USCG, UH Sea Grant, and NOAA, debris cleanup projects have occurred in the NWIHI chain since 1997. Below is a graphic representation of the results to date.



Debris Tonnage Removed from NWIHI in 9-Year Period – Total = 544 Tons

Since the NWIHI are uninhabited and geographically remote, the debris found there originates primarily from fishing vessel and ship discards but also is impacted by currents circulating in the northern Pacific extending from the 42nd parallel to the sub-arctic region. These currents bring drifting debris from the sub-arctic region and the Gulf of Alaska over a 12-year period. Generally, the north Pacific region (above the 42nd parallel) is seen as an area of dispersal, i.e., debris travels elsewhere from here and the sub-tropic region (below the 42nd parallel) is seen as a region where debris from elsewhere collects but also where drifting debris does not disperse. The NWIHI are located in the latter region. Consequently, efforts to reduce marine debris in the NWIHI region requires a two-pronged attack (1) preventing the discarding of debris in the sub-arctic, Gulf of Alaska regions of the Pacific, and (2) periodically cleaning the un-dispersed debris in the NWIHI ocean region.²¹

A CZM 306 assisted effort has the UH School of Ocean Engineering researching potential mitigation measures for dealing with discarded fishing nets and gear in the NWIHI region.

²¹ Surface Current Concentration of Floating Marine Debris in the North Pacific Ocean, Ingraham and Ebbesmeyer, NOAA-NMFS, 2000

I. Energy and Government Facility Siting Assessment

Management Characterization:

1. Significant changes in the State’s ability to address siting of energy and government facilities since last assessment.

Change	Scope of Change	Significance
“Cultural Assessments” required in Environmental Analysis	All projects within coastal zone + all government projects	Impacts on cultural practices in coastal zones now assessed
State Environmental agency has new oversight power	All environmental assessments + impact statements	To eliminate conflicts of interest where agency is both initiating and approving body
Trends	See discussion below	See discussion below

Technological advances have produced trends which have to be considered significant to energy and government facility sitings in the future. The practical application of research, primarily produced by the Natural Energy Laboratory of Hawaii, enables cold seawater pumped from depths below 2000’ to be used to air condition buildings.²² As this technology is utilized in new developments, support facilities will be placed in the coastal zone and environmental protection conditions will be necessary to accommodate them. In addition, the availability of such a technology may cause development locations to gravitate toward the coastal area.

No new energy plants are planned during the next 5 years in Hawaii.

Conclusion:

1. **Priority Needs** in this area include: development and applying performance measure indicators, development of proper control regulations for the pumping of seawater for air conditioning; increased enforcement capability for monitoring such installations; and energy conservation.

2. **Priority** – Last assessment Priority – This assessment

High		High	
Medium		Medium	
Low	X	Low	X

²² Utilized in the construction of new medical school facilities, UU on Oahu in 2004.

IV. Section 309 5-Year Strategy, Schedule, and Summary of Estimate Costs

Summary Tables of Assessment and Strategy: The following summary tables show the sequence, implementation elements, scheduling, projected cost of priority programs devised from this assessment, previous program momentum, and administrative insights.

End Notes:

1. U.S. Environmental Protection Agency; U.S. Department of Agriculture-Natural Resources Conservation Service; Hawaii StateDOH; Hawaii StateDLNR; Hawaii State DBEDT-CZM Program; National Oceanic and Atmospheric Administration; U.S. Fish and Wildlife Service; U.S. Geological Survey.
2. Existing Ahupua'a/Watershed groups in the state include:; West Maui Water Quality Improvement Project; West Maui Mountains Watershed Partnership; East Maui Watershed Group; Leeward Haleakala Watershed Restoration; Lanai Forest and Watershed Partnership; East Molokai Watershed Partnership; South Molokai Watershed Group;; Nawiliwili Bay Watershed Region; Kaiaka-Waialua Bay Hydrological Unit Area Project; Pelekane Bay Watershed Alliance; Hilo Bat Watershed Advisory Group;Ola-a-Kiluaea Partnership; Kohala Forest Management Group; Kauai Watershed Alliance; Hanalei Watershed Hui; Kauai Westside Watershed; North Shore-Napali Watershed Group; Kalunawaikaala Watershed Initiative; Mamala Bay Water Quality Monitoring Group; Pearl Harbor Watershed Region; Ala Wai Canal Watershed Improvement Project; Kailua Bay Advisory Council (Ko'olaupoko Watershed); Ko'olau Mountains Watershed Partnership.

