

# Section 309

## Assessment and Strategy

Guam Coastal Management Program  
Bureau of Statistics and Plans

August 2011



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**Guam Coastal Management Program**  
**Section 309**  
**Assessments and Strategy**

Section 309 of the Coastal Zone Management Act (CZMA), as amended, encourages states and territories to develop program changes in one or more of nine coastal zone enhancement areas through a coastal zone enhancement grant program. Rather than just changes to the manner that states and territories implement programs, the changes are made to federally approved CZM programs. These changes may include updates or revisions to state and territory enforceable policies and authorities. Such changes include the following activities that will enhance a state or territory's ability to achieve one or more of the coastal zone enhancement objectives:

1. A change to coastal zone boundaries;
2. New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
3. New or revised local coastal programs and implementing ordinances;
4. New or revised coastal land acquisition, management, and restoration programs;
5. New or revised Special Area Management Plans (SAMP) or plans for Areas of Particular Concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
6. New or revised guidelines, procedures and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government and other agencies that will result in meaningful improvements in coastal resource management.

**Introduction**

Located in the central western Pacific, Guam is a small raised limestone and volcanic island of approximately 212 square miles, with extensive coasts and a long tradition of active use of coastal resources. The Guam Coastal Management Program, or GCMP, works with a network of partners to manage coastal areas, including a rich coral reef system, an active recreational and subsistence fishery and numerous other resources.

GCMP previously completed assessment and strategy documents in 1991, 1997, 2001 and 2006. Though changing conditions on island warranted some priority changes and numerous updates to 309 efforts, this 2010 update reflects changes expected to occur in conjunction with the single biggest event to happen on Guam since World War II. The massive Department of Defense plans to relocate 8,000 Marines, their dependents and other military resources to the island over the next few years. While this buildup presents many economic opportunities for the community, these opportunities are paired with daunting challenges, especially in the protection and enhancement of the island's limited, fragile natural resources.

Although military officials announced the buildup at the time of the 2006 assessment, the details and scope of this enormous development have only recently been made clear. Even now, after the Record of Decision has been signed, the full extent of the projects to accommodate 8,000 Marines, their dependents, and additional defense personnel are not fully understood. As such, GCMP's 2010 assessment reflects both the uncertainty of the immediate future and the need to prioritize 309 efforts to match the major concerns that will be associated with the rapid, immense scale of the buildup activities. This work also reflects concerns that arise due to the local government and private sector development that is already ongoing in anticipation of both the military buildup and the increase in population due to this activity.

Balancing the rapid, large scale development of the military buildup, Guam continues to focus on conservation efforts that have recently been enhanced by new regional partnerships and a growing public awareness of not only the unique nature of the island's environment, but the need for personal responsibility to conserve it. In 2006, Governor Felix Camacho joined the leaders of the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia and the Republics of the Marshall Islands and Palau in committing to the Micronesia Challenge.

The Challenge is an initiative calling for effective conservation of 20 percent of terrestrial and 30 percent of near shore resources by 2020. Effective Conservation entails the Social, Traditional, Political, Biological, Financial, and Legal aspects of sustainable use of at least 30% of our Marine Resources and 20% of our Terrestrial Resources keeping in mind the overall management of surrounding areas, and finding a right balance between resource utilization by communities to sustain their cultural values, socio-economic development, and prosperity. Because the jurisdictions have widely different capacities, priorities, and types of resource use, "effective conservation" is defined within each jurisdiction and is usually a combination of protected areas, harvest regulation, development control and other mechanisms as necessary to promote sustainable use of the resource. The conservation targets are intended to provide for sustainable use.

Since its creation, the MC has grown to include some endowment funding and an active network of conservation managers and policy specialists working to meet these goals. As a framework for Guam's various ongoing resource management and conservation efforts, this initiative has helped focus efforts on effective conservation and the need for reasonable monitoring mechanisms to document progress and guide strategy development.

The Challenge, new public interest in resource protection, and the buildup will guide GCMP activities during the next few years. The scale of the Department of Defense initiative and the potential coastal zone impacts that may result from this move are unprecedented in non-war time conditions. Given Guam's small size, unique and fragile environment, and the catalog of existing threats to effect conservation, the buildup activity must be closely and carefully monitored to minimize harmful effects to the environment and Guam's civilian community. Whenever possible, new policies and regulations must be developed to anticipate potential problems, ranging from an increase in invasive species to overharvest problems caused by a sudden influx of new workers from areas with different environments and environmental ethics. As such, the GCMP assessment is focused on the following four high priority areas: Cumulative and Secondary Impacts, Energy and Government Facility Siting, and Coastal Hazards, and Oceans

Resources. Coastal Hazards remains a priority due to increasing concerns about climate change impacts and Guam's vulnerability to seismic, storm and other hazards. In the past Energy and Government Facility Siting was not considered a high priority. However this issue has become more significant due to increasing demands for land and renewable energy associated with increased development. Presently the energy siting policy relates only to power. There have been many innovative technologies related to renewable energy; however, none of these technologies are included in the policy. The government facility and energy siting strategy will support national goals related to the National Ocean Policy and Coastal Marine Spatial Planning efforts.

Natural disasters, always a concern for a small island in the Western Pacific's "Typhoon Alley," remain an issue for Guam. New challenges will be associated with climate change impacts, an issue facing communities around the globe.

Government facility siting has been elevated to high priority due to major increases in both federal and local government construction activities, and the need to explore alternative sources of renewable energy to accommodate the tremendous increase for energy. In addition to the new facilities that will be built to house the influx of new military personnel, their dependents, and associated support staff, the local government is working through major developments including the construction of the new landfill, the closure of the old dump, upgrades to water, power and transportation infrastructure and other projects. This rapid and large scale construction has elevated the priority for both government siting and special area management, because of potential impacts on such regions as the northern aquifer recharge area.

This 2010 update provides an opportunity to review the program's accomplishments as well as its strategy for handling new challenges and changing scenarios facing Guam. The new tasks should improve GCMP's ability to help protect the island's fragile environment, which is under new and growing pressure based on rapid large scale development. Most of our priorities remain unchanged, but there will be numerous adjustments to meet current demands and pressures. Just as past assessments have highlighted continuing growth and development, this assessment will note significant upcoming events and the general concern with cumulative and secondary impacts as projects occur.

In light of the proposed and ongoing development activity, Guam's highest priority items are coastal hazards, energy and government facility siting, cumulative and secondary impacts and ocean resources. The four medium priority areas are wetlands, marine debris, special area management plans and public access. Lastly, aquaculture remains a low priority area for Guam, based on the urgent needs associated with the other areas.

In anticipation of changes that will result from the buildup, an increase in existing issues and a lack of resolution to some past concerns, public access also has been elevated to high priority. The buildup includes both terrestrial and coastal areas that will see some use restrictions due to proposed activities such as a firing range. The loss of use at some of these areas, and increasing development outside federal or local properties, will only further compress access that many recreational or subsistence users already are concerned about. The new status will allow GCMP to focus efforts on this important community concern.

Areas for improvement (issues) are identified through an assessment of issue areas and a strategy for improvement.

## **II. Summary of Completed Section 309 Efforts**

Setting the background for the upcoming period of rapid changes, GCMP has completed or initiated the following programs. These activities were developed in response to past assessments, including the most recent 2006 document.

### ***1. Natural Resources Strategy***

The Natural Resources Subcommittee (NRS) of the Civilian Military Task Force is tasked with formulating a strategy to manage natural resources for sustainability through this period of growth, thereby ensuring the viability of natural resources for future generations. The NRS has oversight responsibility for coral reef ecosystems and associated biological communities, terrestrial ecosystems, cultural and archaeological resources, invasive species, watershed ecosystems, migratory birds, wildlife, endangered species and their habitats, protected species, marine mammals, direct, cumulative, and secondary impacts to the natural environment, oversight and participation in the Department of Defense (DOD) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS, hereinafter EIS) process, and required mitigation plans for the loss of natural resources resulting from construction associated with all development.

The Strategy was completed in 2008 and has been used to provide direction for the natural resources subcommittee as we address critical issues related to the military buildup.

### ***2. Mitigation Policy for Development***

Mitigation measures and compensation are required for unavoidable resource loss due to development. The development of a mitigation strategy will assist the Government of Guam in having a better understanding of the cumulative loss of its valuable natural resources as a result of necessary development. The strategy allows resource agencies to have a clear policy in place to respond to requests for development in sensitive areas, and will focus on tools to compensate the public for the loss of valuable natural resources, ideally through mechanisms that restore habitat function and ecosystem services.

The Strategy assists the Government in identifying appropriate mitigation projects and provides critical historic information about previous mitigation attempts. It reviews previous mitigation projects and the effectiveness of those efforts. It assesses the goals and outcomes of past agreements to determine what has actually been achieved in past mitigation efforts. A consultant was hired to complete the plan. Public hearings were conducted and changes were made. The plan was approved by the Governor and was submitted to the Guam Legislature for adoption on September 28, 2010. The project was completed using \$40,000 from Section 309 funds from NA07NOS4190177. Due a resolution passed late in the last legislative term, legal counsel is reviewing the status of the plan, which may have to be resubmitted by the Governor to be formally enacted.

### ***3. Update of the Northern and Central Land Use Plan***

The purpose of this project is to provide a guide for future development of northern and central Guam while protecting Guam's unique culture and natural resources. The land use plan is intended to serve as a guide for future development and support community views regarding development, conservation and need for open space.

The Plan covers the period from 2008 to 2025 and addresses the affected areas of central and north Guam, which will be subject to the greatest growth pressures resulting from the planned military buildup as well as increased private development.

The major driver of the plan was to ensure that development will be conducted in a sustainable way that protects Guam natural resources and the sole source aquifer.

A consultant was hired to complete the plan. Various public meeting were held. The Plan was approved by the Governor and was submitted to the Guam Legislature for adoption. Although policies and plans submitted to the Guam Legislature are usually adopted by default if not action is taken within a 90-day timeframe, there has been significant confusion on this matter. Additionally, the 30<sup>th</sup> Guam Legislature passed a statute provided the members of the 31<sup>st</sup> Guam Legislature, which is the current body, with additional time to review policies and conduct additional hearings. GCMP is presently working with the Governor's Office and legal staff to clarify the status of the plan.

This project required several years of funding for the development of the plan, including stakeholder involvement and public participation portions of the plan. Funds for this project came from Section 309 funds from NA05NOS4191171, NA06NOS4190236, and NA07NOS4190177.

### ***4. Conservation/Development Suitability Analysis Utilizing GIS and Green Infrastructure projects.***

A GIS tool was developed using Green Infrastructure Concepts to strategically determine areas on Guam where conservation of natural resource areas or land development should ideally occur. The primary consideration is to strategically conserve our limited natural resource areas while identifying those areas that are more suitable for development. This tool was completed in September 2010 with funds that came from NA07NOS4190117.

The GIS tool will be utilized to help guide policy in preserving natural resources areas while allowing for more development in other areas. Presently the local conservation areas are very limited and the laws that protect them may not be adequate in the face of shrinking land availability.

With the impending Military Buildup and the associated utilization of previously undeveloped areas, there is a need to determine what land should be conserved and what can be developed without destroying or degrading limited natural resources. New GIS data layers make this type of analysis possible. Some of this recent GIS data development was spurred by the potential changes from a planned Military Buildup, proposed availability of satellite imagery and the need to classify land cover and vegetation types for various reasons.

The analysis tool primarily used existing Geographic Information Systems (GIS) data layers to identify and classify land areas where there are natural hazards and manmade constraints to development, as well as natural resources such as limestone forests, wetlands, streams, farmlands and parks. Utilizing Green Infrastructure concepts, areas have been identified with quality natural resources hubs and cores. The GIS tool provides information the user can use to determine whether these areas can benefit from further protection. Such protection may consist of wider buffers or links to other hubs or cores to create more viable conservation areas and appropriate land use zoning. The tools will assist the Guam Chamorro Land Trust Commission and the Ancestral Lands commission in determining what areas should be reserved for conservation and what areas are appropriate for increased development. The tool will be used by land use planners and policy makers when assessing requests for zone changes.

**5. *The Recreational Water Use Master Plan-*** This project was funded with \$38,000 from 309 funds under grant NA05NOS41911171. The updated plan was completed in 2008. The RWUMP made recommendation of rules and regulations and updated laws that address impacts to coral reef resources resulting from recreational activity and increased populations. Information from the updated plan will be presented the Department of Parks and Recreation to draft legislation to address gaps in the existing laws. The plan has been reviewed by natural resource agencies; however, due to many changes within the Department of Parks and Recreation, the plan has not yet been adopted by the Guam Legislature. It is expected that during this new administration, the GCMP will present the study to the new director to begin the process to achieve adoption by the Guam Legislature.

## **2006-2011 Projects still Ongoing**

### ***1. Shoreline Setback Analysis. (ongoing)***

This project is on-going. Through NA09NOS4190175, section 309 funds will be used to hire a consultant to assess the current condition of several coastal villages. The assessment will include the number of buildings impacted by the existing shoreline setback policy. The study looks at the impact of shoreline erosion due to improper development standards. The RFP for a consultant has been drafted and advertised. The limited funding only provides for analysis for Hagátña, Piti, Asan, Tumon/Tamuning and Agat. There is also a similar study being conducted by Homeland Security, which will cover areas in the most populated northern villages.

To provide for a policy that can be enforced, a comprehensive look at impacts to shoreline along the southern villages is critical to result in actual policy change.

## **2. *Mitigation Banking***

The Natural Resources Subcommittee of the Governor's Civilian/Military Task Force is responsible for ensuring natural resources are protected from expanded public and private development associated with Department of Defense activities and military deployment of additional troops to the island. Mitigation Banking was identified as a possible measure in the Compensatory Mitigation Policy (CMP). The CMP will be applied to any development on government of Guam and private properties on Guam. This effort will not only address losses in the marine environment, but will account for damages or losses to terrestrial or historic resources. A consultant will be hired in 2011, which the project expected to be complete by September 2011. The project, budgeted for \$60,000, is funded under NA08NOS4190455.

## **3. *Guam Seashore Reserve Plan*** (formally known as the Territorial Seashore Reserve Plan).

Although this effort was originally developed with \$91,000 in 309 funds in 2006 through a contract with a private consultant, the final draft was completed by the Seashore Reserve Task Force, which is comprised of GCMP and its network agencies. The Guam Seashore Reserve Plan remains a high priority for this 309 Assessment. Moreover, its implementation will work to protect and manage the seashore's valuable resource and ensure our island's beaches and reefs are protected for the enjoyment of current and succeeding generations. Stakeholder meetings and public outreach efforts have been conducted. The Plan is in its final stages of completion. Although much energy has been invested in the adoption of the Plan, we have not been able to move the plan toward approval from the Seashore Commission. Although members are very supportive of the Plan, other priorities have delayed adoption. Funds were identified in NA06NOS4190236 for public outreach related to the implementation of the Seashore Reserve Plan, however the plan has yet to be adopted and GCMP requested that the funds be reprogrammed for public outreach for the North and Central Land Use Plan. \$20,000 was used for the stakeholder engagement activities.

### III. Enhancement Area Assessments

#### Wetlands

#### **Section 309 Enhancement Objective**

Protection, restoration, or enhancement of the existing coastal wetlands base, or creation of new coastal wetlands

#### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. Please indicate the extent, status, and trends of wetlands in the coastal zone using the following table:

<b>Wetlands type</b>	<b>Estimated historic extent (acres)</b>	<b>Current extent (acres)</b>	<b>Trends in acres lost since 2006 (Net acres gained &amp; lost)</b>	<b>Acres gained through voluntary mechanisms since 2006</b>	<b>Acres gained through mitigation since 2006</b>	<b>Year and source(s) of Data</b>
Tidal vegetated <sup>1</sup>	10,431 1975 estimate	1,394.6 2009	*Significant change due to category change <sup>1</sup>	0	0	2009 FWS Wetlands Inventory
Non-tidal/ freshwater	4,055 1975 estimate	3797.7 2009	No significant change	0	0	2009 FWS Wetlands Inventory
Publicly acquired wetlands	-	No significant change	No significant change?	7.859 2008 <sup>2</sup>	0	EPP & SEIS Layon Landfill Operation
Restored Wetlands	-	No significant change	No significant change	.890 2007 <sup>3</sup>		EPP & SEIS Layon Landfill Operation
Other (please specify)	-	-	-	-	-	

1. In past assessments, Guam's reefs were included in the "tidal vegetated" category due to the mapping techniques and characterizations at the time. However, in the analysis of the most recent inventory, "reefs" were excluded from the "tidal vegetated" category, resulting in what appears to be a huge loss of acreage. This is due to the methodology and not a loss of actual resources. If reefs are included, the acreage will be comparable to the last assessment figures.
2. This 7.859 acre area of wetlands was included in the 317 acres condemned as part of the government's new sanitary landfill project. The wetland portion will not be encumbered for landfill cells 1 or 2, such that no Army Corps Section 404 is required.
3. As mitigation for the loss of 37,864 square feet of wetlands at the Ordot dump, 38,758 square feet of previously filled wetlands adjacent to the Hagátña tennis courts and swimming pool will be restored to create habitat, increase flood storage capacity and improve drainage in the lower area of the Agana River Watershed. Vegetation found in the wetland habitat of the Agana Swamp will be used in this restoration project.

*2) If information is not available to fill in the above table, provide a qualitative description of information requested, including wetlands status and trends, based on the best available information.*

Overall, Guam is working on creating a more holistic approach to environmental protection and specifically to watershed management. GCMP collaborates with other agencies including the Guam Environmental Protection Agency and the Guam Department of Agriculture to carry out these efforts, including projects to protect and enhance the island's wetland areas. Mapping projects, assessment of existing resources and some monitoring efforts are ongoing.

Regarding trends and threats, wetland areas are under constant pressure due to the island's small size. With a landmass of only about 212 square miles and a growing population estimated at about 173,000 in 2009, Guam faces the loss of many natural areas due to growing community needs. Approximately one-third of the island is under federal control, a number that may increase as the military buildup occurs. After considering steep slope areas that are not developable, narrow coasts subject to frequent storm surge and wave inundation, and tracts of local government property, the inventory of developable land is quite small and wetlands are vulnerable to development due to the island's small size.

According to estimates made from the USFWS National Wetland Inventory mapping project for Guam, issued in 1983, Guam's wetland resources covered by this Plan total approximately 5,000 acres. This acreage equals slightly less than four percent of the island's total land area. Government of Guam development within wetlands, or on lands which affect wetlands, is limited to projects where no practicable alternative has existed; these projects typically include road and other utility crossings and the location of infrastructure such as sewer pump stations which must be located in low areas within the surrounding topography.

The Guam Wetland Rules and Regulations, (as amended by Executive Order 90-13), state that the 1983 National Wetland Inventory (NWI) Map is the official wetland map for Guam until such a time that a study is completed. Presently, the NWI map for Guam is the official map. Areas under jurisdiction of the Rules and Regulations include all Government of Guam and private lands on Guam. Land under federal jurisdiction is not governed by the Guam rules and regulations, though still subject to all U.S. Army Corps of Engineers (USACE) Section 404 provisions. Compliance with the Guam rules and regulations shall precede application for permits from the USACE. Issuance of a permit for development by the Guam Land Use Commission does not preclude the USACE from denying an application under Sec. 404.

Guam's community, the public and the regulators must have an opportunity to correct past mistakes and plan for more orderly development in the future. Sustainable use of controlled wetland resources can be achieved through preservation of most high value wetland and although some may be lost to developments, they should be mitigated. Wetlands that were impacted and degraded can be restored to regain their function at their original site or mitigated elsewhere for the permitted activity. Wetland protection can be enhanced through cooperative efforts among regulatory agencies and other Federal/ Government of Guam Agencies.

Although development pressure around Guam continues to be high, there has not been a recent effort to update wetland maps for terrestrial or marine areas. However, application reviews for projects during this assessment period included limited wetland impact issues.

*3) Provide a brief explanation for trends.*

Resource managers are under pressure to balance the need for conservation and community needs, a fact that will continue to be emphasized as the military buildup and accompanying economic surges happen in the next three to five years. Because of the significant development within the Port Authority of Guam and Navy base properties in southern Guam, some of the island's mangroves will undoubtedly be affected by at least indirect and secondary impacts if not more direct impacts from the development. GCMP and partner agencies will carefully monitor the design and permit phases, as well as actual construction work, to attempt to avoid as many impacts as possible, provide adequate mitigation where necessary, and monitor the implementation of these programs.

Since the last assessment, the Government of Guam's solid waste program has been placed in receivership, and the island is under a U.S. Court order to close the Ordot dump and build a sanitary landfill. The order further requires the Government of Guam to end discharge from the Ordot dump into the Lonfit River. As part of the compliance effort, the Government of Guam will open a new municipal solid waste facility in Dandan, Inarajan, in 2011. The Dandan landfill site, located in southern Guam, includes some wetland areas. These wetlands will not be used as part of the new landfill cells or actively used areas.

Because of Guam's size and geology, there are limited alternatives in siting a new landfill facility where wetlands will not be affected. The landfill cannot be built over porous limestone soils due to the potential to contaminate to Guam's Sole Source Aquifer, which provides much of the island's drinking water. Development activities and siting of projects in upland areas, as well as construction on erodible soils and other poor construction practices affects the wetlands and other sensitive areas.

This pressure is expected to increase as military buildup projects break ground in the next few years, but regulatory controls through local statutes and U.S. Army Corps of Engineer requirements will apply: private and government of Guam lands are subject to Guam Wetland Rules and Regulations, while federal properties are subject to USACE Section 404 provisions. Even in cases where local permits and land use permission are granted, the USACE may deny an application under Section 404 and the Guam Coastal Management Program conducts federal consistency reviews of 404 permits.

Since the last assessment, few permits for development that will affect wetlands have been reviewed by the Guam Environmental Protection Agency, which has the primary mandate for local wetland review. According to Guam EPA, seven permit requests are currently pending, but no action on these permits has been taken.

Erosion: Erosion continues to be a significant problem for southern Guam, where development, storms and wildfires remove native forest vegetation and expose highly erodible clay soils. As native species are virtually unable to grow on bare clay soils, these barren areas have dramatically increased sediment loads in southern rivers and streams, leading to major damage on receiving coral reefs. The problem extends beyond environmental concerns, as a freshwater retention dam providing water to much of southern Guam has periods of reduced function due to sediment accumulation.

Past reforestation efforts have focused on planting projects, using nitrogen-fixing species such as acacia to augment the soil in preparation for additional planting of native vegetation. However, many of these areas continued to experience fires and other disturbances, so large numbers of the more than 1 million trees planted in four watersheds have been lost.

GCMP partners with the Guam Department of Agriculture, USDA's NRCS, southern communities and various local organizations to change the pattern of replanting and destruction. New projects include greater volunteer participation, outreach activities, and a campaign to address the wildfires that have been such a significant contribution to the erosion problem for many years. A 2010 public law will increase penalties for anyone throwing lit cigarettes from cars during periods of high fire risk.

To address another cause of wildfires – hunters who intentionally set blazes to draw out deer – GCMP staff are working on a long-term campaign to raise awareness and change public behavior with regard to destructive hunting practices. The new approach includes many family-friendly activities to promote environmental health, recreational opportunities and educational material to highlight the need to protect wetlands and coasts.

Pollution/NPS: Various enforcement policies and measures remain in place to satisfy the intent and objectives of this management measure, and local agencies continue to update regulations and policies to meet changing conditions and incorporate newer technology and information. Guam also updated its pesticide statutes for the first time in more than 30 years, passing updates to the pesticide codes in Public Law 29-26 in October 2007 and adopting new rules and regulations for pesticides in September 2010, via Public Law 30-197.

*4) Identify ongoing or planned efforts to develop monitoring programs or quantitative measures for this enhancement area.*

GEPA is responsible for the monitoring and evaluation of wetlands. GCMP and other agencies as members of the Wetland Task Force will provide input and review of evaluation report and make recommendations for specific project area, based on set methodology for implementation.

5) Use the following table to characterize direct and indirect threats to coastal wetlands, both natural and man-made. If necessary, additional narrative can be provided below to describe threats.

Type of threat	Severity of impacts (H,M,L)	Geographic scope of impacts (extensive or limited)	Irreversibility (H,M,L)
Development/Fill	H	L	H
Alteration of hydrology	H	L	H
Erosion	H	E	M
Pollution	H	E	M
Channelization	H	L	M
Nuisance or exotic species	H	E	H
Freshwater input	H	L	M
Sea level rise/Great Lake level change	H	E	H
Other (please specify)	N/A	N/A	N/A

The existing Guam Wetland Rules and Regulations, drafted in 1978, are outdated and do not provide specific requirements and guidance on mitigation that must be based on scientific knowledge and public benefit.

6) Indicate whether the Coastal Management Program (CMP) has a mapped inventory of the following habitat types in the coastal zone and the approximate time since it was developed or significantly updated

Habitat type	CMP has mapped inventory (Y or N)	Date completed or substantially updated
Tidal Wetlands	Y	2006
Beach	Y	2006
Near shore	Y	2006
Other (please specify)	Y (Imagery)	2009

Note: Raster Data for land covers and vegetations was done in 2002 and revised in 2005 Land Cover classification was made in 2006 and the imagery was done in 2009 prepared in conjunction with NOAA Pacific Services Center.