Tabular Summary # 1 - Section 309 Strategies, 2006-2010, Work Plan - Implementation Elements, Schedule and Estimates Costs - Enhancement Area – Coastal Hazards

GOAL	Building of resilient communities by: (1) adoption of the latest building codes that include state-of-the-art standards for coastal hazard mitigation specific to each of the four Counties in the State of Hawaii, (2) technical support to State and County officials and building industry professionals on the application and interpretation of these building codes; and (3) public education and outreach on coastal hazard mitigation.
PROGRAM CHANGE	Incorporate the adoption of state-of-the-art building codes with customized coastal hazard mitigation strategies into the enforceable policies of the Hawaii CZM Program. This integrated planning approach to reducing the risks to life and property from coastal hazards will build a hazard resilient Hawaii. Changes will be made as appropriate to State statutes, County ordinances, and administrative rules and policies that will result in changes to the Hawaii CZM Program network elements.
Year	Work Plan Strategies
Year 1 07/01/06-06/30/07 Funding \$145,000	<ul style="list-style-type: none"> • Complete Phase 1 of 2 of the County of Maui wind speed mapping and customized building code wind standards. • Adoption of new building codes and customized wind standards by first of the four Counties (“County 1”). • Provide training in County 1 on application of new building codes. • Conduct public outreach and education on coastal hazard mitigation.
Year 2 07/01/07-06/30/08 Funding \$145,000	<ul style="list-style-type: none"> • Complete Phase 2 of 2 of the County of Maui wind speed mapping and customized building code wind standards. • Adoption of new building codes and customized wind standards by second of the four Counties (“County 2”). • Provide training in County 2 on application of new building codes. • Conduct public outreach and education on coastal hazard mitigation.
Year 3 07/01/08 –06/30/09 Funding \$30,000	<ul style="list-style-type: none"> • Adoption of new building codes and customized wind standards by third of the four Counties (“County 3”). • Provide training in County 3 on application of new building codes. • Conduct public outreach and education on coastal hazard mitigation.
Year 4 07/01/09 – 06/30/10 Funding \$30,000	<ul style="list-style-type: none"> • Adoption of new building codes and customized wind standards by fourth of the four Counties (“County 4”). • Provide training in County 4 on application of new building codes. • Conduct public outreach and education on coastal hazard mitigation.
Year 5 07/01/10 – 06/30/11 Funding \$30,000	<ul style="list-style-type: none"> • Provide additional training in appropriate jurisdiction in the State of Hawaii on application of new building codes. • Conduct public outreach and education on coastal hazard mitigation.
Total 5-year Budget - Coastal Hazards = \$380,000	

Tabular Summary # 2 - Section 309, Strategies, 2006-2010 – Work Plan- Implementation Elements, Schedule and Estimated Costs - Enhancement Area - Cumulative and Secondary Impacts

GOALS	<p>A. Develop, implement, and institutionalize an integrated planning approach for the Hawaii CZM Program to assess and manage CSI using the traditional Hawaiian ahupua`a/moku concept for purposes of implementing the ORMP.</p> <p>B. Control CSI on special management areas and coastal and ocean resources</p>
PROGRAM CHANGES	<p>A. Incorporate the ahupua`a/moku concept into the Hawaii CZM Program enforceable policies to provide an integrated planning approach to assess, manage, and control CSI on coastal and ocean resources in order to implement the ORMP. Changes will be made to State statutes, State and County rules, or administrative policies that will better equip Hawaii's CZM Program network elements to meet this goal.</p> <p>B. Develop and incorporate into governmental rules and regulations a methodology for assessing the proportionate regional impacts of surface water runoff and erosion generated by any individual development project on the cumulative region.</p>
YEAR	Work Plan Strategies
<p>YEAR 1 (07/01/06 – 06/30/07) Funding A - \$29,000</p>	<p>A. Planning, research, assessment, and coordination of public outreach for establishing ahupua`a/moku management to implement the ORMP.</p> <ul style="list-style-type: none"> • Identify existing networks, community groups, and organizations to work with. • Establish an ahupua`a/moku network to: increase dialogue with communities, develop a framework for education, and build partnerships among various stakeholders. • Plan, prepare for, and conduct annual workshop to assess ahupua`a/moku issues at the community level and discuss ORMP implementation. • Undertake and coordinate outreach and educational efforts to raise community awareness of Hawaii CZM Program efforts to develop and implement an ahupua`a/moku integrated planning approach and achieve community buy-in to the concept. • Develop the principles for an ahupua`a/moku management framework for the further development and implementation of the ORMP.
<p>YEAR 2 (07/01/07 – 06/30/08) Funding A - \$30,000</p>	<p>A. Completing development of an integrated planning approach and establish a public advisory group.</p> <ul style="list-style-type: none"> • Establish a public advisory group to help assess and monitor ahupua`a/moku issues and maintain a dialogue at the community level to learn about each ahupua`a/moku. • Begin development of an integrated planning approach based on the ahupua`a/moku concept in coordination with the public advisory group. • Convene the annual workshop to continue development of the integrated planning approach. • Maintain outreach activities to enhance public awareness and input.