2. 7. Use the table below to report information related coastal habitat restoration and protection. The purpose of this contextual measure is to describe trends in the restoration

*and protection of coastal habitat conducted by the State using non-CZM funds or non Coastal and Estuarine Land Conservation Program (CELCP) funds. If data is not available to report for this contextual measure, please describe below actions the CMP is taking to develop a mechanism to collect the requested data.*

<b>Contextual measure</b>	<b>Cumulative acres for 2004-2010</b>
Number of acres of coastal habitat restored using non-CZM or non-Coastal and Estuarine Land Conservation Program (CELCP) funds	Cetti Bay and Masso Mitigation Project with DOD 500 acres
Number of acres of coastal habitat protected through acquisition or easement using non-CZM or non-CELCP funds	0

The Cetti Bay project is a joint project between the Guam Department of Agriculture and the U.S. Navy and is intended to mitigate reef damage from the Kilo Wharf Expansion Project. The project, located in the 1,928-acre Cetti Bay Watershed, includes replanting efforts for 500 acres.

The Navy also is supporting the Masso Mitigation Project with \$235,000 in funding to reduce sedimentation from the Piti/Asan Watershed entering the Piti Marine Preserve. Other partners, including the Guam Department of Agriculture, the U.S. Department of Agriculture’s Natural Resource Conservation Service, GCMP and various local organizations have contributed. To date, volunteers have planted thousands of acacia trees to augment the soil in preparation for native species. Some native seedlings already have been planted near the Masso Reservoir.

Numerous other projects targeting badland areas in southern watersheds have been completed or are ongoing. The following listing includes many representative projects:

- Navy Environmental NAVFAC Marianas with Science Applications International: Clear 32 acres of mountainous area and plant 15,000 trees for soil erosion control and reforestation (2009)
- Navy Environmental NAVFAC Marianas with Science Applications International: Naval Magazine site. Grew and planted 50,400 trees in five locations. (2008) Navy Environmental NAVFAC Marianas with Nicole’s Work: Cetti Bay watershed. 6,500 trees and grasses for erosion control (2008)
- Navy Environmental NAVFAC Marianas with Science Applications International: Fena Watershed critical area treatment. 14,000 trees planted for erosion control. (2007)

**Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. For each of the wetland management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

<b>Management categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Wetland regulatory program implementation, policies, and standards	Y	N
Wetland protection policies and standards	Y	N
Wetland assessment methodologies (health, function, extent)	Y	N
Wetland restoration or enhancement programs	Y	N
Wetland policies related public infrastructure funding	Y	N
Wetland mitigation programs and policies	Y	N
Wetland creation programs and policies	Y	N
Wetland acquisition programs	Y	N
Wetland mapping, GIS, and tracking systems	Y	N
Special Area Management Plans	Y	N
Wetland research and monitoring	Y	N
Wetland education and outreach	Y	N
Other (please specify)	Y	N

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
- Characterize significant changes since the last assessment;
  - Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - Characterize the outcomes and effectiveness of the changes.

Although numerous watershed restoration programs are ongoing, the scale and strategy of these programs do not represent a significant change since the last assessment.

3. Indicate whether the CMP has a habitat restoration plan for the following coastal habitats and the approximate time since the plan was developed or significantly updated.

<b>Habitat type</b>	<b>CMP has a restoration plan (Y or N)</b>	<b>Date completed or substantially updated</b>
Tidal Wetlands	N	
Beach and Dune	N	
Near shore	Y- limited areas	2009
Other (please specify)		

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the Coastal Management Program and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need description</b>	<b>Select type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> <b>(H, M, L)</b>
No net loss of wetland functions and values	Recommend revisions of existing laws and regulations, Need for effective enforcement capability	M
Gaps in regulatory reviews, overlaps with other local and federal agencies.	Improving efficiency of the regulatory process to improve wetland protection efforts	M
Education and public outreach	Increase the public’s appreciation of the valuable functions of wetlands	M

**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**        \_\_\_\_\_  
**Medium**      x    
**Low**         \_\_\_\_\_

Briefly explain the level of priority given for this enhancement area.

Development without adequate management controls or infrastructure, such as sewer lines with adequate treatment facilities and roadways with stormwater management systems, poses the most significant threat to Guam’s nearshore and freshwater water quality. While the Guam Coastal Management Program is one partner working to provide appropriate regulation and management support to protect water quality, the primary mandate for this concern lies with the Guam Environmental Protection Agency.

The U.S. EPA recently issued new guidance relative to nonpoint source pollution, requiring programs to be updated and strengthened to be consistent with the U.S. Clean Water Act. Under Guam EPA’s Guam Clean Water Action Plan, the Watershed Planning Committee and partner resource agencies are working together to better manage water resources on Guam.

2. Will the CMP develop one or more strategies for this enhancement area?

Yes \_\_\_\_\_  
No   x  

Briefly explain why a strategy will or will not be developed for this enhancement area.

On Guam, activities affecting wetlands are regulated by both the United States Federal Government and the Government of Guam. Although it has not been finalized, GEPA's Draft Guam Wetland Conservation Plan describes the Guam and Federal programs. The draft document identifies and evaluates areas of program overlap, areas where the two programs may conflict, and explores the dual role of some Government of Guam programs which are tasked with administering Federal programs. Although the draft plan has evaluated the programmatic conflicts and overlaps, gaps remain because the plan has not been finalized and numerous changes have occurred since it was drafted in the late 1990s.

However, in terms of wetland regulations, Federal law supersedes Guam law. Guam's assumption of the Guam Coastal Zone Management Program and the Guam "401 Water Quality Certification" program are critically important in giving local control over development affecting wetlands. In addition to federal wetland programs, Guam has developed its own set of laws regulating development and other activities in wetlands.

These programs have been updated several times, though ideally they would have a regular schedule to reflect changes and new issues. The most recent change to occur since the last assessment is a new focus on watershed ecosystems and wetlands, which is driving changes to some development guidelines. A new Stormwater Management Manual, first released in 2006, recommends management measures and best practices to control pollution and ensure recharge of surface and groundwater resources. The drafted rules and regulations are being reviewed by the Guam Attorney General for approval. However, U.S. EPA and Guam EPA also are working on additional control measures for stormwater; US EPA announced in February 2011 that Guam stormwater sources will have to follow Clean Water Act permitting requirements.

US Department of Agriculture, NRCS, will be initiating an update of wetland information. GCMP will partner with USDA in developing an updated GIS wetland map. Funds from NA10NOS4190208 will be used to complete this effort. It is expected that GCMP GIS staff will map the wetland data.

## Coastal Hazards

### **Section 309 Enhancement Objective**

Prevent or significantly reduce threats to life and property by eliminating development and redevelopment in high-hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise and Great Lakes level change

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. *Characterize the level of risk in the coastal zone from the following coastal hazards:*

*(Risk is defined as: “the estimated impact that a hazard would have on people, services, facilities and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.” Understanding Your Risks: Identifying Hazards and Estimating Losses. FEMA 386-2. August 2001)*

<b>Type of hazard</b>	<b>General level of risk (H,M,L)</b>	<b>Geographic Scope of Risk (Coast-wide, Sub-region)</b>
Flooding	H	Territory-wide
Coastal storms, including associated storm surge	H	Territory-wide
Geological hazards (e.g., tsunamis, earthquakes)	H	Territory-wide
Shoreline erosion (including bluff and dune erosion)	H	Territory-wide
Sea level rise and other climate change impacts	M	Territory-wide
Great Lake level change and other climate change impacts	N/A	
Land subsidence	L	Territory-wide
Other (please specify)		

2. *For hazards identified as a high level of risk, please explain why it is considered a high level risk. For example, has a risk assessment been conducted, either through the State or Territory Hazard Mitigation Plan or elsewhere?*

### **Flooding**

The entire island is considered to be at high risk due to heavy rains, especially during storm events. Runoff from heavy rains may overwhelm drainage systems on main roads and within the villages. For central and southern Guam, the soil type and slope create conditions where landslides are possible. Severe erosion in southern Guam is also a concern, both to the community and to the nearshore ecosystems including coral reefs.

### **Coastal Storms**

Guam has the highest probability of being subject to a tropical cyclone of any U.S. jurisdiction. (Typhoon Vulnerability Study for Guam, WERI Technical Report #85). In 2002 alone, the island was devastated by two typhoons that resulted in presidential disaster declarations. The storm surge associated with these events caused considerable shoreline erosion and debris carried by the strong winds affected coral reefs and other coastal habitat as well as the community.

### **Geologic Hazards**

Guam is in an extremely seismically active area. Although the last major earthquake on Guam occurred in 1993, geologic hazards continue to be a major concern. More detailed analysis of these risks can be found in Guam's Hazard Mitigation Plan and numerous technical reports.

### **Shoreline Erosion**

Erosion on Guam's shoreline continues to be a high priority. Erosion occurs with typhoon and tropical storm events, and may be exacerbated by hardened shore structures and other changes along the shoreline. Recently, communities have become increasingly concerned about new areas of shoreline erosion that threaten public parks and other facilities that historically have not experienced erosion problems.

- 3. If the level of risk or state of knowledge of risk for any of these hazards has changed since the last assessment, please explain.*

Guam's Hazard Mitigation Plan, which was first approved in 2005, was updated since the last assessment period and is currently undergoing the 2011 update. Regarding more specific hazard information, the Army Corps of Engineers recently completed a coastal erosion study for Guam.

The ACOE study was intended to assess storm wave vulnerable sections and determine high priority areas for mitigation work. The study recommended areas for protection, including preliminary design and cost. Through this effort, areas were found to be highly vulnerable to storm wave damage include: 1) Route 1, Piti, west of Asan Point; 2) Route 2, Agat, in the vicinity of the War in the Pacific National Historic Park and Agat Marina; and 3) Route 4 Merizo, including the areas off Cocos Lagoon and Achang Reef.

- 4. Identify any ongoing or planned efforts to develop quantitative measures of risk for these hazards.*

### **Shoreline Setback Analysis and Tsunami Study**

The Guam Homeland Security – Office of Civil Defense is contracting NOAA's Pacific Marine Environmental Laboratory (PMEL) to develop a Tsunami Inundation Study for Guam. GCMO will work closely with GHS-OCD as the technical lead with regard to coastal hazards and GIS/Mapping as the consultant completes the tasks. Expected completion date is close to the end of 2012.

### **Climate change**

Guam has been actively engaged in climate change adaptation planning and development. As part of this process, various regional partners will work together to address concerns and risks. Various risk scenarios will be incorporated. GCMP will continue to partner with regional and national organizations to further characterize the new risks associated with climate change. In particular, GCMP has been engaged with partners under the Micronesia Challenge agreement and other networking partners to continue to work toward adaptation planning for climate change.

5. *Use the table below to identify the number of communities in the coastal zone that have a mapped inventory of areas affected by the following coastal hazards. If data is not available to report for this contextual measure, please describe below actions the CMP is taking to develop a mechanism to collect the requested data.*

<b>Type of hazard</b>	<b>Number of communities</b>	<b>Date completed or substantially updated</b>
Flooding	19 of 19 villages	2007
Storm surge	19 villages	
Geological hazards (including Earthquakes, tsunamis)	19 villages	2009
Shoreline erosion (including bluff and dune erosion)	5 of 19 villages	2008
Sea level rise	0	
Land subsidence	0	
Other (please specify)		

Maps of hazard areas and risk (for wind hazards, surge, flooding, tsunamis, etc.) have been prepared through a variety of technical reports from the University of Guam and its various programs, as well as through the Federal Emergency Management Agency and consultants working with Guam on disaster response, recovery and mitigation work, including the latest updates to the Guam Hazard Mitigation Plan. The 2008 plan contains a variety of mapping tools and the 2011 update will feature changes reflecting new information that may have occurred since the development of the existing maps.

### **Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. *For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:*

Management categories	Employed by state/territory (Y or N)	Significant changes since last assessment (Y or N)
Building setbacks/ restrictions	Y	N
Methodologies for determining setbacks	Y	N
Repair/rebuilding restrictions	Y	Y
Restriction of hard shoreline protection structures	Y	N
Promotion of alternative shoreline stabilization methodologies	Y	N
Renovation of shoreline protection structures	Y	N
Beach/dune protection (other than setbacks)	Y	N
Permit compliance	Y	Y
Sediment management plans	Y	Y
Repetitive flood loss policies, (e.g., relocation, buyouts)	Y	N
Local hazards mitigation planning	Y	N
Local post-disaster redevelopment plans	N	N
Real estate sales disclosure requirements	N	N
Restrictions on publicly funded infrastructure	Y	N
Climate change planning and adaptation strategies	Y	Y
Special Area Management Plans	Y	Y
Hazards research and monitoring	Y	N
Hazards education and outreach	Y	Y
Other (please specify)		

2. *For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.*
- a) *Characterize significant changes since the last assessment;*
  - b) *Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and*
  - c) *Characterize the outcomes and effectiveness of the changes.*

### **Building, repair and rebuilding restrictions**

Guam adopted a new building code through Public Law 30-25, updating Guam's codes for the first time in 14 years. The new standards include changes that are intended to increase safety and reduce damage during typhoons and significant seismic events. These efforts are largely funded under different local and federal programs rather than through GCMP funding, but the coastal

management office continues to play a major role in application review, permitting procedures and development of new policies and programs.

Through the North and Central Guam Land Use Plan, new limitations and restrictions on building sites will be put in place to mitigate against future disaster damage.

### **Permit Compliance**

Although the Guam Coastal Management Program is not the enforcement arm of the Government of Guam, GCMP and the agencies in the development review process work collaboratively to address concerns. Increased focus on permit compliance is occurring, in part due to a greater interest by the public and more concern about adverse development impacts. To better enforce permit conditions, additional manpower and resources will be required as the large scale projects associated with the military begin.

### **Special Area Management Plans**

The North and Central Guam Land Use Plan, discussed in greater detail under the Special Area Management enhancement area, was developed through 309 support. The plan recently finished a series of public hearings and will have impacts on efforts to prevent damages or injuries associated with coastal hazards. The new land use plan also addresses restrictions and limitations on new building sites to mitigate against future hazard damage.

### **Climate change planning and adaptation strategies**

Guam has been actively engaged in climate change adaptation planning and development. As part of this process, various risk scenarios are discussed by natural resource agencies, emergency response teams and community partners. GCMP will continue to partner with regional and national organizations to further characterize the new risks associated with climate change. These efforts are funded by a range of sources, but include significant support from Coral Reef Initiative monies as well as coastal management funding.

To date, managers have identified such threats as coral bleaching and disease, increased flooding, higher rates of shoreline erosion, and other changes that may result from climate change. In particular, the public is very concerned with shoreline erosion problems, which seem to be increasing in frequency and scale with higher wave action. GCMP will continue to partner with appropriate agencies, such as the Department of Homeland Security and Guam's Office of Civil Defense, to develop adaptation strategies.

### **Hazard education and outreach**

Hazards education and outreach activities conducted through the Guam Homeland Security Office and its federal counterparts since the last assessment:

- Tsunami evacuation routes have been created, marked with signage and promoted in a public outreach campaign.
- GHS/OCD is promoting more drills for seismic events in schools and the community.

3. Use the appropriate table below to report the number of communities in the coastal zone that use setbacks, buffers, or land use policies to direct development away from areas vulnerable to coastal hazards. If data is not available to report for this contextual measure, please describe below actions the CMP is taking to develop a mechanism to collect the requested data.

For CMPs that use numerically based setback or buffers to direct development away from hazardous areas report the following:

Contextual measure	Number of communities
Number of communities in the coastal zone required by state law or policy to implement setbacks, buffers, or other land use policies to direct develop away from hazardous areas.	19 of 19 municipalities
Number of communities in the coastal zone that have setback, buffer, or other land use policies to direct develop away from hazardous areas that are more stringent than state mandated standards or that have policies where no state standards exist.	19

### **Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

Gap or need description	Type of gap or need (regulatory, policy, data, training, capacity, communication & outreach)	Level of priority (H,M,L)
Insufficient data, such as shoreline change over time, incidence of coral bleaching, and data for freshwater bodies	Update existing data that we have.	H
Lack of Enforcement	Need more stringent laws and policies and better enforcement	M

Because conditions that affect coastal hazards and the severity of their impact are continually changing, additional updates to existing data will help the island better understand potential threats and mitigate against future damage. This additional data is the focus of several local and federal programs. For instance, an assessment of potential sea level rise in the Marianas needs to be conducted, while data about changing storm and weather conditions could help managers update emergency response plans, create new development controls for hazard prone areas, or develop other mechanisms to help communities cope with changing conditions.

Many construction and development policies reflect older data and should be updated to include the most recent knowledge of appropriate setbacks, siting restrictions and other information to ensure safety and prevent damage. To develop reasonable policies and appropriate restrictions to guide development, more data about current conditions is needed. This data will allow GCMP and partner agencies to help prevent hazard damages by restricting development to sites with the least risk for serious effects associated with storms, inundation and other natural hazards.

It is expected that the strategy will lead to more stringent laws and policies. Updates to policy and regulation must be accompanied by enforcement. GCMP is not an enforcement agency, but the program monitors development and works closely with Application Review Committee members that have enforcement mandates. In addition to increasing manpower to adequately enforce violations of regulation or specific permit conditions, more resources for monitoring and follow up with applicants to obtain necessary information would improve enforcement actions. Finally, training for enforcement staff would be valuable to ensuring that enforcement occurs regularly and appropriately.

### **Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**        X    
**Medium**           
**Low**              

Briefly explain the level of priority given for this enhancement area.

This is a high priority for the GCMP. With the increase in development throughout the island as a result of the military expansion, it is critical that coastal communities in the south are further protected. Shoreline development is becoming more vulnerable to erosion, and more data is critical to support updated shoreline set back policies.

There are few regulations related to shoreline erosion, setback along shorelines are based on distance away from the mid high tide marker and not reflective of the current development conditions.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**          X    
**No**               

Briefly explain why a strategy will or will not be developed for this enhancement area.

The Guam Coastal Management Program will undertake a project to determine potential sea level rise for the island. This modeling work will help the island determine what areas may be most vulnerable to damages and will guide efforts to develop adaptation strategies.

## Public Access

### **Section 309 Enhancement Objective**

Attain increased opportunities for public access, taking into account current and future public access needs, to coastal areas of recreational, historical, aesthetic, ecological, or cultural value

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. Characterize threats and conflicts to creating and maintaining public access in the coastal zone:

<b>Type of threat or conflict causing loss of access</b>	<b>Degree of threat (H,M,L)</b>	<b>Describe trends or provide other statistics to characterize the threat and impact on access</b>	<b>Type(s) of access affected</b>
Private residential development (including conversion of public facilities to private)	H	The Military Buildup has spurred development projects, including pending hotel and condominiums.	Coastal shoreline access for recreational uses and fishing.
Non-water dependent commercial/industrial uses of the waterfront (existing or conversion)	M	The value of beach frontage has spurred conversion of Hagátña properties to development such as restaurants, where access is not usually impeded.	Shoreline access.
Erosion	L	Closures of eroding shorelines for safety reasons are medium but may have an increasing impact in the future.	
Sea level rise	L	Increase seasonal storm surge causing reduced access	
Natural disasters	L	Periodic closures during storm or earthquake events	
National security	H	The Military Buildup will result in restrictions on accessing coastal areas. For example, a planned firing range has a safety zone that extends at least 6 miles out to sea, preventing shoreline and boat access when the range is in use.	Coastal shoreline access for recreational uses, and fishing by land and water.
Encroachment on public land	L	Use for facilities that do not allow public access is a threat.	Shoreline access.

Other			
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2. *Are there new issues emerging in your state that are starting to affect public access or seem to have the potential to do so in the future?*

The Military Buildup proposes to utilize a large area on the east coast of Guam known as Pagat. There will be limited access to the shoreline area and there is also a surface danger zone that extends out 6 miles. Access may only be on the weekends and holidays. The coastal area is also a significant pre-historic site on the National Register of Historic Places and has other unique geological features such caves with fresh water.

3. *Use the table below to report the percent of the public that feels they have adequate access to the coast for recreation purposes, including the following. If data is not available to report for this contextual measure, please describe below actions the CMP is taking to develop a mechanism to collect the requested data.*

<b>Contextual measure</b>	<b>Survey data</b>
Number of people that responded to a survey on recreational access	None
Number of people surveyed that responded that public access to the coast for recreation is adequate or better.	None
What type of survey was conducted (i.e. phone, mail, personal interview, etc.)?	None
What was the geographic coverage of the survey?	None
In what year was the survey conducted?	None

There is a lack of data about the public’s view with regards to public shoreline access. There is a need to conduct such a survey. This can be part of a larger project. The Bureau needs to conduct an inventory and more detailed mapping of current trails and parks that provide public access to the ocean shoreline. The results can be utilized to educate the public about existing access areas during a survey and/or outreach effort.

4. *Briefly characterize the demand for coastal public access within the coastal zone, and the process for periodically assessing public demand.*

Guam’s tropical climate makes marine activities a favorite pastime throughout the year. The overall demand for coastal public access is quite high, for a variety of activities ranging from subsistence fishing to motorized watercraft recreation and other activities. Both visitors and residents use Guam’s beaches regularly. Boaters are also a significant group, with demand for boat access quite high, especially during the calmer summer months when favorable weather conditions make it easier for smaller boats to enter the seas around the island.

Past efforts to attempt to quantify the demand for access include the 2006 *Guam Comprehensive Outdoor Recreation Plan* and the Guam Visitor's Bureau's 2004 *Japanese Visitor Profile* survey. Though neither document is focused strictly on coastal public access issues, marine activities figure prominently in both visitor and local recreational uses. The visitor survey indicated that sightseeing at public parks and beaches ranked second in overall participation by Japanese visitors.

5. *Please use the table below to provide data on public access availability. If information is not available, provide a qualitative description based on the best available information. If data is not available to report on the contextual measures, please also describe actions the CMP is taking to develop a mechanism to collect the requested data.*

<b>Types of public access</b>	<b>Current number(s)</b>	<b>Changes since last assessment (+/-)</b>	<b>Cite data source</b>
<b>(CM17)</b> Number of acres in the coastal zone that are available for public access (report both the total number of acres in the coastal zone and acres available for public access)	26,872 acres of reef including 1,721 acres of lagoon. No changes from the original assessment.		From CZMA Performance Measurement System, March 2006. Original data comes from a BSP report.
<b>(CM 18)</b> Miles of shoreline available for public access (report both the total miles of shoreline and miles available for public access)	Total shoreline Length Approx. 124 miles. Exact coastline length currently not available but it may be approximately 75% of total, which is 93 miles. Remaining shoreline is within federal properties.	<b>No significant change</b>	Guam Seashore Reserve Law. 10feet above the mean high tide mark around the island is access to all public. The shoreline that this law does not apply is shoreline adjacent to federal properties.
Number of State/County/Local parks and number of acres	Approximately 211 sites . 10,626.911 acres.	0	Department of Parks and Recreation

<b>Types of public access</b>	<b>Current number(s)</b>	<b>Changes since last assessment (+/-)</b>	<b>Cite data source</b>
Number of public beach/shoreline access sites	99	+80 (Due to a change in counting methodology. Prior assessment considered only parks and this assessment includes access points.)	From CZMA Performance Measurement System, March 2006
Number of recreational boat (power or non-power) access sites	9	+1	GCMP Personal knowledge
Number of designated scenic vistas or overlook points	14 sites and 115.8 acres	0	Section 309 Assessment and Strategy 2006
Number of State or locally designated perpendicular rights-of-way (i.e. street ends, easements)	18	Not applicable	Public Beach Access file records
Number of fishing access points (i.e. piers, jetties)	8	+7	GIS Manager
Number and miles of coastal trails/boardwalks	Not available, but may be a future GIS project. Staff will be designated to support this effort.	0	
Number of dune walkovers	Not applicable	0	
Percent of access sites that are ADA compliant access	Not available	0	
Percent and total miles of public beaches with water quality monitoring and public closure notice programs	64 percent of Public beaches, Miles not available at this time	No changes – monitoring program rotates sites rather than the number of sites	Surface Water Monitoring and Assessment GEPA 2010 Integrated Report
Average number of beach mile days closed due to water quality concerns	Not available*		

\*The Guam Environmental Protection Agency conducts weekly beach water quality analysis, but beach closures are rare. A single beach has been closed for many years due to deaths associated

with a seaweed species collected at the site, but this incident was not a result of monitoring data or water quality concerns. Beach closures may occur when events such as a major sewage line break occur, but these events have been few during the assessment period.

**Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

<b>Management categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Statutory, regulatory, or legal system changes that affect public access	Y	N
Acquisition programs or policies	N	N
Comprehensive access management planning (including GIS data or database)	Y	N
Operation and maintenance programs	N	N
Alternative funding sources or techniques	Y	N
Beach water quality monitoring and pollution source identification and remediation	Y	N
Public access within waterfront redevelopment programs	N/A	N
Public access education and outreach	Y	Y
Other (please specify)		

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
  - a) Characterize significant changes since the last assessment;
  - b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and

c) Characterize the outcomes and effectiveness of the changes.

The single most significant change in public access has been in awareness and education. This change, though, has not been driven by CZM efforts; instead, a growing number of user conflicts and access concerns are raising major concerns in the community. In part, this new demand for assurances that coastal areas will continue to be accessible is a direct result of the military buildup.

A proposed firing range at a culturally sensitive site along the eastern coast, as well as the probable loss of fishing days when the firing range is in use with a 6+ mile safety zone extending far out to sea, have increased awareness about access issues at the site and around the island. The potential for new challenges to access due to the range and other developments is set to exacerbate the access problems that occurred as a result of national security concerns that became an issue during the last assessment period.

The cumulative effect of the threats to public access has been to renew interest in enforcing local public laws guaranteeing public coastal access and to ensure that future developments do not further impede public access to coastal resources. Guam's Department of Parks and Recreation has jurisdiction over local parks and also has the ability to monitor and enforce public access trails required by local law. Though GCMP has not been involved in these access issues during past assessment periods, the changing community has elevated this issue to become a new focus for the program. A change in authority or legislation to clarify concerns about public coastal access may be necessary to prevent further erosion of public access to coastal sites. Such proposals might include more stringent penalties for violations of existing access laws or clearer regulations specifying how public access laws are applied.

Guam has existing laws to require private landowners to provide public access to the coast, resulting in many "beach access trails" provided by hotels and private businesses with beach front property. However, in practice, many businesses do not maintain the trails or provide parking space to allow the public to actually use the access points. Further, newer and smaller businesses may not be building the access points into their developments and there is little effort to monitor establishments for compliance. Better enforcement and clearer penalties for violations are essential to preserving and enhancing public access. GCMP will continue to work with the Guam Visitors Bureau, the Guam Hotel and Restaurant Association and the Department of Parks and Recreation to improve enforcement.

Finally, there is growing public concern about effective access barriers. Beaches that may have parking spaces and adjacent public park space may nonetheless be unavailable for fishing because of contaminants or other health concerns. These issues are perceived by many residents as effective barriers to public access, although the underlying causes may be water quality or other concerns.

- 3. Indicate if your state or territory has a printed public access guide or website. How current is the publication and/or how frequently is the website updated? Please list any regional or statewide public access guides or websites.*

Guam has an access guide for beach access for the main tourist area. A draft access map was developed by the Bureau’s Land Use Planning Program (GIS); however, due to other priorities, the maps were never completed. Access maps include all public easements on public and private property access to shoreline not only through recreational areas but all throughout the island. The local access laws include all areas along cliffs, beaches, shorelines, cultural sites and scenic vistas.

Additional access guides for trails, rivers, streams, caves and other popular hiking areas are available through printed books sold locally. These materials have been updated sporadically but there is no comprehensive effort to ensure they are regularly changed to reflect changes.

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H,M,L)
Public Access Stakeholder Survey	Data	H
Enforcement of access	Regulatory – clarify jurisdictions and authority	H
Conservation easement programs	Policy	H
Laws protecting and establishing public access need to be strengthened	Regulatory and policy	H
Lack of capacity for lead public access agency	Agency needs trained personnel to ensure PA for the community through various legal mechanisms	H
Comprehensive mapping and inventory of all PA sites	Capacity. This task may have to be carried out by the CMP who has expertise	H

**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High** \_\_\_\_\_  
**Medium**   X    
**Low** \_\_\_\_\_

Briefly explain the level of priority given for this enhancement area.

Guam’s residents and thousands of visitors expect adequate access to coastal resources for a wide range of activities. The need for better public access has become even more critical given the growing population, and potential user conflicts requiring new spaces to accommodate changing use patterns. GCMP will place a higher priority on this enhancement area to ensure that public access is available, given the rapid development and security or safety issues that are arising due to military buildup activities.

Adequate access trails exist, but support in terms of access route signage, facilities for the disabled, parking and restrooms (and their maintenance) are lacking. The GCMP will work with partners such as the Guam Hotel and Restaurant Association, Guam Visitors Bureau and the Department of Parks and Recreation to find viable solutions to these concerns.

There are still significant issues in increasing public access to marine resource areas, especially since increasing Homeland Security concerns have closed or restricted access to certain areas. Access for the disabled, mentioned in the past assessment, also remains a concern.

Although the public is demanding better access to recreational areas, vistas, and natural and cultural resources, Guam’s laws on access are confusing. These statutes do not clearly identify who is responsible for enforcement of public access, or if there are any fines or ramifications for failing to meet the access standards. The public, however, is very concerned and becoming more aware of the loss of access, a feature that has been taken for granted in the past when a smaller, more homogenous population experienced fewer conflicts with either access to or use of the resource.

To support the desire for better access, clarification of policy and, where appropriate, changes to local law may be necessary to facilitate enforcement of the statutes to safeguard public access. Without clarification of the authority to enforce violations, and to impose penalties to those who do not comply with access laws, it becomes difficult to provide meaningful enforcement.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**   X    
**No** \_\_\_\_\_

Briefly explain why a strategy will or will not be developed for this enhancement area.

In the populated north much of the coastal areas are owned by the military. The geology of the north consists basically an upraised limestone plateau’s resulting in steep cliff lines near the

ocean shore. As a result some of the areas are very difficult to access. Because of the terrain and the military presence, the populated northern areas have minimal public access areas, leading residents to use beaches in Tumon Bay and the Tanguisson area.

Central and most southwestern coastal areas are more easily accessible. Tumon is the tourism capital and contains several beach parks available for public use

A survey will be conducted to obtain the public's understanding of public access issues and to provide an updated inventory of access sites. Using this data, changes to existing access policies and enforcement authorities may be drafted to accommodate public demand and account for current conditions such as security concerns and the military's developments. The strategy seeks to strengthen regulations supporting public access in an effort to achieve the goal of increasing public access to coastal resources.

With the survey data, GCMP will have evidence to support changes to access laws. In particular, the study's results will help guide changes to policy and regulation to ensure that the law clearly provides recourse if a private landowner, the government or other entity is violating public access laws. New legislation also should clarify the boundaries of the seashore reserve and include requirements for signage identifying access points.

Under existing statutes, public access is a legal requirement but the penalties for violating these requirements are vague at best. Further, enforcement has been minimal, but focused on hotel and resort facilities, though a variety of other commercial interests also should be considered as more waterfront businesses are constantly under development. The new, clearer policies should lead to better enforcement and a clearer picture of public access issues on the island.

Presently there is much debate as to who is responsible for enforcement of public access. Although the Department of Parks and Recreation can enforce access along beaches, the Departments of Land Management and the Public Works also have enforcement authority. It is expected that the work done through this strategy will lead to clarification of who is responsible and update the enforcement of access. The public access statutes must be revised to clarify what agency has clear authority for enforcement and to ensure penalties are appropriate for violations.

## Marine Debris

### **Section 309 Enhancement Objective**

Reducing marine debris entering the Nation's coastal and ocean environment by managing uses and activities that contribute to the entry of such debris

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. In the table below, characterize the significance of marine/Great Lakes debris and its impact on the coastal zone.

<b>Source of marine debris</b>	<b>Extent of source (H,M,L)</b>	<b>Type of impact (aesthetic, resource damage, user conflicts, other)</b>	<b>Significant changes since last assessment (Y or N)</b>
Land Based – Beach/Shore Litter	H	Aesthetic, Resource damage, Health	N
Land Based – Dumping	H	Aesthetic, Resource damage, Health	Y
Land Based – Storm Drains and Runoff	H	Aesthetic, Resource damage, Health	N
Land Based – Fishing Related (e.g. fishing line, gear)	M	Aesthetic, Resource Damage	N
Ocean Based – Fishing (Derelict Fishing Gear)	M	Resource damage	N
Ocean Based – Derelict Vessels	L	Resource damage	N
Ocean Based – Vessel Based (cruise ship, cargo ship, general vessel)	M	Resource damage	N
Hurricane/Storm	H	Aesthetic, Resource Damage, Health	N
Other (please specify)			

2. If information is not available to fill in the above table, provide a qualitative description of information requested, based on the best available information.
3. Provide a brief description of any significant changes in the above sources or emerging issues.

On-shore Litter: Land-based dumping is increasing due to changes to the solid waste system. For decades, residents could dispose of household garbage through free pickups funded by the local government. The need to finance a new sanitary landfill led to new bills for trash collection; these bills are rising as the landfill opening nears and struggling residents may look to alternate disposal means, including illegal dumping.

4. Do you use beach clean-up data? If so, how do you use this information?

Yes. Guam’s International Coastal Cleanup has grown, with over 3,000 volunteers cleaning 21 sites, an increase in both the number of participants and the number of beaches cleaned. The data is used to develop outreach programs to encourage the community to dispose of trash responsibly and to recycle whenever possible. The data is also used by other agencies to support grant proposals to strengthen the need for programs to reduce cigarette litter. International Coastal Cleanup reports have played a direct role in creating recycling and other programs to reduce the impact to the island’s land fill and to encourage residents to protect coastal areas by disposing of trash responsibly.

**Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

<b>Management categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Employed by local governments (Y, N, Uncertain)</b>	<b>Significant changes since last assessment (Y or N)</b>
Recycling requirements	Y	Y	Y
Littering reduction programs	Y	Y	Y
Wasteful packaging reduction programs	Y	Y	N
Fishing gear management programs	N	N	N
Marine debris concerns in harbor, port, marine, & waste management plans	Y	Y	N
Post-storm related debris programs or policies	N	N	N
Derelict vessel removal programs or policies	N	N	N
Research and monitoring	Y	Y	N
Marine debris education & outreach	Y	Y	N
Other (please specify)			

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
  - a) Characterize significant changes since the last assessment;
  - b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - c) Characterize the outcomes and effectiveness of the changes.

Guam continues to struggle with its solid waste management efforts and, since the last assessment, the island’s public solid waste system was placed under federal receivership due to noncompliance with the Clean Water Act and a federal court case initiated by the U.S. Environmental Protection Agency. Under the receiver, significant changes have been made and a new sanitary landfill is expected to be operational within the next few years. There are a number of additional programs, including the recently revived island wide recycling program, designed to remove larger waste such as cars and appliances from the community. Coastal cleanups are a regular occurrence and many organizations sponsor trash pickup programs as service events.

These efforts to reduce dumping and litter are occurring through Solid Waste Division regulations, local statute, and the efforts of local nonprofit groups, with GCMP acting as a partner for many activities. Though there is a new awareness of the need to better manage solid waste, to recycle, and to stop dumping that will affect coastal habitats, much work needs to be done within the community as we have not progressed beyond awareness to significant behavioral changes.

Positive changes are countered by social and economic realities. Families unused to paying for waste disposal may struggle with new fees, and many people continue to dump garbage, white goods and vehicles across the island. Though this is not a new problem, it may become a more significant threat as fees for the new landfill and waste pickup continue to increase.

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H,M,L)
Enforcement for existing laws related to marine debris	regulatory	M
Research related to extent of fishing gear and boat debris	Data for policy	L

Public outreach program	Communication and outreach	M
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Most of the eastern shoreline is difficult to assess by either boat or land, because of the terrain and rough waters for much of the year. However, because of the currents, this shoreline is a landing area for marine debris. Previous assessments identified a gap in data for the extent of net debris on Guam’s eastern shoreline, compared to the more accessible western side where many cleanup sites occur. Although the issue has not yet been studied, it is not a major issue at this time.

**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**          
**Medium**      
**Low**        

Briefly explain the level of priority given for this enhancement area.

Though Guam has many longstanding concerns about debris, mostly land-based, impacting coastal resources, the concerns associated with marine debris are neither as urgent nor as pressing as other enhancement areas. Further, existing data does not indicate that debris issues are becoming a more significant threat, so GCMP will continue to rate this as a medium priority.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**           
**No**         

Briefly explain why a strategy will or will not be developed for this enhancement area.

At this time, this enhancement area is supported by other networking partners and is not one of the GCMP priorities. During the next 309 period, priorities were selected based on immediate needs related to the increase in development due to the military buildup.

## *Cumulative and Secondary Impacts*

### **Section 309 Enhancement Objective**

Development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources.

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. Identify areas in the coastal zone where rapid growth or changes in land use require improved management of cumulative and secondary impacts (CSI) since the last assessment. Provide the following information for each area:

<b>Geographic area</b>	<b>Type of growth or change in land use</b>	<b>Rate of growth or change in land use</b> (% change, average acres converted, H,M,L)	<b>Types of CSI</b>
Apra Harbor and surrounding coastal area	Increasing activity and development, including dredging and proposed dredging of coral reefs	H- Rapid growth and large area conversions	Increased sedimentation, poor water quality, physical disturbance, change in water flow and current patterns
Northern Guam	Increased development, loss of large tracts of vegetation, increased impermeable surface	H- Rapid growth and large area conversions – forest to residential, commercial, multi-family residential; low density residential to high density uses.	Storm water and runoff concerns, loss of habitat, loss of connectivity between habitats, water quality concerns and others
Island-wide ancestral lands	Increased development and potentially incompatible land uses	H- Rapid growth and large area conversion – extent presently unknown	Storm water and runoff concerns, loss of habitat, water quality degradation, potential contamination and pollution problems
Department of Defense Properties	Properties identified in the Record of Decision to support the Military build up	M- Data needed	Data needed

- Identify sensitive resources in the coastal zone (e.g., wetlands, water bodies, fish and wildlife habitats, critical habitat for threatened and endangered species) that require a greater degree of protection from the cumulative or secondary impacts of growth and development. If necessary, additional narrative can be provided below to describe threats.

<b>Sensitive resources</b>	<b>CSI threats description</b>	<b>Level of threat (H,M,L)</b>
Coral reef	Sedimentation, degradation of water quality, altered water flow and current patterns, marine habitat, direct loss through dredging	H
Critical habitat	Loss of habitat and loss of connectivity between habitats. Loss of foraging area.	H
Fish and wildlife habitat	(See above) Loss of habitat	H
Northern Aquifer	Non point pollution, contamination due to over drilling and improper infrastructure	H
Wetlands	See wetland section	M

### Military Buildup

The Department of Defense will relocate 8,000 Marines, their dependents, and various other military personnel to Guam during the course of the next five years or so. This incredibly large relocation project, the first of its size since the end of World War II, will change the face of the island. Guam is bracing for the impacts that will be associated with this buildup but the island has already seen some indication of what is to come during the early projects that have broken ground in 2009 and 2010.

A massive worker housing project in northern Guam led to the clearing of huge expanses of limestone forest, a scene to be duplicated around the north as the forest is cut to make room for houses, office facilities, training grounds, and other military needs. Consequently, there is less available habitat for endangered species recovery, a loss of the ecosystem services provided by these important habitats, greater potential for pollution and erosion due to the replacement of native vegetation with impermeable surfaces, and potential effects on nearby coastal areas. Further, the increased demand for water and wastewater services may overwhelm an already fragile infrastructure system, leading to more problems with water quality, both within the aquifer system and in surrounding coastlines due to sewage leaks, and additional volume of discharge at the sewage outfalls.

The worker housing project is just one example of the many large projects that are slated to break ground in the next few years. Guam's limited size and geography makes any development

likely to produce cumulative and secondary impacts, and the scale of the buildup and its associated work will only exacerbate these problems. Because so many projects will be occurring around the island in a compressed time frame, the stress on natural resources will be immense. This pressure is unlikely to be relieved when construction is completed, as the loss of such a large area of natural habitats is certain to have long lasting effects that we may not fully realize for years to come. These effects range from water quality concerns to loss of coral reef habitats due to potential increases in contaminants washing into coastal waters, increasing sedimentation and erosion due to large scale development, the loss of available habitat for many species, and other issues.

The military projects will not be the only major development challenges facing Guam in coming years. To meet the needs of a rapidly growing population and a large number of temporary workers, the private sector already is increasing housing stocks, developing new areas and proposing new projects to cater to a new clientele.

The increasing pressure on resources also will occur as a result of the huge population influx. Guam already has seen cases of illegal harvest of species not normally targeted. For example more than 10,000 sea cucumbers were confiscated in 2010 from individuals claiming they were harvested for a “family party.” As new groups come to island during the buildup activities, this kind of activity will only increase, but local laws and regulations may not be sufficient to address very different types of harvest pressure and resource use. Generally, the increasing population could cause significant impacts even without outright harvest, as corals are easily damaged by recreational users and the increasing human presence in coastal waters may impact this ecosystem in ways that are not yet clear to resource managers.

#### Other concerns

The recent release of hundreds of acres of previously unzoned “ancestral lands,” which were condemned by the military after World War II and recently returned to the local government and passed to the original landowners’ estates, requires careful management to control development and the potential for environmental damages. Local policy makers also have increased an old practice of “spot zoning,” where land uses are changed with special interest legislation that is outside the normal zoning process. In some recent cases, agriculturally zoned lots were changed to light industrial zoned lots with a few pen strokes, bypassing the protective process normally in place to allow such major changes in land use. Some other lots were granted a zone designation by the government despite having no previous zoning history. These proposals have become law, and many other zoning change bills have been introduced in the current legislature. Although the parcels listed below are in the North and Central Land Use Plan, the legislature did not consult the plan and are inconsistent with the plan. The GCMP routinely request the legislature to develop a process for review by the appropriate government agencies and a more direct process to provide comments and recommendations; however this has not been implemented.

- Public Law 29-153, January 2009. Agriculture to commercial in Barrigada
- Public Law 29-152, January 2009. Agriculture to light industrial in Barrigada
- Public Law 29-145, January 2009. From unzoned to light industrial in Dededo
- Public Law 29-25, October 2007. Unzoned to light industrial in Dededo

The North and Central Land Use Plan has not been adopted. Although the Plan had been reviewed by the public and appropriate public hearings were conducted, the 30<sup>th</sup> Guam Legislature passed a law to extend the period for review. It is expected that the Legislature will be conducting additional public hearings; however, there is confusion about the plan's status. GCMP continues to work with the Office of the Governor to determine the status of the plan, which may have to be resubmitted to the Guam Legislature for formal adoption.

**Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

<b>Management Categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Regulations	Y	N
Policies	Y	Y
Guidance	Y	N
Management Plans	Y	Y
Research, assessment, monitoring	Y	Y
Mapping	Y	Y
Education and Outreach	Y	Y
Other (please specify)		

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
  - a) Characterize significant changes since the last assessment;
  - b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - c) Characterize the outcomes and effectiveness of the changes.

*Policies, management plans, research, and mapping:*

The most significant achievement under this enhancement area is the completion of Guam's Mitigation Strategy, a project supported by 309 funds. The mitigation strategy is the first of its kind for Guam and will be a vital tool in developing the most appropriate mitigation projects for the many varied and large scale development for both federal and private. The mitigation strategy was submitted to the Guam legislature to become a formal policy.

Other developments under this enhancement area include new monitoring programs, discussed in detail under Ocean Resources. These programs will help Guam identify long-term and secondary impacts as a result of major developments, particularly on coral reefs where baseline data and regular, consistent monitoring information is not available.

With regard to public outreach and communications, GCMP continues to stress the need for a more informed, more educated and more active public. Several publications, hearings, information sessions and meetings have been conducted throughout this assessment period in an effort to help people become more meaningfully involved in the environmental impact statement process for the military buildup. Empowering the public to become involved in these efforts has many benefits, including a stronger voice for conservation and more participation in environmental protection efforts.

Watershed management plans are being developed for the Piti/Asan watershed and the Manell /Geus watershed. Both of the plans are developed thru non 309 funds including Section 310 NA06NOS4190236, CRI-GU-08 and CRI-GU-07 funds. In addition TNC hosted a conservation action plan workshop to develop the basis for a management plan for both watersheds. The expected outcomes will be better management of critical watershed and reduced sedimentation in rivers and streams and improved coral reef health in adjacent MPAs.

Monitoring is being completed through a comprehensive monitoring program funded by Coral Reef Initiative Funds. Guam's monitoring plan builds upon the work already accomplished through past NOAA Coral Reef Ecosystem Monitoring Grants. It incorporates existing monitoring programs and uses modified versions of techniques developed for the five long term monitoring sites and coral disease monitoring conducted by researchers at the UOGML (funded by FY2005 and FY2006 monitoring grants) to collect comprehensive data from permanent sites around the island of Guam.

The primary goals of the Guam Coral Reef Monitoring Plan are to:

- Determine the status and trends in selected coral reef ecosystem indicators to better inform the resource manager's decision making process and increase the effectiveness of natural resource management on Guam.
- Provide managers with early notice of abnormal conditions of selected resources to encourage effective mitigation measures and reduce the costs of management.
- Provide data to better understand the dynamic nature and condition of the island's coastal ecosystems.
- Allow natural resource agencies to meet certain legal and Congressional mandates related to coastal resource protection.
- Measure progress towards performance goals.

### **Conservation/Development Suitability Analysis Utilizing GIS and Green Infrastructure.**

A Geographic Information System (GIS) using Green Infrastructure Concepts was completed in 2010. The tool was developed to strategically determine areas on Guam where conservation of natural resource areas or land development should ideally occur. In developing a CSI policy, this

tool will aid in determining areas where more review and analysis must be conducted. As part of the tool, location of major development projects will be incorporated for proper analysis.

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H,M,L)
Need updates to old fishery and harvest regulations using more current sources of information about populations and ecosystem health	Data; regulations for fishery harvest and resource use	H
Need for tool to determine impact from loss native forest and habitat	Data, regulation for protection of native forest and	M
Assessment tools for cumulative and secondary impacts, no requirements for review of CSI in development applications	CSIs are not addressed in current permitting process; need mechanism to assess CSIs and regulations for development	H
Outreach and education – access to new ethnic groups, transient workers and new groups expected to be on Guam due to the buildup	Outreach targeted to new arrivals and new populations that may be on Guam in association with the buildup	H
Effective training for contractors and workers on best practices and specific local conditions	Outreach on existing and updated regulations, and impacts on habitat, as well as BMPs and alternatives	H

**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**       X    
**Medium**    \_\_\_\_\_   
**Low**        \_\_\_\_\_

Briefly explain the level of priority given for this enhancement area.

While Guam has many existing development regulations and natural resource protection statutes in place, the island has not considered cumulative and secondary impacts during the review process for proposed developments. The impending military buildup, when the island expects to see a massive amount of development in a relatively short time frame, has created a new urgency to consider these types of impacts. Even without the buildup activities, Guam has reached a level of development where cumulative and secondary impacts should be considered for new projects. The island is already experiencing loss of many critical resources and faces potential threats to drinking water sources, available habitat and other resources, so a cumulative and secondary impact policy is needed as the island continues to develop.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**          X    
**No**               

Briefly explain why a strategy will or will not be developed for this enhancement area.

For Guam, gaps in addressing the objectives arise from a number of sources, including lack of updated natural resource data, especially fish habitat and harvesting data, and regulatory and statutory authority relating to poor land use practices. To offset this situation, Guam has been actively and aggressively working to implement the Guam Coastal Nonpoint Source Pollution Management Program, development of watershed plans, conservation action plans, updating of the Northern and Central land Use Plan, and addressing coral reef treats by focusing on coral reef priorities.

One of the gaps is the need for updated fishery and harvest regulations using more current sources of information about populations and ecosystem health. As more development occurs closer to shoreline, fishery management becomes more challenging. Fishing is important to the community. Although, Guam has MPAs that serve as a tool to assist with managing fisheries, having updated fishery data and harvesting regulations, can assist in ensuring that fishing practices can continue to be sustainable. The strategy will not address this gap. Funds from CRI can be directed to this however Department of Agriculture does have funds to address this.

Gaps also occur in assessing CSI in the review of major projects. Cumulative and secondary impacts are not required in the review of projects that go before the Application Review Committee or in the GLUC process. Presently CSI are determined by individual planners who may (or may not?) have experience in this type of assessment. Analytical models and other tools are needed to fully determine the CSI of a development within a particular watershed area. Data and tools to assist planners in determining CSI to the aquifer and to coral reefs are critical.

Soil erosion and sedimentation is one of the most serious and neglected sources of nonpoint source pollution on Guam. Its negative effects can be seen throughout Guam's rivers and streams and have contributed greatly to the degradation of our surrounding reef ecosystem. In the north, it contributes to negative impacts to our sole source aquifer system. Adoption of the draft rules and regulations for the Guam Storm water and Sediment Control Manual is critical. The GCMP

continues to work with the GEPA to move for the approval. The strategy will incorporate the implementation of the stormwater rules and regulations as part of the development of CSI tool.

Gaps occur in both limited available data and inadequacy of analytical methods related to the attempt to create a major shift in land use practices. Although there are efforts to have the GCMP play an active role in Chamorro Land Trust and Ancestral Lands Programs zoning process, this effort has not had the momentum needed.

With the relatively rapid increase in both private and public development from the military buildup, the Government of Guam lacks the necessary data to develop policies to address natural resource losses resulting from the cumulative and secondary impacts associated with development. This is not a new problem, but it has become a very high priority due to the scale and number of projects proposed by developers as the military buildup becomes a reality.

Through the new strategy, Guam will be able to evaluate impacts from public and private sector development within the same general area. The strategy will be tested during the immediate surge of private development and will apply to all various large developments, including private projects that are slated to occur in the near future. The proposed strategy will develop a tool for data collection, a mechanism to assess CSI, and proposed BMPs or alternatives to guide development in a manner less likely to have long term impacts.

# Special Area Management Planning

## **Section 309 Enhancement Objective**

Preparing and implementing special area management plans for important coastal areas

The Coastal Zone Management Act (CZMA) defines a Special Area Management Plan (SAMP) as “a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone. In addition, SAMPs provide for increased specificity in protecting natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making.”

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. Identify geographic areas in the coastal zone subject to use conflicts that can be addressed through special area management plans (SAMP). Also include areas where SAMP have already been developed, but new issues or conflicts have developed that are not addressed through the current plan. If necessary, additional narrative can be provided below.

<b>Geographic Area</b>	<b>Major conflicts</b>	<b>Is this an emerging or a long-standing conflict?</b>
Coral Reefs/Bays/Lagoons/shoreline	Over harvesting, near shore development, increased recreation, poor fishing practices, natural calamity	Long standing conflict
Aquifer Recharge Area	Agriculture, community development, overuse, military build up	Long lasting conflict
Fragile Areas (wetlands, limestone forest, wildlife habitats and historic sites)	Development, military needs, water sports and tropical beach recreation, and outright vandalism and theft of historic properties in historic sites.	Emerging conflict

### **Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. Identify below any special management areas in the coastal zone for which a SAMP is under development or a SAMP has been completed or revised since the last Assessment:

<b>SAMP title</b>	<b>Status (new, revised, or in progress)</b>	<b>Date approved or revised</b>
Coral Reef Initiative	New – Guam Coral Reef Long Term Monitoring Program	2007
Guam Seashore Reserve	In progress - Guam Seashore Reserve Plan currently being completed for all shore areas from 10 fathom contour inland to 10 meters. Guam Seashore Reserve Task Force will seek approval of the Plan and submit to the Legislature.	2009
Aquifer Recharge Area	New - To address the potential contamination of the Northern Aquifer Recharge Area, the Bureau is proposing the North Central Guam Land Use Plan. After conducting many stakeholder and village meetings and a public hearing as required by law, the North and Central Guam Land Use Plan is now in its final stage of adoption by the Guam Legislature. The Plan is currently at the Guam Legislature for their review and action. If no action is taken by the Legislature, the Plan automatically becomes law.	2010
Marine Preserves: Tumon Bay, Piti Bomb Holes, Sasa Bay, Achang Reef Flat, Pati Point	In progress - Rules and regulations have not been adopted	1997

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
  - a) Characterize significant changes since the last assessment (area covered, issues addressed and major partners);
  - b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - c) Characterize the outcomes and effectiveness of the changes.