Tabular Summary # 2 - Section 309, Strategies, 2006-2010 – Work Plan- Implementation Elements, Schedule and Estimated Costs - Enhancement Area - Cumulative and Secondary Impacts

<p>YEAR 3 (07/01/08 – 06/30/09) Funding: A - \$50,000 B - \$95,000</p>	<p>A. Maintaining Integrated Planning approach.</p> <ul style="list-style-type: none"> • Public advisory group and partners begin to advocate for an integrated planning approach. • Convene annual workshop to continue discussion of implementing an integrated planning approach. • Maintain outreach activities to enhance public awareness and input. 	<p>B. Control CSI on special management areas and coastal and ocean resources.</p> <ul style="list-style-type: none"> • Research and develop a methodology for assessing regional impacts of surface water runoff and erosion and a methodology for evaluating the proportionate impacts generated by any individual development in the region for the purpose of identifying effective measures to mitigate cumulative impacts rather than project specific impacts.
<p>YEAR 4 (07/01/09 – 06/30/10) Funding: A - \$60,000 B - \$85,000</p>	<p>A. Institutionalize the integrated planning approach based on the ahupua`a/moku concept into the Hawaii CZM Program.</p> <ul style="list-style-type: none"> • Establish new and modify existing Hawaii CZM Program enforceable policies to embody the integrated planning approach and ahupua`a/moku concept. • Propose legislation for statutory changes to the Hawaii CZM Program network, including SMA permits and possibly other regulatory programs. • Initiate necessary changes to State and County administrative rules. • Adopt new administrative directives to implement the integrated planning approach. • Convene annual workshop on implementation of the integrated planning approach. • Task the public advisory group to monitor ahupua`a/moku issues and foster community stewardship and empowerment. • Maintain outreach activities to enhance public awareness and input. 	<p>B. Control cumulative and secondary impacts on special management areas and coastal and ocean resources.</p> <ul style="list-style-type: none"> • Test the methodology on alternative development proposals. Work with other governmental agencies to incorporate use of the methodology in rules and regulations involving the review and approval of development proposals.

Tabular Summary # 2 - Section 309, Strategies, 2006-2010 – Work Plan- Implementation Elements, Schedule and Estimated Costs - Enhancement Area - Cumulative and Secondary Impacts

<p>YEAR 5 (07/01/10 – 06/30/11) Funding: A - \$55,000 B - \$90,000</p>	<p>A. Institutionalize the integrated planning approach based on the ahupua`a/moku concept into the Hawaii CZM Program.</p> <ul style="list-style-type: none"> • Complete State and County administrative rule changes. • Task the public advisory group to actively assist in implementation. • CSI are assessed and managed using the ahupua`a/moku concept. • Convene 5th annual workshop to monitor progress. • Maintain outreach activities to enhance public awareness and input. 	<p>B. Control cumulative and secondary impacts on special management areas and coastal and ocean resources.</p> <ul style="list-style-type: none"> • Develop guidelines to assist developers/planners/engineers in utilizing the methodology. • Provide training to decision-makers and other users of the information to allow them to interpret and use it effectively.
<p>Total 5-year Budget - Cumulative and Secondary Impacts = \$524,000</p>		

Tabular Summary # 3 - Budget Summary by Enhancement Area and Fiscal Year

Enhancement Area	Fiscal Year 2006-07	Fiscal Year 2007-08	Fiscal Year 2008-09	Fiscal Year 2009-10	Fiscal Year 2010-11	5 –Year Totals
Coastal Hazards	\$145,000	\$145,000	\$30,000	\$30,000	\$30,000	\$380,000
Ocean Resources	0	0	0	0	0	0
Special Area Management Planning	0	0	0	0	0	0
Cumulative & Secondary Impacts	\$29,000	\$30,000	\$145,000	\$145,000	\$145,000	\$494,000
Public Access	0	0	0	0	0	0
Fiscal Years Totals	\$174,000	\$175,000	\$175,000	\$175,000	\$175,000	\$874,000

The above budget summary for the prospective 5-year period reflects Hawaii’s desire to concentrate energies and resources on a limited number of enhancement areas in order to bolster prospects of success.