Coral Reefs: In August 2002, the Guam Coral Reef Initiative Coordinating Committee (GCRICC) began the process of selecting and prioritizing the main threats to local coral reefs. They include Land-based Sources of Pollution, Fisheries Management, Public Outreach and Education, Recreation Use and Misuse, Coral Bleaching and Disease. This was not a 309 effort, but funded by CRI funds. The GCRICC identified local navigators and drafted Local Action Strategies (LAS) for five chosen focus areas. Among the numerous benefits realized through these efforts since 2006, the LAS process significantly expanded and enhanced the network of stakeholder groups working on coral reef issues. The Guam Visitors Bureau and the tourism industry are now working with natural resources agencies to market Guam's coral reefs, and in particular Guam's marine preserves, to the one million visitors that come to our island yearly. A new awareness of the economic value of our coral reef resources is beginning to create a sense of stewardship in the industry, absent during the economic boom of the 1980s and recession of the 1990s. Ultimately these new partnerships and increased support for improving the health of Guam's coral reefs and support for the Local Action Strategies projects.

Guam (Territorial) Seashore Reserve Plan: Using 309 funds, a contractor was hired in 2006 to draft the Plan required to support the 1976 Territorial Seashore Protection Act. This plan will develop criteria for shoreline development, and address the procedure for use and/or development within Guam's waters from mean high water line to the 10 fathom contour. It also identified areas needing further planning, research and management activities in this SAMP. It is expected that this Plan, once adopted, will strengthen the existing law on shoreline development and will provide new protections against shoreline encroachments. The Guam Seashore Reserve Plan has gone through several stakeholder meetings with private, public and government agency reviews. Currently, the seashore reserve plan while still in draft form will be reviewed by the Guam Seashore Protection Commission again due to comments and recommendations addressed during the stakeholder meetings. In addition, incorporated into the draft plan are important comments provided by the Natural Resources Legal Counsel.

The Guam Seashore Reserve Task Force will meet with the Guam Seashore Protection Commission (GSPC) to submit the changes for their review and action. Once the Commission approves the Plan, GCMP will begin preparation for the Public Hearing process and submission to the Governor and the Legislature for their review and action.

Aquifer Recharge Area: The Northern Guam Lens serves as a source of potable water for the majority of the island's population. Under the Safe Drinking Water Act, the aquifer has been designated a sole source aquifer. Although groundwater has traditionally been considered less susceptible to contamination than surface water sources, the aquifer may be contaminated by

pollutants dumped above it. Ongoing studies under the “Groundwater under direct influence” (GWUDI) program, through Guam EPA and the University of Guam’s Water and Environmental Research Institute, verify the need for greater scrutiny of development over the aquifer and highlight the need to continue efforts to safeguard this resource.

Due to the high percolation rate in northern Guam, and the multitude of land use activities that exist in this area, the potential for contamination is high. Some homes in northern Guam lack running water and sewage connections, leading to raw sewage being dumped above the sole source aquifer. Other threats include organic compounds used in industry, the use of pesticides in agriculture, and saltwater intrusion from wells pumping too much water too quickly.

To address these issues, the Bureau of Statistics and Plans and Guam Coastal Management Program is developing the North and Central Guam Land Use Plan, which will represent the islands view for the future, and the goals, objectives and policies to ensure the protection of our natural resources during anticipated development. Should the Plan be approved, it will become an official element to Guam’s Comprehensive Development Plan (CDP). The plan’s overarching goal is to ensure sustainable development and maintain or improve the quality of life of our community. This process is supported by 309 funds and is ongoing at the time of the assessment.

**Marine Preserves**

While the marine preserves currently limit direct harvest of fish and other marine species, these areas are currently open to virtually all types of other activity. The intent of the preserves is to protect both species and habitats, so controls on non-harvest activity are intended to become part of the management system for these protected areas. The new regulations, in development as the eco permit system, will address the need to balance public demand for recreational access with the health of the ecosystem, while addressing a longtime complaint of fishermen who object to heavy recreational use that may threaten progress made by reductions in fishing effort.

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy).

<b>Gap or need description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H,M,L)
With the military buildup before us, there are many positions available for knowledgeable people in the federal sector. Guam has lost many highly experienced personnel and support staff with environmental knowledge to the	Capacity	High

<p>federal government due to higher wages and incentives. With the condition of our economy, and the attractive pay in the federal side, there is an inability to refill lost positions. It will undoubtedly take many years for Guam to recover from this action. Guam needs to be in a better position to have staff capable of reacting and responding to the rapid development pressures with legislation and regulations that are environmentally sensitive.</p>		
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**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**     \_\_\_\_\_  
**Medium**      X    
**Low**        \_\_\_\_\_

Briefly explain the level of priority given for this enhancement area.

During this assessment period, the SAMP is medium priority. Although the adoption of the Guam Seashore Reserve Plan will lead to a major program change with GCMP carrying the primary responsibility for resource protection in this area, the long delays in adoption time and the more urgent need of military buildup issues have led GCMP to place the SAMP as a medium priority. Should the plan be passed within this assessment period, GCMP staff are prepared to undertake education programs and other actions to promote the need for the plan, encourage compliance with new requirements and work to implement the new rules and regulations.

The large military presence and their proposed plans to develop make Guam vulnerable to many environmental issues not to mention the possibility of accidents during the normal transportation and storage of radioactive material, chemicals and explosives. Any accidents involving nuclear materials could have far reaching consequences on the island’s population and economy. This ever-present threat should not be ignored.

Capacity remains a high priority not just for the GCMP but throughout the government of Guam. It is expected that as part of an ongoing effort by the GCMP, a strategic plan that includes capacity will be developed. It is expected that various options such as short term contracting, working with UOG for interns, and other options will be explored to address lack of capacity.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**      \_\_\_\_\_  
**No**            X    

Briefly explain why a strategy will or will not be developed for this enhancement area.

The Guam Coastal Management Program will concentrate on the SAMPs already proposed. We do not want to be overwhelmed with what we plan to pursue. To continue to address the needs of existing SAMPs, GCMP will conduct staff training and work with the Department of Land Management to ensure a smooth transition for the Guam Seashore Reserve Plan. GCMP will further work with network partners for effective implementation of SAMP strategies.

Funding for capacity for threats to coral reefs will be addressed with coral reef management and monitoring grants. The GCMP will continue to work with its networking partner including the Department of Agriculture, Guam Environmental Protection Agency and others to address the capacity issues related to ensuring implementation of existing strategies.

## Ocean/Great Lakes Resources

### **Section 309 Enhancement Objective**

Planning for the use of ocean resources

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. In the table below characterize ocean and/or Great Lakes resources and uses of state concern, and specify existing and future threats or use conflicts.

<b>Resource or use</b>	<b>Threat or use conflict</b>	<b>Degree of threat (H,M,L)</b>	<b>Anticipated threat or use conflict</b>
Living Resources: Coral reefs and associated ecosystems - Fishes - Corals - Mollusks - Echinoderms - Crustaceans - Sea grass - Marine mammals - Sea turtles	- Overharvesting - Recreational overuse/ misuse - Sedimentation - Eutrophication - Pollutants - Ocean warming - COTS outbreaks - Invasive species - Marine debris - Nesting habitat destruction - Behavior disruption - Vessel collisions - Mid and long range active sonar - Poaching - Fisheries bycatch - Jurisdiction conflicts - Vessel groundings - Underwater detonation training exercises	High	- Increased non point source pollution - Cultural pressures - Increase in threat of sedimentation - Ocean acidification - Increased risk of invasive/nuisance species - Inadequate management (planning, enforcement, monitoring, etc.) due to jurisdictional conflict - Increase in threat of overharvesting - Increase in recreational overuse/misuse - Increase in threat of ocean warming - Increase in nesting habitat destruction - Increase in behavior disruption - Increase in risk of collision with vessels - Increase in risk associated with mid-

			<p>and long-range active sonar</p> <ul style="list-style-type: none"> <li>- Increase in risk of poaching</li> <li>- Increase in threat of vessel groundings</li> <li>- Increased threat of underwater detonation training exercises</li> </ul>
<p>Non-living resources</p> <ul style="list-style-type: none"> <li>- marine minerals</li> <li>  sand</li> </ul>	<ul style="list-style-type: none"> <li>- Disputes in jurisdiction</li> <li>- Management conflict</li> <li>- Illegal removal of beach sand</li> </ul>	Low	<ul style="list-style-type: none"> <li>- Inadequate management (planning, enforcement, monitoring, etc.) due to jurisdictional conflict</li> <li>- Increase in sand removal with anticipated increase in coastal development</li> </ul>
<p>Ocean Space: waste disposal</p>	<ul style="list-style-type: none"> <li>- Eutrophication from wastewater discharge</li> <li>- Introduction of pathogens from wastewater discharge</li> <li>- Leachate from Ordot dump</li> </ul>	Medium	<ul style="list-style-type: none"> <li>- Increase in threat of eutrophication associated with waste water discharged to coastal waters</li> <li>- Increase in threat of pathogen-related activity associated with waste water discharged to coastal waters</li> <li>- Sedimentation and pollution associated with accidental spill of dredge material in transit to disposal site</li> </ul>
<p>Maritime/ Navigation</p>	<ul style="list-style-type: none"> <li>- Disruption of non-military vessel movement by military activities</li> <li>- Oil spills</li> <li>- Discharge of radioactive material</li> <li>- Other pollution</li> <li>- Vessel groundings</li> </ul>	Medium	<ul style="list-style-type: none"> <li>- Increased disruption of non-military vessel movement</li> <li>- Increased risk of oil spills, radioactive discharge, and other types of pollution</li> <li>- increased risk of grounding</li> <li>- increased risk of</li> </ul>

	- Invasive/nuisance species		invasive marine species
Mariculture	- Localized degradation of waters - Risk of invasive marine species	Low	Unknown
Recreation: - Tourism - Boating - Personal watercraft - Scuba diving - Snorkeling - Swimming/ wading - Board sports - Fishing - Other recreational activities	- Safety hazards - User conflict - Water quality degradation - Disruption of living resources - “Souvenir” taking of living resources	Medium high	Increased recreational activity associated with expected increase in numbers of tourists, military personnel, foreign workers and permanent residents
Harbors	- Sedimentation - Contamination from polluted sediments - Discharge of radioactive material - Other pollutants - Oil spills - Marine invasive species - Behavior disruption Collisions with vessels - Vessel groundings - Underwater detonation training exercises - Safety hazards - User conflict - Injury to living resources/disruption to behavior of living resources by recreational activities	High	- Threat of sedimentation and pollution associated with accidental spills of dredged material in transit to ocean disposal site - Increased threat of sedimentation - Increased threat of contamination from polluted sediments - Increased threat of discharged radioactive materials - Increased threat from other pollutants - Increased threat of oil spills - Increased threat of marine invasive/nuisance species - Increased threat of behavior disruption - Increased threat of collision with vessels - Increased threat of

			vessel groundings - Increased threat of underwater detonation activities - Increased safety hazards - Increased user conflict
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2. Describe any changes in the resources or relative threat to the resources since the last assessment.

**Living Resources**

Our characterization of living resources is expanded to reflect new harvest pressure on species that formerly had little or no pressure, and to account for the ecosystem services provided by the ecosystems such as coral reefs, sea grasses, and mangroves, rather than focusing exclusively on individual components of these systems.

Specifically, there is increasing pressure on holothurians (sea cucumbers), echinoderms (sea urchins), some mollusks, other echinoderms and crustaceans that may be harvested for subsistence or commercial purposes. Sea turtles have been added to account for traditional consumption, threats to nesting sites by coastal development and poaching, collision with vessels, pollution, and bycatch.

The rapidly growing population of the island is putting increasing pressure on many species and the nearshore habitat areas. These threats will likely increase as the military buildup brings additional people to island, including many who are unfamiliar with local resource regulations and the fragility of the ecosystem.

**Non-living Resources**

The Threat/Conflicts associated with the marine minerals and sand were clarified by including mention of the root of the management conflict, namely a dispute over the jurisdiction of submerged lands claimed by the federal government. As a result of this dispute, there is the potential for conflict in the management of marine minerals and sand occurring in federal submerged lands (particularly those submerged lands that occur within 0-3 miles from shore). However, the interest in mining marine minerals or sand in Guam’s waters is apparently limited. The threat to Non-living Resources by the illegal removal of sand and other beach material was also added. This threat was not included in the previous assessment, but was likely a concern at the time. It is expected that with the increase in coastal development associated with the buildup, and the increasingly strained monitoring and enforcement capacity of local resource agencies, the number of incidences of illegal removal of beach material is expected to increase.

Guam does not have much control over foreign vessels dumping outside of Guam’s EEZ and in international waters. Ocean disposal from on shore activities are controlled by USEPA.

A more detailed description in the changes to all resources/uses listed in the above table, as well as descriptions of anticipated threats or use conflicts may be found in Appendix B.

**Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

<b>Management categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Comprehensive ocean/Great Lakes management plan or system of Marine Protected Areas	Y	N
Regional comprehensive ocean/Great Lakes management program	Y	Y
Regional sediment or dredge material management plan	Y	Y
Intra-governmental coordination mechanisms for Ocean/Great Lakes management	Y	N
Single-purpose statutes related to ocean/Great Lakes resources	N	N
Comprehensive ocean/Great Lakes management statute	N	N
Ocean/Great Lakes resource mapping or information system	Y	Y
Ocean habitat research, assessment, or monitoring programs	Y	Y
Public education and outreach efforts	Y	Y
Other (please specify)		

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
  - a) Characterize significant changes since the last assessment;
  - b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - c) Characterize the outcomes and effectiveness of the changes.

*Comprehensive ocean/Great Lakes management plan or system of Marine Protected Areas*  
Marine Preserves: The five locally-managed marine preserves created in 1997 were not discussed under the Living Resources Enhance Area in the previous assessment, but with the

modification of the Management Categories to include “Comprehensive ocean/Great Lakes management plan or system of Marine Protected Areas,” reference to the marine preserves is made here. Detailed information regarding the marine preserves can be found under the “Special Managed Area” Enhancement Area section of this document.

*Regional comprehensive ocean/Great Lakes management program*

Micronesia Challenge: In 2006, Governor Felix Camacho joined the leaders of the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia and the Republics of the Marshall Islands and Palau in committing to the Micronesia Challenge. The Challenge is an initiative calling for the effective conservation of 20 percent of terrestrial and 30 percent of near shore resources by 2020. Since its creation, the MC has grown to include endowment funding and an active network of conservation managers and policy specialists working to meet these goals. As a framework for Guam’s various ongoing resource management and conservation efforts, this initiative has helped focus efforts on effective conservation and the need for reasonable monitoring mechanisms to document progress and guide strategy development.

The Micronesia Challenge was initiated by the elected leaders of the various jurisdictions in Micronesia and regional meetings and workshops have been funded by non-governmental sources; however, jurisdictional dues and the LAS/MC Coordinator position have been funded through the CRI Monitoring Grant.

Each jurisdiction has very different approaches to meeting Challenge goals. For the independent jurisdictions, which tend to have smaller populations and relatively more coastal areas, the nearshore goal has been approached in a spatial manner, while for Guam the focus has been on effective management rather than a strictly spatial interpretation of “30 percent of nearshore resources.” To this end, Guam’s efforts to meet MC goals have been to work on creating effective management strategies rather than creating new marine protected areas. Such strategies include reduction in pollutants, including sediment, to improve habitat and coral reef health, as well as a watershed management approach. Infrastructure improvements, upland reforestation projects, and other approaches also are part of these efforts to reach the 30 percent target.

Western Pacific Regional Fisheries Management Council: Although not described in the 2006 Assessment and Strategy document, the Western Pacific Regional Fisheries Management Council (Wespac) is a federal organization tasked with managing and implementing laws governing fishing within the exclusive economic zone of U.S. Pacific jurisdictions, including Guam and the Commonwealth of the Northern Marianas in Micronesia.

The eight regional fisheries management councils were established by Congress through the Fishery Conservation and Management Act of 1976 (now called the Magnuson-Stevens Fisheries Conservation and Management Act) and are funded by the National Marine Fisheries Service.

Former Bureau of Statistics and Plans Directors have served on the Council and GCMP staff members have attended some of the Council meetings hosted on Guam; however, in recent years there has been significant conflict between local resource agencies and Wespac representatives

on Guam. Local resource agencies have raised serious concerns about Wespac involvement in local jurisdictional issues, particularly regarding the locally-managed marine protected areas.

Other regional management programs: The U.S. All Island Coral Reef Initiative Coordinating Committee, Western Micronesia Chief Executive Council, and the Western and Central Pacific Fisheries Commission are regional coordinating bodies that continue to operate as described in the 2006 assessment and strategy.

*Regional sediment or dredge material management plan*

US EPA Ocean Dredged Material Disposal Site: With the expiration in 1997 of a previously-designated Ocean Dredged Material Disposal Site (ODMDS) within Guam's EEZ, a new site was designated in 2010 after completing the EIS process and after the appropriate permits and approvals were obtained. The new site, located about 12 miles to the West of Apra Harbor, will be used for the disposal of uncontaminated dredged materials that are not suitable for beneficial re-use or cannot be re-used or stockpiled for future use given costs, logistical constraints, and capacity of existing land disposal or re-handling sites. Disposal operations at the site will be limited to a maximum of 1 million cubic yards (764,555 cubic meters) per calendar year and must be conducted in accordance with the Site Management and Monitoring Plan and any project-specific permit conditions. The designated ODMDS will be monitored periodically to ensure that the site operates as expected.

- The Guam Coastal Management Program participated in the EIS process for the ODMDS by providing scoping comments and comments on the Draft EIS document. The Guam Coastal Management Program agreed with the federal consistency determination submitted by the U.S. Environmental Protection Agency that there will be no direct or indirect adverse impacts on coastal uses or resources and that the proposed action is consistent to the maximum extent practicable with the enforceable policies of the GCMP.

*Ocean/Great Lakes resource mapping or information system*

NOAA shallow water benthic habitat mapping efforts: Since the last assessment Guam has benefitted from the benthic habitat mapping efforts of the NOAA Center for Coastal Monitoring and Assessment (CCMA) and follow-up work by University of Guam Marine Lab (UOGML) with support by the NOAA Pacific Islands Technical Assistant. In 2005, the CCMA produced benthic habitat data for Guam in the form of an atlas and spatial data available through a website and on a CD-ROM. Later that year the UOGML developed benthic habitat data that improved upon the CCMA data and released the data in the form of a printed atlas and spatial data and map PDFs available through a website.

Funding for the benthic habitat data and maps produced by the UOGML was provided through the FY2000 CRI Grant and critical support to the project was provided by the 2004-2006 NOAA Pacific Islands Technical Assistant for Guam, who was funded through the NOAA Coastal Services Center and co-supervised the Administrator of the Guam Coastal Management Program and Mark Tupper, associate faculty with the UOGML.

NOAA multibeam sonar mapping efforts: Multibeam sonar data for Guam was collected in 2003 and 2007 by the NOAA Pacific Islands Benthic Habitat Mapping Center. 60-meter bathymetry

data is available for the entire island between depths of approximately 300 to more than 1000 (up to 2500) meters, while 5-meter bathymetry data is available for a more limited coastal area at depths between 20 and 300 m. Limited mapping was also completed around Santa Rosa Reef, which lies to the south of Guam. In addition to bathymetry data, backscatter and derived geomorphologic data (e.g., substrate, slope, rugosity, Bathymetric Position Index structures and zones) is also available at [http://www.soest.hawaii.edu/pibhmc/pibhmc\\_cnmi\\_gua.htm](http://www.soest.hawaii.edu/pibhmc/pibhmc_cnmi_gua.htm).

High resolution (1m) multibeam and side-scan sonar data was collected in Apra Harbor by the NOAA Office of Coast Survey and the United States Navy Fleet Survey Team. The data, which was processed and made available by the NOAA Pacific Islands Benthic Habitat Mapping Center ([http://www.soest.hawaii.edu/pibhmc/pibhmc\\_cnmi\\_apra.htm](http://www.soest.hawaii.edu/pibhmc/pibhmc_cnmi_apra.htm)) includes bathymetry, side-scan imagery, and geomorphologic data, including substrate, slope, and rugosity.

Environmental Sensitivity Index maps: Environmental Sensitivity Index (ESI) maps and spatial data for Guam were made available in 2005. The ESI maps, which are developed by the NOAA Office of Response and Restoration with collaboration with local resource experts, are used for identifying sensitive resources before oil spills occur so that protection priorities can be established and cleanup strategies designed in advance. ESI maps are also used in spill response to reduce environmental consequences of spill and cleanup efforts, and for other activities for which information about the location and distribution of sensitive environmental resources is useful.

#### *Ocean habitat research, assessment, or monitoring programs*

Comprehensive long-term coral reef monitoring program: A comprehensive long term coral reef monitoring strategy was developed in 2006 by the Guam Coral Reef Monitoring Group (GCRMG), which is comprised of individuals representing several local and federal resource agencies. The strategy, which was built upon work accomplished through past NOAA Coral Reef Ecosystem Monitoring grants projects, was updated in 2010 to reflect a significant change in the monitoring framework and a shift in priorities.

The primary goals of the Guam Coral Reef Monitoring Plan are to:

- Determine the status and trends in selected coral reef ecosystem indicators to better inform the resource manager's decision making process and increase the effectiveness of natural resource management on Guam
- Provide managers with early notice of abnormal conditions of selected resources to encourage effective mitigation measures and reduce the costs of management
- Provide data to better understand the dynamic nature and condition of the island's coastal ecosystems
- Allow natural resource agencies to meet certain legal and Congressional mandates related to coastal resource protection
- Measure progress towards performance goals.

As with the previous strategy, the updated strategy provides a framework for collecting high quality, statistically-robust data for a number of coral reef ecosystem health parameters, including water quality, benthic habitat, and associated biological community parameters, at reef

sites around the island. Monitoring these parameters would provide an early warning system for changes in reef health and further our understanding of the processes underlying these changes. The monitoring program would thus allow managers to evaluate the effectiveness of specific management strategies and provide important information about reef resilience. The strategy ensures timely analysis and reporting of monitoring data to resource managers. The data will also be provided to NOAA for inclusion in CoRIS and the triennial “Status of the Coral Reef Ecosystems of the U.S. and Freely Associated States” report and will be disseminated to policy makers and the public through multiple media.

In response to managers’ concerns that island-wide monitoring at twenty sites may not be able to provide the necessary information for site-specific impacts, the updated strategy includes a shift to more robust monitoring at fewer high priority reef areas. The updated strategy also calls for a stratified random sampling design and a split-panel sampling approach that involves the combined use of fixed and unfixed transects and quadrats.

Through the implementation of this updated island-wide monitoring strategy, monitoring coverage continues to expand over existing monitoring efforts, statistically-robust data is being collected at high priority reef sites, coordination among partners continues to improve, and local capacity continues to increase. The long-term monitoring program is still in the process of development, and while data collection was delayed until August 2010 because of boat availability issues, a contract with a private charter has been established and high quality reef ecosystem data has thus far been collected at 20 sampling stations along a portion of the forereef in Tumon Bay and 20 stations along the forereef in East Agana Bay. Additional sites tentatively targeted for annual monitoring efforts include Western Shoals (Apra Harbor), Piti Bay, and at least one site along the southwestern coast.

Marianas Reef Assessment and Monitoring Program: Since the last assessment two research cruises (2007 and 2009) were carried out in Guam and the CNMI as part of the NOAA Pacific Islands Fisheries Science Center (PIFSC) Coral Reef Ecosystem Division’s (CRED) Pacific Islands Reef Assessment and Monitoring Program (RAMP). A comprehensive analysis of data collected between 2003 and 2007 in Guam and the CNMI was provided in the recent report, *Coral Reef Ecosystems of the Marianas Archipelago: 2003-2007*. The Pacific Islands RAMP is carried out with support from NOAA’s Coral Reef Conservation Program; the GCMP Biologist carried out benthic surveys on Guam, Rota, Tinian, Aguihan, and Saipan as part of the 2007 Marianas RAMP.

#### *Public education and outreach efforts*

The Guam Coastal Management Program has initiated numerous outreach and education projects that aim to raise awareness of ocean resource-related issues and to affect changes in the attitudes, perceptions, and behavior of Guam’s population with regard to ocean resources and their interaction with these resources. The GCMP played a key role in creating and facilitating the following outreach and education projects:

Guardians of the Reef: The Guardians of the Reef program involves high school students who prepare lesson plans and provide presentations about coral reefs to third grade students around the island. This program has been ongoing for the past five years.

Youthspeak 2010 and Island-wide Telethon: These efforts aimed to educate island residents, particularly students, about the potential impacts of the proposed military buildup on Guam's ocean resources and island infrastructure and to encourage involvement in the NEPA process

Recreational Users Workshops: Two recreational user workshops (2005 and 2008) were provided to commercial operators that take visitors to interact with Guam's reefs. The workshop provided information about the state of Guam's coral reef resources, the threats to these resources, and best management practices for recreational activities that occur in the reef environment.

Creation of numerous outreach materials: The GCMP produced a variety of outreach materials pertaining to ocean resources, including the bi-monthly Man, Land and Sea newspaper insert, posters about fishing regulations, information about the impacts of marine debris and how to live safely in a coastal area, and other outreach materials.

Kika Clearwater campaign: The Kika Clearwater campaign aimed at providing information to residents and visitors about how to use the ocean responsibly. This campaign included multiple printed materials and a video shown on airplanes landing on Guam and on the visitors channel.

International Coastal Cleanup: Every year the GCMP coordinates the International Coastal Cleanup. This event includes numerous pre-cleanup outreach events, the cleanup itself (which includes both beach and marine cleanup sites), and post-cleanup outreach.

"I Love My Watershed" Hike: An informational hike was offered for residents to see the Masso River above the Piti Marine Preserve. The hike focused on issues including sedimentation, native habitats threatened by development, and other issues within Guam's watersheds.

Marine Preserve Snorkeling Events: Several events, including the Mañahak Run and Splashin' in the Sea, have taken place over the last few years. These events are coordinated by the GCMP and include educational and safety briefings for student participants.

2008 International Year of the Reef: Multiple events were offered throughout 2008 to raise awareness about Guam's coral reefs in conjunction with the International Year of the Reef. Events included a Public Service Announcement contest for high school students, a snorkeling event, movie screening and coral reef awards.

Additional outreach and education events on Guam that were initiated by other agencies and supported by the GCMP include:

National Park Service Reef Rangers Camp: The Reef Rangers camp developed by the National Park Service provides an opportunity for students to safely interact with ocean resources and teaches them about proper resource management.

Recycling: Events including recycling at schools, Liberation Day parade and carnival and multiple presentations in schools about recycling and marine debris.

Island Pride Campaign: Numerous events associated with the Island Pride campaign were offered to residents in an effort to raise awareness about Guam's environmental resources, and to foster a sense of pride and stewardship. Island Pride events included festivals held on Earth Day, educational briefings for island students at the National Park Service Visitors Center and other student-focused events.

Marine debris cleanups: A number of marine debris cleanup events were carried out by the Marine Awareness Foundation and the Micronesian Divers Association through funding obtained through NOAA. The events involved numerous residents and helped not only to remove debris from Guam's beaches and reefs, but also raised awareness among participants and others about the impact of marine debris on Guam's coastal resources.

Rare Pride Campaign: A Rare Pride campaign aimed at reducing the threat of sedimentation on Guam's stream and coral reef ecosystems was carried out on Guam between Feb. 2009 and Dec. 2010, with supporting activities likely to continue. The campaign utilized social marketing techniques to affect change in the attitudes, perceptions, and behaviors of those engaged in destructive arson activity and stoked the community members impacted by the degraded condition of Guam's southern watersheds to take action to reduce arson in their watershed.

UnderWater World Ocean Camp: The local aquarium, UnderWater World, ran a successful educational ocean camp from 2005 to 2009 teaching students about science, ocean resources and responsible resource use.

Haggan Watch: Haggan Watch is a volunteer sea turtle monitoring program carried out by the Department of Agriculture's Division of Aquatic and Wildlife Resources; in addition to providing valuable information about the status of sea turtle nests island-wide, the programs provides an opportunity to teach individuals about threats to sea turtles and their eggs.

Micronesia Challenge Outreach Campaign: A campaign to raise awareness of the Micronesia Challenge among Guam residents was carried out in 2009-2010 with the help of an intern.

EcoSummer Camp: The EcoSummer camp, coordinated by 4H and the University of Guam in 2008, taught students traditional fishing methods and about ocean resources.

GCMP has conducted surveys to determine whether its outreach programs were effective in reaching the target audiences and conveying the desired message to the public. In the past, these surveys resulted in a shift to the family-oriented activities described in more recent projects. The success of this focus will be assessed through a new survey that GCMP will be conducting in late 2011. These results will be used to improve outreach efforts in future years.

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need Description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H, M, L)
Coordination for regional and local efforts including CMSP related to NOP, scientific research, and other studies	Policy	M
Fisheries and Resource Mapping	data	M

Note: A more comprehensive table of gaps and needs is provided in the Appendix C, based on Coral Reef Priorities.

**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**        X    
**Medium**           
**Low**              

Briefly explain the level of priority given for this enhancement area.

Ocean resources play a critical role in the economic, social, and cultural well-being of Guam’s residents, but a multitude of local, regional, and global stressors threaten the vitality of living resources and conflict exists between the variety of uses of ocean resources. These threats and conflicts are expected to increase in the coming years, especially with the substantial population increase and associated impacts to ocean resources expected with the military buildup, as well as the increased threat posed by dredging/filling activities, coastal development projects, and other activities directly or indirectly associated with the military buildup. It is of vital importance that the system of management employed to conserve and restore living resources and to minimize conflicts between uses of ocean resources must become significantly more efficient and effective in a relatively short period of time. Due to the high degree of importance of Ocean Resources to Guam and the expected increase in the level of threat to these resources and the expected increase in conflict between uses of these resources, the priority of the Ocean Resources Enhancement Area was increased to High.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**        \_\_\_\_\_  
**No**           X  

Briefly explain why a strategy will or will not be developed for this enhancement area.

An additional strategy will not be developed for this enhancement area at this time because strategies recently developed by GCMP and its partners, such as the Coral Reef Management Priorities document and the Natural Resources Strategy, are considered adequate.

## Energy & Government Facility Siting

### **Section 309 Enhancement Objectives**

Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance

### **Resource Characterization**

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. In the table below, characterize the types of energy facilities in your coastal zone (e.g., oil and gas, Liquefied Natural Gas (LNG), wind, wave, Ocean Thermal Energy Conversion (OTEC), etc.) based on best available data. If available, identify the approximate number of facilities by type.

<b>Type of Energy Facility</b>	<b>Exists in CZ (# or Y/N)</b>	<b>Proposed in CZ (# or Y/N)</b>	<b>Interest in CZ (# or Y/N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Oil and gas facilities	Y	N	N	N
Pipelines	Y	N	N	N
Electric transmission cables	Y	Y	Y	Y
LNG	N	N	N	N
Wind	N	Y	Y	Y
Wave	N	N	N	N
Tidal	N	N	N	N
Current (ocean, lake, river)	N	Y	Y	N
OTEC	N	Y	Y	Y
Solar	N	Y	Y	Y
Other (please specify)				

2. Please describe any significant changes in the types or number of energy facilities sited, or proposed to be sited, in the coastal zone since the previous assessment.

Guam is shifting toward renewable energy sources. Several feasibility and site assessment studies have been developed since the last assessment, with potential areas for new energy producing technology tentatively and roughly identified.

### **Electric Transmission Cables**

Guam Power Authority (GPA) completed its \$4M underground line conversion initiative for two 34.5 kV transmission lines. The project provides two protected transmission lines and a fiber optic line directly connecting the Tanguisson Power Plant to the Harmon Substation. This

project will ease the restoration of power to GPA customer when electrical disruptions occur. The project was partially funded by a FEMA hazard mitigation grant and was cost shared by GPA as part of several projects to extend underground line protection to large load centers in the central part of Guam.

### **Wind**

The Guam Power Authority is moving forward with the installation of a 60-m meteorological monitoring tower in Cotal, Yona. A wind tower site assessment conducted by DNV Global Energy Concepts Inc. (DNV-GEC) identified siting for two wind towers on Guam to evaluate potential wind farm siting. DNV-GEC determined that 20 to 30 MW of wind energy generation is conceivable for exposed ridgelines in the Cotal and Pulantat (southern) areas. DNV-GEC recommended installing at least one 60-m tower and proceeding with one year of data collection. The estimated cost for this project ranges from \$60,000 to \$80,000 per tower, depending on the availability of local tower installation contractors.

The Department of the Navy performed an assessment of renewable energy resources at naval installations in the U.S. and abroad with support from the National Renewable Energy Laboratory (NREL) and its subcontractor DNV Global Energy Concepts, Inc. (DNV-GEC). Preliminary site assessments were performed by NREL and DNV-GEC to evaluate potentially viable wind energy development areas. To document the development potential, meteorological (met) tower sites were identified and a wind resource monitoring program has been established and implemented. Wear Construction, Inc. installed the 60-m XHD met tower, identified as Site 8201, at the Ordnance Annex on September 17, 2008, under contract with DNV-GEC. The location of the tower is on Mount Alifan in the village of Santa Rita in southern Guam.

### **OTEC**

The U.S. Navy is conducting a feasibility study for Ocean Thermal Energy Conversion on Guam. Makai Ocean Engineering of Honolulu, Hawaii was awarded \$149,996.00 for the Guam Ocean Thermal Energy Conversion Feasibility Study by Naval Facilities Engineering Command in February 2009.

GPA's Renewable Resource Acquisition: In April 2008, GPA initiated bid solicitations for renewable resources, which included photovoltaics, wind, biomass, wave energy, and ocean thermal energy as stated in their Integrated Resource Plan (IRP). This plan called for the procurement of wind (or other renewable energy) projects. Solicitations for this project were later cancelled because of technicalities; however, GPA plans advertise the bid in the future.

### **Solar**

Naval Facilities Engineering Command (NAVFAC) Marianas completed a \$5 million solar photovoltaic (PV) project on Naval Base Guam. The PV system will produce sufficient solar power to energize approximately 54 homes on base and is designed to generate 250 kilowatts of power.

The firm Winzler and Kelly conducted a solar siting study for GPA to evaluate undeveloped properties on Guam for potential solar plant siting. The study concluded that there are numerous properties available on Guam that could support a 10 MW solar power plant. However, potential developers must include provisions to perform a System Impact Study for any potential site they may consider.

3. Does the state have estimates of existing in-state capacity and demand for natural gas and electric generation? Does the state have projections of future capacity? Please discuss.

As Guam prepares for the military buildup, the Commission on Consolidated Utilities (CCU), which is responsible for managing Guam's infrastructure, completed an assessment of the electric generation required to meet the power demands of the additional population. An agreement has been reached with the DOD through an MOU to ensure that funding will be provided to build the required infrastructure. In addition, the Guam Power Authority is also looking into alternative energy sources that are more sustainable.

4. Does the state have any specific programs for alternative energy development? If yes, please describe including any numerical objectives for the development of alternative energy sources. Please also specify any offshore or coastal components of these programs.

**Public Law 29-62:** In 2008, Guam law 29-62 was established to promote the development of renewable energy. It directs the Guam Power Authority (GPA) to establish renewable portfolio standard goals; and for the Public Utilities Commission to study the feasibility of implementing a rate structure to encourage the use of renewable energy.

**Executive Order 2010-15:** Governor Camacho signed Executive Order 2010-15, which established the Guam Energy Task Force and made it responsible for creating a strategic energy plan for the island by developing and implementing a long-term Guam Energy Strategic Plan. The task force will tap into the expertise of Guam's energy, business, scientific, academic, non-profit, and government sectors, thus allowing the island to speak with a unified voice on energy issues. Members include representatives of UOG, GEO, GPA, the Guam Chamber of Commerce, the Guam Hotel and Restaurant Association and the Mayor's Council of Guam. The task force will be assisted by several federal partners including NREL, DOI, the Department of Defense, the U.S. Environmental Protection Agency and the U.S. Department of Agriculture.

**Energy Task Force:** The task force is in collaboration with a team from the National Renewable Energy Laboratory. The team was on island for a week in Oct. 2010 to meet with the different stakeholders and conduct technical assessments. They are evaluating land access and potential crops that can be grown for biofuel.

**University of Guam:** In April 2009, the University of Guam signed a teaming agreement with Battelle for environmental sustainability and renewable energy projects. Battelle is an

international science and technology enterprise that explores emerging areas of science, and develops and commercializes technology. The University of Guam will seek federal funding for energy assessments and modeling for Guam and Micronesia; renewable energy assessments and implementation; environmental sustainability and alternative energy education and outreach; and public/private financing options and services for environmental sustainability and renewable energy programs and projects.

5. If there have been any significant changes in the types or number of government facilities sited in the coastal zone since the previous assessment, please describe.

Through public/private partnerships 5 schools have been built. HUD’s community block grant has funded 1 health facility, 2 fire stations and 3 police satellite offices, a community swimming pool and a skate park.

**Management Characterization**

*Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.*

1. Does the state have enforceable policies specifically related to energy facilities? If yes, please provide a brief summary, including a summary of any energy policies that are applicable to only a certain type of energy facility.

No. While the island has an Energy Building Code, the code has not been adopted into law and is not enforceable.

2. Please indicate if the following management categories are employed by the State or Territory and if there have been significant changes since the last assessment:

<b>Management categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Statutes or regulations	N	N
Policies	N	N
Program guidance	N	N
Comprehensive siting plan (including SAMPs)	Y	N
Mapping or GIS	N	N
Research, assessment or monitoring	N	N
Education and outreach	Y	N
Other (please specify)		

3. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
  - a) Characterize significant changes since the last assessment;
  - b) Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - c) Characterize the outcomes and effectiveness of the changes.

**Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H,M,L)
Awareness in energy efficiency and sustainable development concepts	Training	H
Implementation of the Guam Energy Building Code	Regulatory	H
Local polices regarding immerging technologies	regulatory	M

**Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**       X    
**Medium**           
**Low**              

Briefly explain the level of priority given for this enhancement area.

As Guam’s economy and population – and the associated pressures on coastal resources – grows, the need to adopt more sustainable development practices becomes more pressing.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**          X    
**No**

Briefly explain why a strategy will or will not be developed for this enhancement area.

The proposed strategy seeks to order and regulate the use of land for the benefit of the island community and the long term protection of natural resources. By directing future developments accordingly, either for the siting of energy or government facilities, the plan will serve as a guidance document that provides information to make the best possible choices to ensure the community's well-being with minimal damage to natural resources. The strategy complements the study completed in the last assessment period, which identified ideal conservation areas on public lands. The new strategy will identify appropriate sites for alternate energy facilities, allowing permitting and planning agencies to direct development to the best alternatives while provide guidelines for public or private entities to site facilities. This project will support the general guidelines developed in the North and Central Land Use Plan and other efforts to promote responsible development and resource protection. This strategy will also support the national ocean policy and the desire to complete coastal marine spatial planning for off shore energy siting as well as recreational activities, Department of Defense activities, ocean resource protection, and the resolution of user conflicts.

The strategy will be implemented by the appropriate government of Guam agencies including the Office of the Governor, the Department of Land Management, the Bureau of Statistics and Plans, the Guam Energy Office, the Guam Environmental Protection Agency, the Chamorro Land Trust and the Ancestral Lands Commission. Implementation will occur through the planning process, including review of proposed development on both public and private properties. The effort will ensure that energy or government facilities are sited in a manner consistent with surround properties. GCMP will work with partner agencies to direct development in coastal areas to be consistent with CMSP efforts to the greatest extent possible.

# Aquaculture

## 1. Section 309 Enhancement Objective

Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone, which will enable States to formulate, administer, and implement strategic plans for marine aquaculture

### Resource Characterization

*Purpose: To determine the extent to which problems and opportunities exist with regard to the enhancement objective.*

1. Generally characterize the private and public aquaculture facilities currently operating in your state or territory.

<b>Type of existing aquaculture facility</b>	<b>Describe recent trends</b>	<b>Describe associated impacts or use conflicts</b>
There are over 100 acres of ponds constructed, mainly in the southern region of the island, with several species being actively cultivated, including tilapia, milkfish, mullet, freshwater giant prawns, marine shrimp, Chinese carp and catfish.	Backyard aquaculture has significantly increased since its introduction in 1995 by the University of Guam Cooperative Extension, with nearly a dozen growers of tilapia, milkfish and catfish producing for sale to restaurants, roadside stalls and weekend flea markets.	Damage to earthen ponds, causing subsequent damage to nearby reefs. Water quality concerns and invasive species threats.
Western Pacific Tropical Research Center, College of Agriculture and Life Sciences, University of Guam	Recently, WPTRC researchers obtained funds to continuously look for ways to increase added value of existing products and /or increase consumer demand for new products. The scope of work conducted by WPTRC scientists is quite broad and researchers are regarded as experts in the fields of plant and animal sciences, bio-technology, food and nutrition, aquaculture, soils science, tropical agro-ecology, technical networking and agricultural economics.	
Guam Aquaculture Development and Training Center: Shrimp	Guam Aquaculture Development and Training Center (GADTC) at the University of Guam has been	

Study	<p>awarded a \$60,000 grant from National Oceanic and Atmospheric Administration (NOAA) for a pioneering study in shrimp nutrition and genetics. Dr. Gong's group will estimate genetic variations of the utilization efficiency of plant proteins by different shrimp families of <i>Penaeus vannamei</i>, the most popular species of shrimp currently cultured worldwide. Nearly twenty families with a large genetic diversity will be evaluated using five dietary treatments representing different protein levels and percentages of marine and plant proteins.</p> <p>The results of this study will be useful in exploring the potential of an innovative approach to genetic selection. Improved efficiency of utilizing plant proteins by <i>P. vannamei</i> will lead to a decreased dependence on marine proteins in shrimp feed formulation.</p>	
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**Management Characterization**

Purpose: To determine the effectiveness of management efforts to address those problems described in the above section for the enhancement objective.

1. For each of the management categories below, indicate if the approach is employed by the state or territory and if significant changes have occurred since the last assessment:

<b>Management categories</b>	<b>Employed by state/territory (Y or N)</b>	<b>Significant changes since last assessment (Y or N)</b>
Aquaculture regulations	Y	N
Aquaculture policies	Y	N
Aquaculture program guidance	Y	N
Research, assessment, monitoring	Y	N
Mapping	Y	N

Aquaculture education & outreach	Y	N
Other (please specify)		

2. For management categories with significant changes since the last assessment provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference rather than duplicate the information.
- Characterize significant changes since the last assessment;
  - Specify if it was a 309 or other CZM driven change (specify funding source) or if it was driven by non-CZM efforts; and
  - Characterize the outcomes and effectiveness of the changes.

No Significant change

### **Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H,M,L)
Gap in support from the Government of Guam	Gap in policy to developing a strategic plan for aquaculture development and to provide support in terms of permanent positions and funding for facilities and equipment.	L

### **Enhancement Area Prioritization**

1. What level of priority is the enhancement area for the coastal zone (including, but not limited to, CZMA funding)?

**High**      \_\_\_\_\_  
**Medium**    \_\_\_\_\_  
**Low**          X  

Briefly explain the level of priority given for this enhancement area.

Aquaculture efforts on Guam continue to be sporadic and generally small scale. Although the island has few aquaculture-specific regulations, new projects are subject to a range of local and federal environmental regulations that make it somewhat difficult for the smaller-scale projects to proceed, primarily due to water quality issues for both fresh and marine areas. Existing farms,

covering about 100 acres of earthen ponds and in much smaller above ground setups employed in backyard operations, have been “grandfathered” in as they have been existence for decades.

The University of Guam remains the lead agency for aquaculture development and continues to receive various grants for food fish and some ornamental production. In the future there may be greater interest but at this time the interest is nominal. It is not expected that the GCMP will be providing any limited funds from 309 to this effort.

2. Will the CMP develop one or more strategies for this enhancement area?

**Yes**            \_\_\_\_\_  
**No**                X  

Briefly explain why a strategy will or will not be developed for this enhancement area.

There is not likely to be substantial, if any, growth in this area in the next few years, based on historic trends as well as the growing difficulty for farms and aquaculture operations to find affordable land for these projects. The University will be increasing its manpower and capabilities and will be better able to assist any aquaculture farmers should the need arise.

## *Guam Coastal Management Program*

### *Section 309 Strategy*

#### *Summary*

Although the Guam Coastal Management Program recognized that many areas in the assessment are critical, for this Assessment and Strategy, the Guam Coastal Management Program has identified strategies for three high priority areas and one medium priority areas to be developed; (high priority) **Coastal Hazards, Energy and Government Siting and Cumulative and Secondary Impacts and** (medium priority) **Public Access**. Although **Ocean Resources** is a high priority, the strategy for this area will be addressed under other programs including the coral reef initiative and Micronesia Challenge. Many of the gaps identified in priorities are difficult to address due to limited personnel, the reduction of federal funds, the time frames imposed by the grant process, and more particularly, by the additional use of time for the bid and contract process, which takes away from the time available for product development itself.

The projects identified in the strategy will be phased over several years and over several grant cycles. The strategy will concentrate on the 4 (3 high and 1 medium) priority areas listed above, GCMP section 309 funds will not be used for projects under Wetlands, Special Area Management Plans, Marine Debris, Ocean Resources and Aquaculture.

Since the Guam Coastal Management Program's last assessment was completed in 2006, the single biggest driving factor in determining the Section 309 strategy is the large scale military buildup to move an estimated 8,000 Marines, their dependents and other military personnel to Guam. This move will be accompanied by major upgrades in existing defense properties, the construction of new facilities, and a large amount of private and local government development. Our highest priorities reflect the impacts and concerns that are associated with these activities, which will have tremendous effects on coastal resources during this phase of rapid development and booming population growth.

A major concern for our community during this challenging time is not just the health of local natural resources, but the public's continuing ability to use these resources for recreation, subsistence and cultural practices. As such, GCMP will undertake a project to quantify existing public access needs while considering the potential for degradation of our resources due to increasing access and demand. The need to protect access must be balanced with resource conservation, and a critical first step in addressing useful policies. This information will inform efforts to best manage competing interests and ensure meaningful access to our coastal areas, vistas, caves, near shore waters and cultural sites. This difficulty is highlighted in the proposed Marine firing range that the Department of Defense has proposed for Pagat, Mangilao, where an important cultural site is located. The public outcry over this project has been unprecedented and is raising greater awareness about other historical and cultural sites as well.

Obtaining data including socioeconomic data will clarify the issues related to enforcement. Presently there is much debate as to who is responsible for enforcement of public access.

Although the Department of Parks and Recreation can enforce access along beaches, the Departments of Land Management and the Public Works also have enforcement authority. It is expected that the work done through this strategy will lead to clarification of who is responsible and update the enforcement of access.

Among the projects we are proposing is the development of a new policy to manage cumulative and secondary impacts associated with private sector development. The government of Guam currently has no structure in place requiring private developers to consider these impacts through local regulatory processes, and given the many pressures on the island's limited natural resources such a policy is long overdue. The policy, combined with the recently completed Guam Mitigation Strategy and existing regulations, will help the island better understand these cumulative impacts and provide the best alternatives to evaluate threats to our natural resources. At a minimum, the new policy will include a method to assess cumulative and secondary impacts, as well as best management practices to provide a mechanism to prevent such impacts to the greatest extent possible.

This period the GCMP will undertake a project that will support sustainable development as part of a larger initiative to reduce the island's dependency on traditional power supplies derived from expensive, imported fossil fuels. This is to ensure that development is done in a sustainable way, that limited land resources are utilized in ways that benefit the community, and ensure that renewable energy becomes part of the GCMP enforceable policies. A sustainability policy needs to be created to clearly outline how Guam will integrate climate change and adaptive management concepts into land use policy decisions.

Guam will study sea level rise to provide information to incorporate climate change effects into existing policies and development regulations. Identified threats include shoreline erosion and salt water intrusion into wetlands and marshes. The potential loss of critical infrastructure facilities are of particular concern, as many major highways, the island's single commercial port, many communications facilities, and major power and water arteries are in areas that may be susceptible to sea level rise. The first phase of the strategy will be to gather existing data and create a model of projected sea level rise for Guam, with information on the effect of this rise on various resources. The strategy's second phase will include an analysis of sea level rise on natural resources, and the use of the model and data to develop policies, rules or management actions to account for these changes.

Each strategy will include support for capacity issues to ensure the effective implementation of existing and newly developed strategies.

These projects and ongoing work through both GCMP programs and our network of partners will help carry Guam through the next several years, when rapid, large scale development will challenge our resources. As such, GCMP's 2011 assessment reflects both the uncertainty of the immediate future and the ability to work through that uncertainty by focusing on the appropriate enhancement areas.

## Task 1

### Public Access for Guam's Natural and Cultural Resources Strategy

#### I. Issue Area(s)

The proposed strategy or implementation activities will support the following priority (high or medium) enhancement area(s) (*check all that apply*):

- |  |   |
|--|---|
| <input type="checkbox"/> Aquaculture                         | <input type="checkbox"/> Cumulative and Secondary Impacts |
| <input type="checkbox"/> Energy & Government Facility Siting | <input type="checkbox"/> Wetlands                         |
| <input type="checkbox"/> Coastal Hazards                     | <input type="checkbox"/> Marine Debris                    |
| <input type="checkbox"/> Ocean/Great Lakes Resources         | <input checked="" type="checkbox"/> Public Access         |
| <input type="checkbox"/> Special Area Management Planning    |   |

#### II. Program Change Description

A. The proposed strategy will result in, or implement, the following type(s) of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised Special Area Management Plans (SAMP) or plans for Areas of Particular Concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government and other agencies that will result in meaningful improvements in coastal resource management.

#### B. Proposed Program Change(s) or Activities

This strategy will attempt to revise authorities to improve enforcement of public access codes, to increase community understand of this issue and to expand access to include cultural resources.

Firstly there is a need to gather data about the current Public Access (PA) conditions, laws, and attitudes. The data gathered will be utilized to formulate proposed changes or enhancements to public access conditions and laws or regulations affecting access. For example the Department of Parks and Recreation is the lead agency with regard to public beach access. However, the department's shortage of manpower and resources has led the GCMP to become more involved in access issues, through the installation of signage identifying access routes and other tasks. The need for better monitoring and enforcement of access laws and a clear characterization of access needs and challenges are critical to improving coastal access for the public. The data will be a crucial part of the overall effort to find solutions to increase coastal access.

### **III. Need(s) and Gap(s) Addressed**

The ongoing military buildup will have impacts on public access to the ocean shore and associated resources. Though current public access laws are adequate for certain situations there are definitely weaknesses and gaps that do not protect the public's right to access the ocean shore. A comprehensive review of the various laws to determine what changes are necessary to strengthen them is needed to ensure continued future public access to the ocean shore.

It is expected that obtaining data including socioeconomic data will clarify the issues related to enforcement. Presently there is much debate as to who is responsible for enforcement of public access. Although the Department of Parks and Recreation can enforce access along beaches, the Departments of Land Management and the Public Works also have enforcement authority. It is expected that the work done through this strategy will lead to clarification of who is responsible and update the enforcement of access. A critical part of the strategy will be education of government agencies, policy makers and the general public. A formal Memorandum of Understanding between appropriate agencies will be developed to provide better coordination for identification of public access issues and subsequent enforcement actions if the need arises.

As the population continues to change, the need for public access to recreational and cultural sites will increase. Education and outreach strategies will be developed as part of the core GCMP program.

### **IV. Benefit(s) to Coastal Management**

Strengthened public access laws will benefit the CMP. Identifying current conditions, public attitudes and addressing the ambiguities in jurisdiction, authority and enforcement of the current laws will help negate legal challenges to the laws and will hopefully result in more public access to the ocean shore for the community.

### **V. Likelihood of Success**

In general, the community supports, and sometimes demands public access to the ocean shore so efforts to be undertaken with these projects should have a high likelihood of succeeding. Although Parks and Recreation currently lacks resources to fully monitor and enforce access regulations, the proposed strategy will account for the current problems and the end product should provide recommendations for changing the responsible agency, adding additional resources for access issue, or other steps that will ensure the challenge of maintaining public access is addressed. Even without formal changes, however, other resource agencies and CMP in particular are already increasing their involvement in this sensitive issue.

The resistance to public access routes is normally by an individual/developer or agency that must provide PA on their properties. Recently efforts by a landowner/developer to close the Gun Beach area in Tumon, which has a legal easement, generated significant public outcry. That access easement was finally reopened, with GCMP assisting in the effort by providing historic maps showing a trail that has existed since at least the early 1900s.

The Gun Beach case illustrates the need for the strategy and the likelihood of support for the project. There is a need to continuously update the inventory and mapping of PA locations and to educate the public of their locations, usage and benefits. This must also include efforts to educate the public about caring for such areas in keeping them trash free and protecting the natural and cultural resources that may exist. The deplorable conditions of some PA sites are one major reason for the resistance to establishing them on private properties. A PA maintenance program should also be pursued and established in order help reduce such resistance.

## VI. Strategy Work Plan

Total Years: 2 Years

Total Budget: \$100,000

Final Outcome(s) and Products: Proposed public access legislation/regulation submitted for adoption based on comprehensive law review related to public access to natural resources such as ocean and shoreline, caves and vista's and cultural resources; Up-to-date Inventory of Public Access sites, Survey results on public perception on the state and need for Public Access for the island, clarification of enforcement responsibilities and authorities.

Year 1:

Budget: \$70,000

Task	1 <sup>st</sup> Qtr	2nd	3rd	4th	5th	6th	7th	8th
Task 1: Collect data on status of existing public access to the ocean shore.	x							
a. Compile GIS database of existing public access sites	x							
b. Compile site conditions to natural and cultural resources associated, number of people accessing site		x						
Task 2: Collect data on the Public's perception of public access, and their use		x	x					
Develop RFP and SOW			x					
Hire Consultant			x					
Conduct public survey				x				
Review and evaluate results of survey and adjust if necessary				x				
Task 3: Conduct Comprehensive law review of existing legislation					x			
a. Comprehensive review of existing legislation, regulations,						x		

authorities, jurisdiction and enforcement related to Public Access to the Ocean Shore;								
Develop public outreach and education materials and activities						X	X	
Draft and submit proposed legislation for adoption based on the review and public.								X

**VII. Fiscal and Technical Needs**

**A. Fiscal Needs:**

GCMP will conduct all designated tasks within the budget provided. Some work, such as mapping and inventory development, may be done by GCMP (rather than a contractor) to reduce overall costs. GCMP will also work with Department of Parks and Recreation to obtain park and cultural data. GCMP will also work with the Department of Land Management to obtain easement data to determine areas that have been identified as public access.

**B. Technical Needs:**

At this point GCMP believes it has most of the technical knowledge, skills, or equipment to carry out the proposed strategy. The exception may be in the area of conducting a survey of attitudes about the state of Public Access for the island. Contractors with extensive experience in this field will fill this role of the project.

**VIII. Projects of Special Merit (Optional)**

The Bureau’s LUPP will work on mapping the PA sites, inventorying the associated natural and cultural resources. This data and associated information, with the exception of the exact locations of cultural resources, can be made available on the web for public as part of the CMP’s education and outreach efforts.

## Task 2

### Developing a Cumulative and Secondary Impact Policy for Guam

#### I. Issue Area(s)

The proposed strategy or implementation activities will support the following priority (high or medium) enhancement area(s) (*check all that apply*):

- |  |  |
|--|--|
| <input type="checkbox"/> Aquaculture                         | <input checked="" type="checkbox"/> Cumulative and Secondary Impacts |
| <input type="checkbox"/> Energy & Government Facility Siting | <input type="checkbox"/> Wetlands                                    |
| <input type="checkbox"/> Coastal Hazards                     | <input type="checkbox"/> Marine Debris                               |
| <input type="checkbox"/> Ocean/Great Lakes Resources         | <input type="checkbox"/> Public Access                               |
| <input type="checkbox"/> Special Area Management Planning    |  |

#### II. Program Change Description

A. The proposed strategy will result in, or implement, the following type(s) of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised Special Area Management Plans (SAMP) or plans for Areas of Particular Concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government and other agencies that will result in meaningful improvements in coastal resource management.

B. Describe the proposed program change(s) or activities to implement a previously achieved program change. If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)

GCMP will use 309 funding to develop a policy to assist the Government of Guam assess and manage the cumulative and secondary impacts of development projects to natural resources such as wetland, fisheries, public access, water quality, native forest, habitat loss, and coral reefs. The policy will also be similar to the NEPA requirements.

Due to the anticipated improvement in the local economy, increased tourist numbers and military buildup, there is pressure on the local government agencies to move quickly to approve

development projects without carefully considering the cumulative and secondary impacts to the environment and to the community. It is expected that by March 2011, the mitigation policy will be adopted for non federal government projects. The mitigation policy addressed compensation for losses to the natural resources as a result of new development. Guam will be experiencing growth due to the military buildup. This growth will have a tremendous impact on Guam's natural resources including fish, coral reefs, native forest, wetlands, mangroves, rivers, streams and the sole source aquifer.

The 309 strategy will include determining the appropriate data needed to assess CSI at the project level and beyond. Because potential CSI are wide ranging and may affect many different resources, there is a need for better information to support policy changes, including the cumulative amount of native habitat loss from development and the percentage of impervious surfaces over critical area. CSIs will need to be identified and assessed to support these types of changes.

Impacts may not be significant when reviewing projects on an individual basis. However as the number of small or medium projects get approved, it may result in significant impact to natural resources.

The strategy will also determine direct and indirect activities that have an influence on assessing CSI. The goal of the strategy is to create a method to determine the effects of CSI on critical natural resources such as wetland, fisheries, public access, water quality, native forest, habitat loss, and coral reefs. In developing the CSI, thresholds will be determined for disruption of wildlife habitat, area of impervious surface, loss of wetland, potential for stormwater runoff, sedimentation, water quality resulting from the project, impact to coral reefs, etc. This tool will have wide use, though its most immediate application may be as a part of the Department of Defense Adaptive Program Management process that is intended to guide development during the construction phase of the military buildup.

This effort will require that both local government agencies and federal agencies be engaged in this process. Although CSI issues are critical in determining impacts to development, very few government agencies are able to evaluate this appropriately. The policy will be supported by a new analytical model that incorporates critical data appropriately addressing CSI issues. This strategy will assist the GCMP in developing methods to assess cumulative and secondary impacts and determine the extent of impact to natural resources. The policy will serve as a tool to engage the community in participating in land use planning and in determining the type of community they live in.

Due to the technical nature of this project, a Consultant with CSI experience will be sought. Members of the local and regional community with technical expertise will be invited to participate in developing the Scope of Work and reviewing of the proposals. The GCMP staff will assist in providing data and necessary coordination required for the completion of the project. An ad hoc committee composed of the GCMP, Department of Agriculture, Guam EPA, NOAA, and other Federal partners will be organized to review the CSI policy.

This project will assist the GCMP in formulating new legislation to address this new policy. The

consultant will provide recommended language for the Government of Guam CSI law. The GCMP will work with stakeholders and members of the Guam Legislature to enact the new law.

### **III. Need(s) and Gap(s) Addressed**

Identify what priority need the strategy addresses, and explain why the proposed program change or implementation activities are the most appropriate means to address the priority need. This discussion should reference the key findings of the Assessment and explain how the strategy addresses those findings.

The proposed strategy will create a mechanism to assess CSI and collect data that will support new permitting requirements to address CSI in new developments. Because this is a new process for the permitting review agencies, and because many developers are sensitive about changes to this process, additional data collection to support the need for these steps will be required. The strategy will support this data collection as well as the development of new draft policies and guidelines for BMPs or alternative development.

### **IV. Benefit(s) to Coastal Management**

Discuss the anticipated effect of the program change or implementation activities including a clear articulation of the scope and value in improved coastal management and resource protection.

Guam's coastal resources face a range of threats, and the new impacts from rapid large scale development are a significant concern. Years of development have caused many changes across vulnerable ecosystems, but because many of these problems occurred over a long time period and as a result of cumulative impacts, it has been difficult to assign responsibility for mitigation work or to determine appropriate limits and regulations to prevent further system degradation.

The proposed strategy will offer a way to assess cumulative and secondary impacts, as well as providing alternative practices and best management practices to developers in a concerted effort to reduce CSIs as much as possible. This new policy and system of BMPs should have a favorable impact on resource protection, for both species- and ecosystem-level threats.

### **V. Likelihood of Success**

Discuss the likelihood of attaining the proposed program change and implementation activities. The state or territory should address: 1) the nature and degree of support for pursuing the strategy and the proposed change; and, 2) the specific actions the state or territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities.

The creation of policies that may affect developers and private landowners will always be the subject of scrutiny and, to some degree, controversy. However, given the massive scale of projects currently aligned with the Department of Defense buildup, resource conservation is gaining unlikely allies in the public as the island braces for major changes with this development.

The need for a way to address CSIs has never been more apparent and the public will likely support the effort to protect resources during this sensitive time frame and beyond.

To build wider support for the proposed strategy to create new guidelines and regulation, CMP will work with existing partners, building on the success of the tourism industry partnerships that have been successfully established since the last assessment period. Further, more local groups are becoming involved in environmental protection projects and support, and many youth groups are taking a new interest in resource conservation. Additional public outreach and education will allow CMP to build on this interest and garner support for measures to conserve natural resources.

## VI. Strategy Work Plan

Using the template below, provide a general work plan that includes the major steps necessary for achieving the program change and/or implementing a previously achieved program change. The plan should identify significant projected milestones/outcomes, a schedule for completing the strategy, and budget estimates. If an activity will span two or more years, it can be combined into one entry (i.e., Years 2-3 rather than Year 2 and then Year 3). While the annual outcomes are a useful guide to ensure the strategy remains on track, OCRM recognizes that these benchmarks may change some over the course of the five-year strategy due to unforeseen circumstances. The same holds true for the annual budget estimates. If the state intends to fund implementation activities for the proposed program change, describe those in the plan as well. Further detailing of annual tasks, budgets, benchmarks, and work products will be determined through the annual award negotiation process.

<b>Activities</b>	<b>1<sup>st</sup> quarter</b>	<b>2<sup>nd</sup> quarter</b>	<b>3<sup>rd</sup> quarter</b>	<b>4<sup>th</sup> quarter</b>
<b>Develop scope of work and RFP that includes method for determining thresholds of significant coastal resources and required data for the development of a CSI tool.</b>	<b>X</b>			
<b>Select contractor and finalize contract</b>	<b>X</b>			
<b>Work with networking agencies and other stakeholders to determine CSI criteria</b>		<b>X</b>		
<b>Develop policy regarding parameters for CSI •</b>		<b>X</b>	<b>X</b>	
<b>Develop CSI policy and craft language for development laws. Integrate of cumulative and secondary impact model and concepts in the evaluation of project review and land-use planning.</b>			<b>X</b>	<b>X</b>

## BUDGET

Object Class Categories	309 Funds	Other funds (306)	Total
Personnel			
Fringe Benefits			
Travel			
Equipment			
Supplies		\$10,000*	
Contractual	\$70,000		
Other			
<b>Total</b>	<b>\$70,000</b>		<b>\$70,000</b>

- 306 funds for outreach and education strategies

**Total Years: 1**

**Total Budget: \$70,000**

**Final Outcome(s) and Products: CSI policy to address impacts from increased development including private, Government of Guam and DoD.**

- Guidance that improves and strengthens the coastal planning processes to incorporate cumulative and secondary impacts when reviewing development project as stated in Executive Order 78-37.
- Guidance to address CSI impacts to support determination for loss of natural resources.
- Draft legislation for submission to the Administration and the Guam Legislature to include CSI when analyzing on impacts to natural resources from both public and private property.

Process for collaborating among relevant agencies for determining if a project will be sustainable.

## VII. Fiscal and Technical Needs

**A. Fiscal Needs:** If 309 funding is not sufficient to carry out the proposed strategy, identify additional funding needs. Provide a brief description of what efforts the applying agency has made, if any, to secure additional state funds from the legislature and/or other sources to support this strategy.

The GCMP will seek additional funds from Gum EPA and funds from the coral reef initiative to support the project, which is expected to cost about \$100,000.00 in total. To appropriately review various projects, government of Guam agencies must actively be engaged in the development of the CSI tool and policy.

**B. Technical Needs:** If the state does not possess the technical knowledge, skills, or equipment to carry out the proposed strategy, identify these needs. Provide a brief description of what efforts the applying agency has made, if any, to obtain the trained personnel or equipment needed (for example, through agreements with other state agencies).

It is expected that the GCMP will hire a consultant to develop the policy. The GCMP will conduct all the required public outreach to obtain public support for the CSI policy.

### **VIII. Projects of Special Merit (Optional)**

If desired, briefly indicate what PSMs the CMP may wish to pursue to augment this strategy. Any activities that are necessary to achieve the program change or that the state intends to support with baseline funding should be included in the strategy above. The information in this section will not be used to evaluate or rank PSMs and is simply meant to provide the CMPs the option to provide additional information if they choose. PSM descriptions should be kept very brief (e.g., undertake benthic mapping to provide additional data for ocean management planning). Do not do provide detailed project descriptions that would be needed for the PSM competition.

### Task 3

#### *Improved Siting for Government of Guam Facilities and Alternative Energy Projects*

##### **I. Issue Area(s)**

The proposed strategy or implementation activities will support the following priority (high or medium) enhancement area(s) (*check all that apply*):

- |   |   |
|---|---|
| <input type="checkbox"/> Aquaculture                                    | <input type="checkbox"/> Cumulative and Secondary Impacts |
| <input checked="" type="checkbox"/> Energy & Government Facility Siting | <input type="checkbox"/> Wetlands                         |
| <input type="checkbox"/> Coastal Hazards                                | <input type="checkbox"/> Marine Debris                    |
| <input type="checkbox"/> Ocean/Great Lakes Resources                    | <input type="checkbox"/> Public Access                    |
| <input type="checkbox"/> Special Area Management Planning               |   |

##### **II. Program Change Description**

**A.** The proposed strategy will result in, or implement, the following type(s) of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised Special Area Management Plans (SAMP) or plans for Areas of Particular Concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government and other agencies that will result in meaningful improvements in coastal resource management.

**B.** Describe the proposed program change(s) or activities to implement a previously achieved program change. If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)

Program change has not been completed for this policy since the approval of the Guam program. This strategy will provide recommendations for policy makers to establish a public lands register that will identify the suitability for development of energy and government facilities on government of Guam properties including Chamorro Land Trust Properties and Ancestral Lands including renewable energy facilities. This strategy will provide needed data to support two goals: 1) appropriate siting for government of Guam projects including housing, schools, health facilities, infrastructure, etc. and 2) to develop a policy related to siting of renewable energy facilities. This effort will assist Guam in supporting the national effort toward coastal marine

spatial planning (CMSP).

### **III. Need(s) and Gap(s) Addressed**

Identify what priority need the strategy addresses, and explain why the proposed program change or implementation activities are the most appropriate means to address the priority need. This discussion should reference the key findings of the Assessment and explain how the strategy addresses those findings.

It is generally assumed that about a third of the land on Guam is owned by the local government, but the government of Guam has not performed an accurate or updated inventory of its land holdings. Further, Government of Guam has not developed a plan for optimal land use. As a result of this lack of active management, lands have been used in an uncontrolled manner, “lost” through encroachment by adjacent property owners, and developed without regard for the best uses of individual sites. With increasing demands for public services, a decreasing amount of property for development, and a rapidly growing population, the Government of Guam can no longer afford to take this approach to managing its land inventory.

The majority of undeveloped properties or properties not deeded to a government agency are under the control of the Chamorro Land Trust. The Trust leases properties for agricultural, residential and commercial activities to indigenous Chamorros. This strategy will determine all properties that are suitable for government of Guam development. The results will be presented to the Government of Guam planning agencies and to entities that manage government of Guam properties for incorporation and adoption into an updated zoning map of Guam.

The second goal of this strategy is to identify appropriate locations for projects that support alternative energy. Because many alternative energy sources have special siting requirements, it is critical that the Government of Guam evaluate its current lands to identify areas that are feasible for such energy projects as solar, OTEC, and wind facilities. All these energy sources have been examined by local government and private sector partners, but there has been minimal work to identify public lands appropriate for these projects.

The proposed strategy addresses the need to determine what areas are suitable for alternate energy facilities, keeping in mind existing uses and natural constraints on the properties. The strategy complements the previous study identifying ideal conservation sites, and may use that information to determine areas where some energy facilities will be possible that will not conflict with other uses such as conservation easements.

This new policy document will help officials make informed decisions in a shorter timeframe, using reliable information that will anticipate the types of new development the local government will conduct in the near future. At this time, there is no such policy guidance in place. The strategy will address an emerging need while setting the stage for better public development in the future.

### **IV. Benefit(s) to Coastal Management**

Discuss the anticipated effect of the program change or implementation activities including

a clear articulation of the scope and value in improved coastal management and resource protection.

This strategy will provide the local government with a key decision-making tool for improved use of limited land resources, particularly with respect to new renewable energy facilities. The GCMP will work with the Department of Land Management, Department of Public Works and the Chamorro Land Trust to produce an agreed register of public lands. The lands on the register be evaluated and will provide general guidance in planning and siting of renewable energy facilities. The goal will be a more comprehensive look at limited land resources to appropriately meet future needs in a sustainable fashion. General designed criteria will also be formulated to meet the specific conditions and characteristics of the site with proper approval. Design professionals will use the information as applicable, or conduct appropriate research required by specific site conditions. Building from previous work with Center for Watershed Protection, all facility designs must meet low impact development standards with a goal to reduce stormwater and erosion in coastal waters.

The register will incorporate existing features, current zoning and other land use designations for all public parcels. The comprehensive project will further evaluate natural resources, geology, hydrology, topography, soil types and conditions, existing infrastructure and general uses for public lands. Geographic Information Systems (GIS) layers will be used for natural and man-made constraints, as well as areas of particular concern. Conditions included in this documentation may include such information as:

- Air Installation compatible Use Zones (AICUZ)
- Radio Frequency Interference Free Zones (RFI)
- Electromagnetic Radiation Zones (EMR)
- Explosive Safety quantity Distance (ESQD) Circles
- Historic and Prehistoric Sites
- Aquifer Recharge Areas and Wells
- Watersheds
- Wetlands and Freshwater Springs
- Seismic Fault Zones
- Slopes and Erosion Zones
- Flood Hazard Areas
- Marine and Terrestrial Ecological Communities
- Limestone and Native Forests
- Seashore Reserve

Before a project is undertaken for the use or disposition of government-owned lands, “Guam Public Lands Register” will be evaluated for compliance with the appropriately designated land use. Officials from the following agencies will be engaged in the process for specific and current information that may affect or change the land’s optimal potential use:

- Department of Land Management (DLM)
- Bureau of Statistics and Plans (BSP)
- Guam Environmental Protection Agency (GEPA)

Guam Energy Office (GEO)  
Department of Agriculture (DOAG)  
Department of Public Works (DPW)  
Department of Parks and Recreation (DPR)  
Guam Waterworks Authority (GWA)  
Guam Power Authority (GPA)  
Guam Housing and Urban Renewal Authority (GHURA)

This project will be adopted as an official register of public lands for the island of Guam. As part of the preparation for each of the Governor's Civilian Military Task Force, each subcommittee developed a needs assessment for future population and development growth. Information from these reports will be used as a starting point to determine future government of Guam facility needs. Recommendations will be provided to the appropriate Government of Guam agencies, the Administrations and the Guam Legislature for land designations for government lands. If properties currently under the Chamorro Land Trust or Ancestral Lands Commission are appropriately suited for government purposes or energy facilities, recommendation on resolutions will also be shaped and included in the recommendations.

GCMP will seek professional services for the development of this inventory of lands suited to alternate energy sources. An inventory, assessment, and classification of existing public lands will be conducted. The contractor will conduct field surveys, aerial photographs, and review existing surrounding uses, zoning, and acreage. It is anticipated that this project may run through a period of 3 years.

This second goal of the strategy will also be critical in supporting the National Ocean Policy's effort to carry out coastal marine spatial planning (CMSP) efforts. Determining areas appropriate for alternative energy will be critical to the success of Guam's effort toward CMSP.

## **V. Likelihood of Success**

Discuss the likelihood of attaining the proposed program change and implementation activities. The state or territory should address: 1) the nature and degree of support for pursuing the strategy and the proposed change; and, 2) the specific actions the state or territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities.

We believe that the likelihood for success is realistic and achievable. With a concerted effort from all network agencies, obtaining the latest and most current information of the public parcels is achievable. Because of the growing interest in alternative energy sources and the need for areas to construct these facilities, the strategy is timely and will be supported by projects in many partner agencies that are seeking to develop alternatives to our traditional fossil fuel based power system.

## VI. Strategy Work Plan

Activities	1 <sup>st</sup> quarter	2 <sup>nd</sup> quarter	3 <sup>rd</sup> quarter	4 <sup>th</sup> quarter	5 <sup>th</sup> quarter	6 <sup>th</sup> quarter	7 <sup>th</sup> quarter	8 <sup>th</sup> quarter
Develop Scope of Work and RFP seeking professional engineering services specializing in land use planning, renewable energy and environmental science.	X							
Publish RFP in daily newspaper.	X							
Call a meeting of all Government Agencies/Departments to discuss proposal and gain support. Review previous GovGuam needs assessment for facilities(CMTF)	X							
Create listing of government-owned parcels including lot numbers, acreage, etc. for all government controlled properties		X						
Work with GIS manager and staff in obtaining layers, including natural and man-made constraints and APC.		X						
Conduct site assessments of parcels, including site visits and aerial photography.			X	X				
Collect and validate data				X				
Completion of 1 <sup>st</sup> Draft					X			
Meet with agency officials to review 1 <sup>st</sup> Draft					X			
Determine sites for energy facilities off shore. Finalize and complete Inventory						X		
Issue press release and conduct press conference of the comprehensive public lands register and alternative energy siting							X	
Proceed with Guam Legislature for the adoption of an official “Guam Public Lands Register” and alternative energy siting								X

**VII. Fiscal and Technical Needs**

**A. Fiscal Needs:** If 309 funding is not sufficient to carry out the proposed strategy, identify additional funding needs. Provide a brief description of what efforts the applying agency has made, if any, to secure additional state funds from the legislature and/or other sources to support this strategy.

The GCMP will partner with the Department of Land Management and other appropriate entities to obtain additional funding for this project if required.

**B. Technical Needs:** If the state does not possess the technical knowledge, skills, or equipment to carry out the proposed strategy, identify these needs. Provide a brief description of what efforts the applying agency has made, if any, to obtain the trained personnel or equipment needed (for example, through agreements with other state agencies).

GCMP will seek professional engineering services with a specialty in renewable energy siting, environmental sciences, including hydrology, geology, and other natural systems, to complete this project.

**VIII. Projects of Special Merit (Optional)**

If desired, briefly indicate what PSMs the CMP may wish to pursue to augment this strategy. Any activities that are necessary to achieve the program change or that the state intends to support with baseline funding should be included in the strategy above. The information in this section will not be used to evaluate or rank PSMs and is simply meant to provide the CMPs the option to provide additional information if they choose. PSM descriptions should be kept very brief (e.g., undertake benthic mapping to provide additional data for ocean management planning). Do not do provide detailed project descriptions that would be needed for the PSM competition.

**BUDGET**

<b>Object Class Categories</b>	<b>309 Funds</b>	<b>Other funds (306)</b>	<b>Other sources</b>	<b>Total</b>
<b>Personnel</b>				
<b>Fringe Benefits</b>				
<b>Travel</b>				
<b>Equipment</b>				
<b>Supplies</b>				
<b>Contractual</b>	<b>\$150,000</b>			
<b>other</b>				
<b>Total</b>				<b>\$150,000</b>

## Task 4

### *Sea Level Rise Modeling and Analysis*

#### **I. Issue Area(s)**

The proposed strategy or implementation activities will support the following priority (high or medium) enhancement area(s) (*check all that apply*):

- |  |   |
|--|---|
| <input type="checkbox"/> Aquaculture                         | <input type="checkbox"/> Cumulative and Secondary Impacts |
| <input type="checkbox"/> Energy & Government Facility Siting | <input type="checkbox"/> Wetlands                         |
| <input checked="" type="checkbox"/> Coastal Hazards          | <input type="checkbox"/> Marine Debris                    |
| <input type="checkbox"/> Ocean/Great Lakes Resources         | <input type="checkbox"/> Public Access                    |
| <input type="checkbox"/> Special Area Management Planning    |   |

#### **II. Program Change Description**

**A.** The proposed strategy will result in, or implement, the following type(s) of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised Special Area Management Plans (SAMP) or plans for Areas of Particular Concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government and other agencies that will result in meaningful improvements in coastal resource management.

**B.** Describe the proposed program change(s) or activities to implement a previously achieved program change. If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)

There is strong evidence that sea levels are rising globally. Studies show that sea levels changed little from AD 0 until 1900; however, in the 20<sup>th</sup> century sea levels began to climb. Records and research show that sea level has been steadily rising at a rate of 1 to 2.5 millimeters (0.04 to 0.1 inches) per year since 1900. This rate may be increasing. Since 1992, new methods of satellite altimetry (the measurement of elevation or altitude) indicate a rate of rise of 3 millimeters (0.12

inches) per year. This is a significantly larger rate than the sea-level rise averaged over the last several thousand years (NOAA NOS Website 2011).

Rising sea levels inundate wetlands and other low-lying lands, erode beaches, intensify flooding, and increase the salinity of rivers, bays, and groundwater tables. Some of these effects may be further compounded by other effects of a changing climate.

Some of the potential adverse effects of sea level rise include: increased coastal flooding, threat to critical infrastructure, coastal erosion, property loss, increasing salinity of rivers and bays and groundwater, and the loss of wetland and marsh habitat. Additionally, measures that people take to protect private property from rising sea level may have additional adverse effects on the environment and on public uses of beaches and waterways.

The threats to critical infrastructure and loss of property are of particular concern to Guam because major highways, the island's single commercial port, major power, water, and communications facilities, as well as many residences, are in low coastal plains that may be especially susceptible to sea level rise.

The strategy would pursue studies and data required to model the projected sea level rise for Guam and potential effects on various resources. The initial phase would be to conduct the modeling studies to determine the projected sea level rise for Guam and to display those results in various formats. These results, in appropriate formats, will form the basis for efforts to educate the government and public about potential threats and to develop recommended legislative and regulation changes, or planning activities, to mitigate damages that may result from sea level rise. For example, changes to the setbacks from the seashore reserve could be increased for new coastal development, and water development efforts could be required to undergo new reviews to prevent damage to the groundwater table.

The second phase of this strategy would include analysis to the effects of the sea level rise on natural resources such as saltwater marshes. Some wetland resources may be adversely affected by sea level rise, while other resources may migrate upland. This phase would attempt to understand and quantify those effects. Models such as the Sea Level Affecting Marshes Model (SLAMM) would be utilized. The results of the second phase will allow resource managers to develop new plans to account for these changes and design new regulations or management actions to ensure the continuing health of these resources.

### **III. Need(s) and Gap(s) Addressed**

Despite the potential problems associated with sea level rise, we are not aware of any data that exists on the potential projected sea level rise for the island of Guam or the main populated Marianas Islands. Climate models, satellite data and hydrographic observations demonstrate that sea level is not rising uniformly around the world. In some areas, sea level has risen at a rate several times faster than the global average, while sea level has actually fallen in other regions ([IPCC, 2007](#)). While current model projections indicate substantial variability in future sea level

rise at regional and local scales, the IPCC has concluded that the impacts are “virtually certain to be overwhelmingly negative” ([IPCC, 2007](#)).

The project will allow the Government of Guam to assess potential impacts and develop mechanisms to help communities cope with these impacts. Further, new development could be regulated to prevent damage and loss associated with changes due to sea level rise.

**IV. Benefit(s) to Coastal Management**

The development of the Shoreline Inundation Study will lead to changes in development and setback regulations, with the goal of reducing threats to the community and providing a system to guide development in a manner that will reduce impacts to the natural systems. This study will support Guam’s efforts to be more adaptive to impacts from climate change.

**V. Likelihood of Success**

The degree of success for this project is high due to existing collaborative partnerships with the government agencies and available expertise to carry out the modeling and analysis.

**VI. Strategy Work Plan**

**Total Years:** One year

**Total Budget:** \$70,000

**Final Outcome(s) and Products:** A Shoreline Inundation Study for Southern Guam, new setback policies,

<b>Activities</b>	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>
<b>Develop scope of Work and RFP for modeling study</b>	X	
<b>Select contractor and begin study</b>	X	
<b>Contractors collect baseline data necessary to model sea level rise</b>	X	
<b>Sea level rise modeling results are circulated for review by various subject matter experts</b>	X	
<b>Develop sea level rise scenarios and conduct stakeholder meetings</b>		X
<b>Sea level rise modeling results are used to begin analysis of affected natural and cultural resources, infrastructure and the community.</b>		X
<b>Develop legislative and rule changes with appropriate public outreach to engage the public. Conduct training for planners and agency staff.</b>		X

**BUDGET**

<b>Object Class Categories</b>	<b>309 Funds</b>	<b>Other funds (306)</b>	<b>Total</b>
<b>Personnel</b>			
<b>Fringe Benefits</b>			
<b>Travel</b>			
<b>Equipment</b>			
<b>Supplies</b>		<b>10,000*</b>	
<b>Contractual</b>	<b>\$70,000</b>		<b>\$80,000</b>

\*education and outreach strategy implementation

**Enforceable Policies/Outcomes**

- Report on alternative methods to improve and stabilize erosion along Guam’s shoreline.
- Initiate the process to incorporated changes to Title 18 and 19 GCA and Executive Order 78-20, (Flood Hazard and Wetland Area Rules and Regulations) rules and regulations for development along Guam’ Shoreline and within Guam’s Seashore Reserve, Chapter 63, Title 21, Seashore Act (as amended) GCA .
- Information will assist in supporting the development of the rules and regulations for the implementation of the New Seashore Reserve Plan for shoreline and hazardous areas.
- Report on the [areas?]most susceptible to shoreline erosion.
- Draft revisions to Title 18 and 19 GCA and Executive Order 78-20, (Flood Hazard and Wetland Area Rules and Regulations) rules and regulations for development along Guam’ Shoreline and within Guam’s Seashore Reserve, Chapter 63, Title 21, Seashore Act (as amended) GCA and submit to [legislature] for adoption.

**VII. Fiscal and Technical Needs**

**A. Fiscal Needs:** If 309 funding is not sufficient to carry out the proposed strategy, identify additional funding needs. Provide a brief description of what efforts the applying agency has made, if any, to secure additional state funds from the legislature and/or other sources to support this strategy.

GCMP will conduct all tasks within the budget provided. Some work may be done by GCMP to reduce overall costs.

**B. Technical Needs:** If the state does not possess the technical knowledge, skills, or equipment to carry out the proposed strategy, identify these needs. Provide a brief description of what 48 efforts the applying agency has made, if any, to obtain the trained personnel or equipment needed (for example, through agreements with other state agencies).

GCMP has some technical knowledge, skills or equipment to carry out some tasks of the proposed project. However, a contractor with expertise and skills will be hired from what is budgeted.

**VIII. Projects of Special Merit (Optional)**

If desired, briefly indicate what PSMs the CMP may wish to pursue to augment this strategy. Any activities that are necessary to achieve the program change or that the state intends to support with baseline funding should be included in the strategy above. The information in this section will not be used to evaluate or rank PSMs and is simply meant to provide the CMPs the option to provide additional information if they choose. PSM descriptions should be kept very brief (e.g., undertake benthic mapping to provide additional data for ocean management planning). Do not do provide detailed project descriptions that would be needed for the PSM competition.

***5-Year Budget Summary by Strategy***

At the end of the Strategy section, please include the following budget table summarizing your anticipated Section 309 expenses by strategy for each year.

<b>Strategy Title</b>	<b>Year 1 Funding</b>	<b>Year 2 Funding</b>	<b>Year 3 Funding</b>	<b>Year 4 Funding</b>	<b>Year 5 Funding</b>	<b>Total Funding</b>
Public Access for Guam’s Natural and Cultural Resources Strategy	\$70,000	\$30,000				\$100,000
Developing a Cumulative and Secondary Impact Policy for Guam		\$40,000	\$40,000			\$80,000
Improved Siting for Government of Guam and for Alternative Energy Projects			\$30,000	\$70,000		\$100,000
Sea Level Rise Modeling and Analysis					\$70,000	\$70,000
<b>Total Funding</b>	\$70,000	\$70,000	\$70,000	\$70,000	\$70,000	\$350,000

## Appendix A

### PUBLIC COMMENTS

The draft assessment was offered to the public on-line on the Bureau's website ([www.bsp.guam.gov](http://www.bsp.guam.gov)) for more than 30 days on the Bureau's website while hardcopies were available at the Bureau and GCMP's office for comment. The draft assessment was provided to local network agencies, as well as to the Coastal Programs Division (CPD) of the Office of Ocean and Coastal Resource Management (OCRM)

A press release was also issued on February 21, 2011 for public comment. No comments were received by the general public.

The Guam Coastal Management Program (GCMP) received comments from the Department of Agriculture which were minor. GCMP also received comments from OCRM and are included herein.

#### MARINE DEBRIS

Comments from Valerie Brown, NOAA Fishery Biologist

ON RESOURCE CHARACTERIZATION: Table

Ocean Based Fishing (Derelict Fishing Gear)

And Ocean Based – Vessel Based (cruise ship, cargo ship, general vessel)

*A large portion of the debris on the east side comes from commercial vessels – lots of buoys and lines and baskets, etc from fishing vessels – I would rank it as a medium threat – nets are less so, but they have been seen.*

ON PRIORITY NEEDS AND INFORMATION GAPS

Research related to extent of fishing gear and boat debris

*I would make this Low – there isn't anything we can really do except for cleanups*

Public outreach program

*I would make this high*

“There is also a gap in the information regarding boat debris (sunken and rusting vessels) in the Apra Harbor area, and in accessing regional information regarding the debris contributions of distant waters fishing fleets. Securing this information will require funding, which is not currently available.”

*I think there is a great deal of information on vessels in Apra – just no funding for removal*

## Appendix B

Describe any changes in the resources or relative threat to the resources since the last assessment. The following narrative more fully explains the changes introduced in Ocean Resources – Resource Characterization in the report.

### **Living Resources**

Several additional threats to Living Resources were included, and some modifications were made to threats/conflicts included in the previous assessment. These modifications and additions are as follows:

#### Modified Threats or Conflicts

- “Over fishing” was changed to “overharvesting” to better capture the range of organisms harvested for subsistence and commercial use
- “Increased human presence in marine environment” was changed to “recreational overuse/misuse” to more specifically target concerns over the impact of recreational activities to Guam’s ocean resources

#### Additional Threats or Conflicts

- “Eutrophication” was added to specifically account for the impact of excess nutrients from sewage discharge, agricultural runoff, and other sources on the health of Guam’s Living Resources
- “Crown of thorns sea star outbreaks” was added to account for the significant island-wide loss of living coral observed in the last several years as a result of chronic outbreaks of the crown of thorns sea star
- “Invasive/nuisance species” was added to account for the current risk to Guam’s marine resources as a result of non-native, and potentially invasive or nuisance, species being introduced to Guam’s coastal waters through ballast water discharge and vessel hulls
- “Marine debris” was added to account for the threat to Guam’s marine resources by discarded monofilament nets and other types of marine debris
- “Nesting habitat destruction” was added to account for the threat to nesting habitat by coastal development, including the disruption/destruction of nesting beach habitat and light pollution
- “Behavior disruption” was added to account for the threat to nesting sea turtles, sea turtle hatchlings, marine mammals and other marine organisms from light and sound pollution, vehicle, vessel and human traffic, and other potential causes of behavioral disruption.
- “Collisions with vessels” was added to account for the threat to sea turtles, marine mammals, and other marine organisms by collision with vessels
- “Mid- and long-range active sonar” was added to account for the potential threat to marine mammals by active sonar use in military operations
- “Poaching” was added to account for the illegal harvest of sea turtles and other marine organisms for which harvest is prohibited or restricted

- “Fisheries bycatch” was added to account for the threat to sea turtles that nest or reside in Guam’s waters by fisheries practices that do not specifically target sea turtles but which may result in the injury or death of sea turtles as unintended bycatch
- “Disputed jurisdiction over management of living resources” was added to account for the lack of clarity regarding the management of living resources that occur on submerged lands claimed by the federal government
- “Vessel groundings” was added to account for the threat to coral reefs and other nearshore marine habitats by vessel groundings
- “Underwater detonation training exercises” was added to account for the threat to sea turtles, marine mammals, reef fishes, corals, and other reef organisms as a result of underwater detonation training exercises carried out by the military

Sedimentation, pollution (referred to here as “other pollutants”), and ocean warming remain as significant threats to Guam’s Living Resources. While the degree of each threat (Low, Medium, or High) was not identified here, the combined degree of threat for the multiple threats to Guam’s Living Resources remains High.

A number of existing threats are expected to increase over the next five years, primarily as a result of military buildup projects and the increase in population and coastal development directly or indirectly associated with the buildup. Below are descriptions of anticipated threats to Living Resources:

- “Increased non point source pollution”: a further increase in the threat of non point source pollution is expected with the anticipated increase in coastal development directly or indirectly associated with the military buildup
- “Cultural pressures”: it is not clear exactly what this meant when this anticipated threat was included in the previous assessment, but in the current context “cultural pressures” is intended to mean cultural practices, historical legacies, and other cultural phenomena that influence and present certain challenges to the effective management of natural resources; it is anticipated that these challenges will grow with the increase in the population of non-indigenous residents and the potential for conflicts over the limited natural resources, political influence, etc.
- “Increase in threat of sedimentation”: an increase in the threat of sedimentation is expected with the anticipated increase in dredging/filling activities, road/bridge construction, and other coastal development projects associated with the military buildup, the new landfill, and a possible increase in tourism-related development
- “Ocean acidification”: the threat of ocean acidification was added to account for the anticipated threat of the already-changing ocean chemistry associated with an increase in amount of greenhouse gases in the atmosphere
- “Invasive/nuisance species”: the threat of invasive/nuisance species is expected to increase with the increase in vessel activity directly or indirectly associated with the military buildup
- “Inadequate management (planning, enforcement, monitoring, etc) because of jurisdictional conflict”: this anticipated threat remains a concern, with the possibility of an increase in conflict with a greater number of planned military activities anticipated to occur on/over submerged lands claimed by the federal government

- “Increase in threat of overharvesting”: the threat of overfishing is expected to increase with the anticipated increase in population associated with the buildup, as well as continuing pressure to alter the management regime of the locally managed marine preserves
- “Increase in recreational overuse/misuse”: the threat of recreational overuse and misuse is expected to increase with the increase in the number of recreational users associated with the buildup, and with a possible increase in the number of tourists
- “Increase in threat of ocean warming”: the threat of ocean warming is expected to increase as the concentration of greenhouse gases continues to increase and oceans continue to warm; an increase in the frequency and severity of coral bleaching events is anticipated, posing a significant challenge to the long-term vitality of Guam’s coral reef ecosystems
- “Increase in nesting habitat destruction”: an increase in the threat of nesting habitat destruction is expected with an anticipated increase in activities, such as coastal development, sand removal, and military training activities
- “Increase in behavior disruption”: the threat of behavioral disruption (which can lead to injury or death) to sea turtles, sea turtle hatchlings, marine mammals and other marine organisms is expected to increase with the anticipated increase in light and sound pollution, vehicle, vessel and human traffic, and other potential causes of behavioral disruption associated with the military buildup
- “Increase in risk of collision with vessels”: an increase in the risk of collision between sea turtles, marine mammals, and other marine organisms is expected with the anticipated increase in vessel traffic directly or indirectly associated with the military buildup
- “Increase risk associated with mid- and long-range active sonar”: an increase in the risk to marine mammals associated with mid- and long-range active sonar is expected with the anticipated increase in military training activities
- “Increase risk of poaching”: the threat of poaching to populations of sea turtles, sea turtle eggs, and other protected species is expected to increase with the anticipated increase in population associated with the military buildup
- “Increase in threat of vessel groundings”: the threat of vessel groundings is expected to increase with the increase in vessel traffic associated with the military buildup
- “Increased threat of underwater detonation training exercises”: the threat of underwater detonation training exercises is expected to increase with the anticipated increase in the frequency of training events and the use of more powerful explosives

### **Non-living Resources**

#### *Ocean Space: Waste Disposal*

Two additional threats/conflicts pertaining to Ocean Space: Waste Disposal were included; these modifications and additions are as follows:

- “Eutrophication from wastewater discharge” was added to account for the conflict between the use of ocean space for the discharge of waste water and the health of living resources that may be impacted by the excess nutrients present in wastewater discharge

- “Introduction of pathogens from wastewater discharge” was added to account for the conflict between the use of ocean space for the discharge of waste water and human health/living resources that may be impacted by pathogens present in wastewater discharge
- “Leachate from Ordot dump” was added to account for the conflict between the past and present use of the Ordot dump and human health/living resources that may be negatively impacted by pollutants present in leachate associated with the dump

Considered in combination, the degree of the conflicts/threats associated with the use of Ocean Space for waste disposal remains Medium.

The first two existing conflicts/threats associated with the use of Ocean Space for waste disposal are expected to increase, while an additional threat is anticipated in the coming years. These are as follows:

- “Increase in threat of eutrophication associated with waste water discharged to coastal waters” was added to account for the expected increase in conflict between the use of Ocean Space for the discharge of waste water and the health of living resources that may be impacted by the excess nutrients present in wastewater discharge; the increase in this conflict/threat is expected to be a result of the anticipated increase in population associated with the military buildup and the increased volume of wastewater discharge generated by the additional population
- “Increase in threat of pathogen-related activity associated with waste water discharged to coastal waters” was added to account for the expected increase in conflict between the use of Ocean Space for the discharge of waste water and human health/living resources that may be impacted by the pathogens present in wastewater discharge; the increase in this conflict/threat is expected to be a result of the anticipated increase in population associated with the military buildup and the increased volume of wastewater discharge generated by the additional population
- “Sedimentation and pollution associated with accidental spills of dredged material in transit to ocean disposal site” was added to account for the anticipated conflict between the use of Ocean Space for dredged material disposal and the health of Living Resources that may be negatively impacted by accidental spills as the dredged material is transported to the newly designated ocean disposal site

#### *Maritime/Navigation*

Several additional threats/conflicts pertaining to Maritime/Navigation were included; these additions are as follows:

- “Disruption of non-military vessel movement by military activities” was added to account for the conflict between the use of coastal waters by military and non-military (commercial, recreational, subsistence) vessels
- “Oil spills” was added to account for the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of oil spills

- “Other types of pollution” was added to account for the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of other types of pollution generated by vessels using Guam’s coastal waters
- “Discharge of radioactive material” was added to specifically account for the conflict between Maritime-Navigation-related use of Ocean Resources by nuclear-powered vessels and vessels that are used to ship radioactive material and human health/Living Resources at risk for injury or death as a result of contamination by radioactive materials
- “Vessel groundings” was added to account for the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of vessel groundings
- “Invasive/nuisance species” was added to account for the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of invasive/nuisance species introduced to Guam’s coastal waters in ship ballast water or on ship hulls

The degree of the conflicts/threats associated with the Maritime/Navigation use of Ocean Resources remains Medium.

The first two existing conflicts/threats associated with the use of Ocean Space for waste disposal are expected to increase, while an additional threat is anticipated in the coming years. These are as follows:

- “Increased disruption of non-military vessel movement”: an increase in the disruption of non-military vessel movement is expected with the anticipated increase in military construction, training and other operations
- “Increased risk of oil spills”: an increase is expected in the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of oil spills with the anticipated increase in military and non-military vessel traffic associated with the military buildup
- “Increased risk of radioactive material discharge”: an increase is expected in the conflict between Maritime/Navigation-related use of Ocean Resources by nuclear-powered vessels and vessels that are used to ship radioactive material and human health/Living Resources at risk for injury or destruction as a result of contamination by radioactive materials with the anticipated increase in use of Guam’s coastal waters by nuclear-powered vessels and vessels that are used to ship radioactive material
- “Increased risk of other types of pollution”: an increase is expected in the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of other types of pollution generated by vessels using Guam’s coastal waters; this increase is expected with the anticipated increase in the use of Guam’s coastal waters by military and non-military vessels associated with the military buildup
- “Increased risk of grounding with increase in vessel activity”: an increase is expected in the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of vessel

groundings; the increase in conflict is expected with the anticipated increase in the use of Guam's coastal waters by military and non-military vessels associated with the military buildup

- "Increased risk of invasive marine species": an increase is expected in the conflict between Maritime/Navigation-related use of Ocean Resources and the health of Living Resources at risk for injury or destruction as a result of invasive/nuisance species introduced to Guam's coastal waters in ship ballast water or on ship hulls; the increase in conflict is expected with the anticipated increase in the use of Guam's coastal waters by military and non-military vessels associated with the military buildup

### *Mariculture*

One additional threats/conflicts pertaining to Mariculture was included; this addition is as follows:

- "Risk of invasive species" was added to account for the conflict between Mariculture-related use of Ocean Resources and the risk to Living Resources from non-native invasive/nuisance species associated with Mariculture activities

The degree of the conflicts/threats associated with Mariculture-related use of Ocean Resources was reduced to Low as little Mariculture-related activities are carried out on Guam; the activities that are carried out are limited in scale and the threat to water quality and living resources is relatively low when compared to other threats/conflicts.

"Unknown" was included under Anticipated Threats or Conflicts associated with Mariculture-related use of Ocean Resources because little information is available on which to base a prediction about future Mariculture-related activities and any threats that may be associated with these activities.

### *Recreation*

The already-inclusive description of activities considered under the Recreational Use of Ocean resources remains the same. The conflict/threat previously described as "disruption to living resources" was clarified as follows:

- "Disruption to living resources" was changed to "injury to living resources/disruption to behavior of living resources" to clarify the conflict between the Recreational Use of Ocean Resources and the threat of injury to and the disruption of the behavior of Living Resources by these activities

The degree of the conflicts/threats associated with the Recreational use of Ocean Resources remains Medium.

The anticipated increase in the threat/conflict associated with an anticipated increase in tourism arrival or resident usage was changed to "Increased recreational activity associated with expected increase in number of tourists, military personnel, foreign workers, and permanent residents" to

account for a range of anticipated causes for an increase in recreational activities and associated threats/conflicts

### *Harbors*

Several additional threats/conflicts associated with Harbors are included and the three threats/conflicts described in the previous assessment are further clarified. Many of the threats/conflicts listed under Harbors are also listed under other ocean resources/uses, but are included here along with descriptions as they specifically pertain to Harbors. The modifications and additions are as follows:

#### Existing Threats/Conflicts

- “Sedimentation” is intended account for the threat posed to Living Resources in Apra Harbor by sedimentation associated with activities, such as dredging/filling, vessel movements, military training activities, coastal development, and other activities carried out in the harbor or on coastal lands influencing the harbor’s waters.
- “Other pollutants” is intended to account for the threat posed to Living Resources in Apra Harbor and to the health of humans who utilize the harbor waters by other pollutants generated by vessels, coastal facilities, and other sources of pollutants
- “Dredging of contaminated sediments” is intended to specifically account for the threat posed to Living Resources in Apra Harbor and to the health of humans who utilize the harbor waters by contaminated sediments re-suspended in the water column by dredging activity

#### Additional Threats/Conflicts

- “Discharge of radioactive material” was added to specifically account for the threat posed to Living Resources in Apra Harbor and to the health of humans who utilize the harbor waters by radioactive materials discharged by nuclear-powered vessels and vessels that are used to ship radioactive materials
- “Oil spills” was added to account for the threat posed to the health of Living Resources in the harbor as a result of oil spills
- “Marine invasive/nuisance species” was added to account for the threat to the health of Living Resources as a result of invasive/nuisance species introduced to Apra Harbor in ship ballast water or on ship hulls
- “Behavior disruption” was added to account for the threat to nesting sea turtles, sea turtle hatchlings, marine mammals and other marine organisms in Apra Harbor from light and sound pollution, vehicle, vessel and human traffic, and other potential causes of behavioral disruption in the harbor
- “Collisions with vessels” was added to account for the threat to sea turtles, marine mammals, and other marine organisms in Apra Harbor by collision with vessels operating in the harbor
- “Vessel groundings” was added to account for the threat to coral reefs and other marine habitats in Apra Harbor by vessel groundings
- “Underwater detonation training exercises” was added to account for the threat to sea turtles, marine mammals, reef fishes, corals, and other reef organisms in Apra Harbor

as a result of underwater detonation training exercises carried out by the military in the harbor

- “Safety hazards” was added to account for the threat to human safety by activities carried out in the harbor
- “User conflict” was added to account for the conflict between activities carried out in the harbor, including military and non-military (commercial, recreational, subsistence, cultural) activities
- “Injury to living resources/disruption to behavior of living resources by recreational activities” was added to account for the threat to posed to the health of Living Resources in Apra Harbor by recreational activities carried out in the harbor

The degree of the conflicts/threats associated with Apra Harbor remains High.

Most of the existing threats/conflicts pertaining to Apra Harbor are expected to increase, primarily as a result of the anticipated military buildup. Below are brief descriptions of those existing threats/conflicts that are expected to increase as well as one additional threat/conflict:

- “Sedimentation and pollution associated with accidental spills of dredged material in transit to ocean disposal site” was added to account for the threat to Living Resources in Apra Harbor posed by accidental spills of dredged material as it is transported from dredging sites in the harbor to the newly designated ocean disposal site
- “Increased threat of sedimentation”: an increase in the threat of sedimentation to Living Resources in Apra Harbor is expected with the anticipated increase in dredging/filling activities and coastal development in the harbor in association with the military buildup
- “Increased threat of contamination from polluted sediments”: an increase is expected in the threat to Living Resources in Apra Harbor and the health of humans utilizing harbor waters by contaminated sedimentation resuspended during dredging activities; the increase in this threat is expected in association with dredging projects directly or indirectly associated with the military buildup
- “Increased threat of discharged radioactive material”: an increase is expected in the threat to the health of Living Resources in Apra Harbor and to the health of humans utilizing harbor waters by radioactive material discharged by nuclear-powered vessels and vessels that are used to ship radioactive material; the increase in this threat is expected with the anticipated increase in the use of harbor waters by these vessels as a result of the military buildup
- “Increased risk of other types of pollution”: an increase is expected in the threat to the health of Living Resources in Apra Harbor and to the health of humans utilizing harbor waters posed by other types of pollution generated by vessels using Guam’s coastal waters; this increase is expected with the anticipated increase in the use of Guam’s coastal waters by military and non-military vessels associated with the military buildup
- “Increased threat of oil spills”: an increase is expected in the threat to the health of Living Resources in Apra Harbor by oil spills with the anticipated increase in military and non-military vessel traffic associated from the military buildup

- “Increased risk of invasive marine species”: an increase is expected in the threat to the health of Living Resources in Apra Harbor by invasive/nuisance species introduced to Guam’s coastal waters in ship ballast water or on ship hulls; the increase is expected with the anticipated increase in the use of Guam’s coastal waters by military and non-military vessels associated with the military buildup
- “Increase threat of behavior disruption”: an increase is expected in the threat of behavioral disruption (which can lead to injury or death) to sea turtles, sea turtle hatchlings, marine mammals and other marine organisms in Apra Harbor with the anticipated increase in light and sound pollution, vehicle, vessel and human traffic, and other potential causes of behavioral disruption associated with the military buildup
- “Increase threat of collision with vessels”: an increase is expected in the threat of collision between sea turtles, marine mammals, and other marine organisms with the anticipated increase in vessel traffic directly or indirectly associated with the military buildup
- “Increased threat of vessel groundings”: an increase is expected in the threat to coral reefs and other marine habitats in Apra Harbor by vessel groundings; the increase in this threat is expected with the anticipated increase in the use of Guam’s coastal waters by military and non-military vessels associated with the military buildup
- “Increased threat of underwater detonation training exercises”: an increase is expected in the threat to the health of Living Resources in Apra Harbor by underwater detonation training exercises with the anticipated increase in the frequency of training events and the use of more powerful explosives
- “Increase in safety hazards”: an increase in human safety hazards is expected with the anticipated increase in activities that may pose risks to human safety directly or indirectly associated with the military buildup
- “Increase in user conflict”: an increase in user conflict is expected with the anticipated increase in military and non-military (commercial, recreational, subsistence, cultural) activities carried out within the harbor

## Appendix C

### **Priority Needs and Information Gaps**

Using the table below, identify major gaps or needs (regulatory, policy, data, training, capacity, communication and outreach) in addressing each of the enhancement area objectives that could be addressed through the CMP and partners (not limited to those items to be addressed through the Section 309 Strategy). If necessary, additional narrative can be provided below to describe major gaps or needs.

<b>Gap or need Description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H, M, L)
<i>Goal: Improve condition of ocean resources by reducing the amount of sediment and pollution</i>		
Development of prioritized action plan for implementation of CAP projects	Policy	M
Implementation of highest priority CAP projects	-	H
Effective enforcement against illegal activities (e.g., arson, poaching, illegal clearing and grating, other illegal construction/development practices)	Regulatory, Policy, Capacity	H
Measurement of effectiveness of CAP projects implemented under prioritized plan	Data	M
Development and implementation of watershed management plan for additional priority watershed (in addition to Piti-Asan and Manell-Geus)	Policy, Capacity	H
Creating/strengthening of partnerships with other local and federal resource agencies in the development and implementation of management plans to reduce sediment runoff in additional priority watersheds	Policy, Communication and Outreach	M
Approval and implementation of Guam Soil Erosion and Sediment Control and Stormwater Rules and Regulations	Regulatory, Training, Capacity	H
Completion of final versions of CNMI and Guam Stormwater Management Manual and the Seashore Reserve Plan	Regulatory, Policy	M

<b>Gap or need Description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H, M, L)
Update of zoning and building codes based upon final CNMI and Guam Stormwater Management Criteria and the Seashore Reserve Plan	Regulatory	M
Design and implementation of strategy for effective enforcement of Guam Soil Erosion and Sediment Control and Stormwater Rules and Regulations	Policy, Training, Capacity	M
Design and implementation of strategy for evaluating effectiveness of Stormwater Management Criteria and Seashore Reserve Plan	Policy, Capacity, Data	M
Education and outreach efforts targeted in priority watersheds	Capacity, Communication and Outreach	M
Engagement with community before developing and implementing specific regulations	Capacity, Communication and Outreach	M
Work with social marketing expert to develop targeted outreach campaign for priority watersheds	Capacity	M
Creation of partnerships with NGOs to implement targeted outreach campaigns	Communication and Outreach	L
Creation of public information officer position to promote a range of coastal management and coral management initiatives	Communication and Outreach	M
<i>Goal: Conserve and enhance Guam's coral reef fisheries resources</i>		
Synthesis of existing fisheries data	Capacity	M
Development of standardized monitoring protocols, training of personnel in techniques, and allocation of resources to data collection efforts, analysis and reporting	Policy, Training, Capacity, Data	M
Identification of priority monitoring sites	Policy	M
Conduct research aimed at understanding connectivity	Data	M
Develop connectivity models	Data	M
Implementation of major objectives in the National Marine Fisheries Service Habitat Assessment Improvement Plan relevant to Guam's ocean resources	Capacity	M

<b>Gap or need Description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H, M, L)
Pilot a community management program for marine preserves/priority watersheds	Communication and Outreach	M
Addition of staff to facilitate development of community management programs, including a fisheries extension officer, public information officer, and outreach specialist	Capacity	H
Work with community to develop and implement management programs, such as a community watch program	Communication and Outreach	H
Assess fishing techniques to determine impacts, number of users, and cultural importance	Data	M
Increase of creel survey analysis to assess socioeconomic characteristics of fishermen and their effort and success at recreational and commercial fishing	Data, Capacity	M
Increase of enforcement capacity of regulatory agencies by increasing salaries and provided needed equipment and supplies	Capacity	H
Implementation of Conservation Officer Reserve Program	Capacity	H
Examination of fish life history data to consider species-specific regulations	Data	M
Improvement of educational programs to enhance understanding of fisheries status and management needs	Communication and Outreach	M
Development of partnerships with federal resource managers to facilitate effective management of aquatic resources in federally controlled areas	Communication and Outreach, Policy	L
Develop management strategies to address indigenous fishing rights as ordered by PL 29-127	Policy	M
<i>Goal: Mitigate the existing and anticipated pressures of rapid development on Guam's coral reefs by implementing the Guam Natural Resources Strategy</i>		
Development of standard permit review process to ensure that permit applications comply with new Guam Compensatory Mitigation Policy	Policy	M

<b>Gap or need Description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H, M, L)
Ensure that permit applicants submit mitigation plans that comply with the Guam Compensatory Mitigation Policy	Capacity, Training	M
Ensure that permitting agencies have technical capacity for review of mitigation plans	Capacity	M
Development and implementation of comprehensive monitoring of water quality and coral reef ecosystem parameters within watersheds targeted for watershed restoration	Policy, Data, Capacity	M
Implementation of the goals and conservation actions listed in Chapters 6-17 of the Guam Natural Resources Strategy	-	M
<i>Goal: Improve condition of Guam's ocean resources by reducing negative recreational impacts</i>		
Review of existing plans and programs, synthesis of existing and proposed rules and regulations, and identification of critical gaps	Regulatory, Policy	L
Work with attorney to draft additional rules and regulations for recreational use of reefs	Regulatory	L
Gain support for new and existing regulations by Chamber of Commerce, Guam Visitors Bureau, etc.	Communication and Outreach	L
Development of community education and outreach programs to inform users of existing and new regulations, plans, and programs	Communication and Outreach	L
Increase capacity of regulatory agencies to effectively enforce existing plans, programs, and new regulations	Capacity	M
Expansion of education efforts targeting specific resource user groups	Communication and Outreach	L
Examination of sustainable finance mechanisms to support the management and protection of resources	Policy	M

<b>Gap or need Description</b>	<b>Type of gap or need</b> (regulatory, policy, data, training, capacity, communication & outreach)	<b>Level of priority</b> (H, M, L)
<i>Goal: Enhance the resiliency of Guam's ocean resources with regard to climate change impacts</i>		
Finalization of response plans for bleaching events, disease and predator outbreaks, and other acute events	Policy	M
Development and implementation of regulations to facilitate improved response to anthropogenic acute events	Regulatory	L
Facilitation of annual training to improve response-team skills	Training	L
Development and testing of mitigation and rehabilitation methods	Data	L
Evaluation of social, economic, and political impacts of climate change impacts to ocean resources	Data	H
Incorporation of climate change adaptation strategies developed by other jurisdictions	Policy	M
Development of connectivity models at multiple scales	Data	M
Use of models to refine management strategies to maximize resilience	Policy	M
Increase in understanding of causes, spread, and impacts of coral diseases	Data	L
Development and testing of approaches for rehabilitation of key reef areas	Data	M
Participation in the development and implementation of Micronesia Biosecurity Plan	Policy	M
Collection of baseline data on invasive species presence and impacts on Guam's nearshore habitats (with focus on Apra Harbor)	Data	M
Establishment of baselines and investigation of consequences of climate change on coral reef ecosystems of the Western Pacific	Data, Capacity	H

Note: The gaps/needs above were adapted from the objectives and key actions identified in the 2010-2015 Coral Reef Management Priorities document. Additional key actions are provided in the Coral Reef Management Priorities document.

## Appendix D

LETTER VIA E-MAIL

Ms Vangie Lujan  
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Guam Coastal Management Program  
Bureau of Statistics and Plans  
Government of Guam  
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Hagåtña, Guam 96932

December 20, 2010

RE: Draft 2011-2015 CZMA Section 309 Assessment and Strategy

Dear Vangie:

Thank you for submitting a draft Coastal Zone Enhancement Program (309) Assessment and Strategies document. The Coastal Programs Division (CPD) appreciates the Guam Coastal Management Program's (GCMP) submittal, and we commend you on past accomplishments and for developing an informative Assessment and Strategies document. The draft Assessment presents data on past accomplishments, as well as current and projected future needs. The draft Strategies are, for the most part, ambitious and address needs identified in the Assessment.

The remainder of this letter describes the process CPD used to review the draft Assessment and Strategies, timeline for completion, and comments on specific aspects of the Assessment and Strategies. We are happy to discuss this with you at your convenience.

### **REVIEW PROCESS**

As part of our ongoing efforts to identify NOAA resources to support CZMA priorities, CPD invited reviewers from several NOAA programs to provide comments on draft 309 Assessment and Strategies. Staff from the Estuarine Reserves Division, National Marine Protected Areas Center, Coastal Services Center, Marine Debris Program, and National Centers for Coastal Ocean Science participated in the review. They were asked to provide information about tools, studies, or other data related to assessment questions or gaps you identified in the assessment. Reviewers were also asked to identify existing projects or opportunities to leverage resources related to proposed strategies. Comments received from reviewers have been incorporated into CPD's comments on your draft 309 Assessment and Strategies.

### **FINAL 309 SCHEDULE**

December 30, 2010	CPD provides comment letter to the GCMP
February 28, 2011	Final 309 Assessment and Strategy Due to CPD
April 29, 2011	CPD approves final 309 Assessment and Strategy

## **PROJECTS OF SPECIAL MERIT**

CPD anticipates awarding a portion of section 309 funds based on an annual evaluation and ranking of Projects of Special Merit (PSM). It is anticipated that approximately 10% of Section 309 funds will be set aside for PSM beginning with FY2012. The intent of the PSM competition is to offer Coastal Management Programs an increased opportunity to develop innovative projects for approved enhancement area strategies that focus on national coastal priorities. Guidance for PSM will be issued by CPD separately to provide additional information about eligible projects and submission requirements. To be eligible, a proposed PSM must support an approved strategy for one or more enhancement areas of national importance: (1) Wetlands, (2) Coastal Hazards, (3) Cumulative and Secondary Impacts, and (4) Ocean and Great Lakes Resources (including planning for offshore energy uses).

## **SPECIFIC COMMENTS**

### ***General***

Please ensure that all assessment and strategy questions have been addressed and that the final document is thoroughly edited, spell-checked and includes page numbers.

### ***Summary of Completed 309 Efforts***

- (1) This should be a comprehensive summary of the activities accomplished under the current 2006-2010 strategies. Please focus on activities completed in the past five years only. Please specify when the activity was or is expected to be completed, and the funding award year (eg NA09)

### ***Wetlands Assessment***

- (2) Resource Characterization Q1: The table lacks data on the current extent of wetlands. At a minimum there should be data from the 1983 USFWS survey and 2006 GCMP data (described in Q6).
- (3) Resource Characterization Q 7 (Contextual Measure): Please include the cumulative acres of coastal habitat restored. Was any coastal habitat protected thru non CZM or CELCP funding? Please clarify.
- (4) Management Characterization Q2: Please only report on management categories with significant changes since the last assessment listed in Q1.
- (5) Enhancement Area Prioritization Q1: Please explain the level of priority given to Wetlands.
- (6) Enhancement Area Prioritization Q2: The explanation contradicts the gaps indentified in Q1. It suggests that the gaps are addressed in GEPA's wetland conservation plan. Is this correct? When will the plan be completed?

### ***Coastal Hazards Assessment***

- (7) Resource Characterization Q2: The use of sub-headings would improve the readability of this section. Please organize the text by hazard type. What were the findings of the USACE erosion study?
- (8) Resource Characterization Q4: Please describe who will be conducting the shoreline and tsunami study, how GCMP will be participating, and completion date. Please provide examples of how Guam has been engaged with adaption planning.
- (9) Resource Characterization Q5: Please list the total number of villages in Guam. Eg 19 villages of X total.
- (10) Management Characterization Q2: This section is missing explanations of most of the management categories listed with significant changes (3 of reported).
- (11) Management Characterization Q3 (Contextual Measure): Does GCMP use numerically based or descriptive standards for setbacks or buffers? Data is reported twice.
- (12) Management Characterization Q4: The identified gaps are not evident in the assessment. Please clarify. Does the need for stringent policies to address lack of enforcement refer to policy standards or the enforcement of those polices and standards?
- (13) Enhancement Area Prioritization Q1: Missing explanation for level of priority given to enhancement area.
- (14) Enhancement Area Prioritization Q2: The strategy doesn't appear to address priority needs. Please explain or better articulate priority needs. Perhaps need to rephrase "lack of enforcement" to policy.

#### ***Public Access Assessment***

- (15) Resource Characterization Q1: Column 2 and 3 of table missing descriptions of threat or conflict.
- (16) Resource Characterization Q4: Is there any data to quantify public demand? Please give examples of why public access is needed. Is there any difference in need between residents and tourists?
- (17) Resource Characterization Q5: Colum 3 of table, please include data for any changes since last assessment. Colum 4, please cite the original data source where possible.
- (18) Resource Characterization Q5 (Contextual Measures 18): Column 1, how many miles of the shoreline can be accessed by public?
- (19) Resource Characterization Q5: Column 2: Where data is listed as not available, how will it be collected in the future? When will data be available?
- (20) Management Characterization Q2: Please describe the significant change for outreach and education. The narrative is confusing.
- (21) Management Characterization Q3: Who drafted the draft access map?
- (22) Priority needs and information gaps enforcement of access, regulatory gap: What do you mean, what laws are not being enforced? This does not follow from assessment narrative.
- (23) Enhancement Area Prioritization Q1: Please remember that installation of access route signage, facilities for the disabled, parking, and restrooms cannot be financed thru 309 funds.
- (24) Enhancement Area Prioritization Q3: The survey described is not a strategy. A strategy must address the gaps identified in the assessment. Suggest rewording to data collection.

#### ***Marine Debris Assessment***

- (25) Resource Characterization Q3: Please only describe significant changes listed in Q1. On-shore litter: Please update the description, the language is the same as the 2006 Assessment & Strategy.
- (26) Commercial fishing: This is not listed as a significant change in Q1. Narrative is the same as last Assessment & Strategy Report.
- (27) Recreational/Subsistence Fishing: This is not listed as a significant change in Q1. What are the key points in this section – not clear as written? Is the increase in fishing lines collected due to the increase in collection sites?
- (28) Management Characterization Q2: Section does not address the specified questions: Characterize significant changes since the last assessment; Specify if it was a 309 or other CZM-driven change (specify funding source) or if it was driven by non-CZM efforts; and Characterize the outcomes and effectiveness of the changes.
- (29) Priority needs and information gaps: Please update additional narrative, same as 2006 assessment.
- (30) A reviewer from the Marine Debris Program commended Guam on its outreach efforts on littering/dumping both on land and from vessels. The marine debris program would welcome hearing about future outreach activities related to marine debris. If, in the future, a higher priority is placed on assessing the derelict and abandoned vessels in Apra Harbor, they would be happy to work with Guam on possibilities for helping with such a survey, particularly in light of the recent workshop on state and territory responses to abandoned and derelict vessels conducted by the Marine Debris Program.

### ***Cumulative and Secondary Impacts Assessment***

- (31) Resource Characterization Q1: Apra Harbor – should dredging be included in column 2? Missing data for DOD properties, columns 3 & 4.
- (32) Resource Characterization Q2: Should the table include aquifers and wetlands? Coral reefs CSI threat should include introduction of pollutants.
- (33) Resource Characterization Q2 other concerns: Need improvements to zoning law including better criteria for zoning changes. Need to follow long term land use plan.
- (34) Management Characterization Q1: Should education and outreach be listed as a significant change? It is described in the narrative but not indicated in the table.
- (35) Management Characterization Q2: Please organize narrative under management categories (ie include sub-headings).
- (36) Management Characterization Q2: Critical habitat and access not mentioned in narrative.
- (37) Management Characterization Q2 Conservation/Development suitability analysis: Who is coordinating the analysis? When will it be completed and how will it be used?
- (38) Priority needs and information gaps: Please provide more detail on the outreach needs listed in the table. Outreach for what specifically? Not much consideration of CSI on habitat or how to make suitability regulations matter.
- (39) Enhancement Area Prioritization Q1: Missing explanation.
- (40) Enhancement Area Prioritization Q2: Please make sure the strategies match the identified priority needs and information gaps. The table and this section should clearly articulate what changes the strategy will seek. Eg. How to assess CSI from projects (needs for permitting and /or mitigation).

### ***Special Area Management Planning Assessment***

- (41) Management Characterization Q1: Does the Guam coral reef priorities document meet the definition of a SAMP?
- (42) Management Characterization Q2: Section on aquifer recharge is repetitive and needs to be edited.
- (43) Enhancement area prioritization Q1: Should this be high instead of medium? Narrative states that during this assessment period, the SAMP remains a high priority.
- (44) Enhancement area prioritization Q2: How will capacity issues be addressed to ensure the effective implementation of existing SAMP strategies?

### ***Ocean Resources Assessment***

- (45) Resource Characterization Q1 Living resources: what about invertebrates such as sea cucumbers?
- (46) Resource Characterization Q1 Non-living resources anticipated threat: Please describe the management context and who has jurisdiction.
- (47) Resources Characterization Q1 Harbors: Threat should be contamination from dredged sediments
- (48) Resources Characterization Q2: Missing text
- (49) Management Characterization Q2: Please organize into sub-headings based on significant changes identified in previous table.
- (50) Management Characterization Q2 USEPA Ocean Disposal Site: Has there been a federal consistency review of designation?

### ***Energy and Government Facility Siting Assessment***

- (51) Resource Characterization Q2: Please describe all facilities with significant changes listed in Q1.
- (52) Management Characterization Q3: This text is not needed unless there are significant changes in management categories.
- (53) Enhancement area prioritization Q2: What will the strategy seek to accomplish?

### ***Aquaculture Assessment***

Good information throughout this section.

#### ***Strategy – General:***

- (1) Please ensure the proposed strategies address the priority gaps and needs identified in the assessment.

#### ***Strategy - Summary:***

- (2) Please correct the number of identified priority areas from 3 to 4. Public access needs should be tempered by ecologically sound access as noted in other sections. Increased recreational use is a threat to some resources.
- (3) CSI – will need methodology to assess impacts and BMP's to provide alternatives.

***Strategy 1- Public Access for Guam’s Natural and Cultural Resources***

- (4) This strategy needs a much clearer statement of the program change. What conditions (permit conditions?) or laws may be changed or maintained to enhance public access, and what is the general nature of those changes that the Program is aiming for?
- (5) Is Guam interested in developing regulatory requirements for the provision of access in new developments, or to require mitigation of public access for unavoidable impacts to public access (See attached Rhode Island Policy as an example).
- (6) Please be mindful that 309 funding CANNOT be used to fund any on-the-ground, spade-in-earth type access projects.
- (7) The Assessment and Strategy (p.65 top of the page) should spell out the “weakness and gaps” in the current public access laws that need to be filled to protect public access to the ocean and shore. Also please indicate which specific laws would be reviewed and possibly enhanced.
- (8) Suggest that the Assessment and Strategy discuss environmentally sensitive or sound public access, especially in ecologically or culturally sensitive areas. Given the increasing population due to the military buildup and reduction in access sites, there may be some areas where public access may not be desired to manage impacts to critical resources. Please consider adding an environmental evaluation to the inventory of public access sites, and an assessment of how increased access needs can be addressed in a sustainable manner through regulatory and other management techniques.
- (9) Please describe the actions needed to be undertaken to enhance the probability that any revisions to the public access laws or conditions will be adopted by the legislature or Agencies. What needs to be done in advance to ensure that that the changes will be approved? These activities should be included as subtasks in the strategy.
- (10) What has hampered efforts in the past? What will you do differently?
- (11) Likelihood of success: What about the lack of capacity for the lead public access agency? Will this strategy address this issue?
- (12) Strategy workplan: Year 2 schedule seems ambitious. Seems more reasonable to implement over 3 years.

***Strategy 2– Develop a Cumulative and Secondary Impact Policy for Guam***

- (13) The strategy calls for the development of a CSI policy that “will assist the Government of Guam by having a better understanding of the cumulative loss of its valuable resources and how a particular development will impact a community and its resources.” Although elsewhere in the strategy it talks about a mitigation requirement.

As written it is not clear if the policy will require addressing the cumulative and secondary impacts to reduce the loss of resources. We suggest that the policy require Guam government to assess CSI from proposed developments.

(14) The strategy does not reflect the priority needs and gaps identified in the assessment. What about updating fishing and harvesting regulations?

(15) Many states have had policies requiring them to avoid, minimize or mitigate cumulative secondary impacts; however, these policies are not very effective unless the state or territory has a methodology for assessing those cumulative impacts.

Therefore, in addition to developing a policy to assess CSI, the policy should call for the avoidance, minimization or mitigation of CSI. The program change should clearly provide for the development of a methodology to assess CSI that might be included in the overall policy along with appropriate data requirements.

(16) Section III: Missing, please describe the needs and gaps addressed

(17) Section IV: Missing, please describe the benefits to coastal management.

(18) Section V Likelihood of success: How supportive are the stakeholders and legislature to the development of a policy and methodology to assess CSI? Are there activities that need to be included in the Strategy to enhance their support needed for adoption of the policy and methodology?

(19) Section VI workplan: Suggest adding a few additional activities as part of the strategy to the table on the bottom of the page after “develop CSI policy and craft language for mitigation law.”

- Outreach education tasks necessary to enhance probability of adoption
- Proposed Adoption of New Law (target date)
- Training for Guam Coastal program staff to understand and use methodology to implement policy (if necessary)

(20) Section VII Fiscal and Technical Needs: What do you anticipate the total cost to be? We suggest allocating sufficient 309 funds incase additional funding sources aren't secured.

### **Strategy 3– Energy and Government Facility Siting: Green Government Building Pilot Project Energy and Government Siting**

(21) This task is probably more appropriately placed under the coastal hazards enhancement area as a means to reduce greenhouse gases and mitigate climate change.

(22) Energy and Government facility siting generally addresses development of rational procedures to guide the siting or location of large energy or government facilities in a

manner that avoids, or minimizes environmental impacts of those facilities, and precludes the obstruction of needed projects because of unsubstantiated local objections.

- (23) While the project has a great degree of merit, as a 309 project it is weak because there does not appear to be a program change. This project is really about generating interest in green retrofitting buildings and developing an action plan to retrofit government buildings and as such is not a program change. As I understand it the project calls for developing an inventory of priority government buildings that could be retrofitted and BMPs/design changes to enhance “green/sustainability” of structures that is then submitted to the governor and legislature for funding. Also it is not clear that 309 funds could not be used to pay for BMPs, or retrofits. Having said that, this would be an excellent 306 project.
- (24) Section III Needs and Gaps Addressed: Will this strategy develop a policy on energy and government facility siting?
- (25) Section VI Strategy work plan. There doesn’t appear to be a clear nexus between the Enforceable Policies/Outcomes listed and the task description or work plan in the previous pages.
- (26) Section VI Budget. Needs more detail about contractual cost.

***Strategy 4 –Tsunami Inundation Study for Southern Guam***

- (27) This effort does appear to identify a program change. However, it would be beneficial if the final strategy more clearly articulated how and when the study will be used to change setback requirements to account for Tsunami inundation areas. Please clarify what findings the study will provide; and generally what kinds of revisions are anticipated to Title 18, 19 and EO 78-20 Seashore Reserve, and building codes.
- (28) How is the Tsunami study linked to the report on alternative methods to improve and stabilize erosion along Guam’s shoreline?

Once again, thank you for submitting a well-organized draft 309 Assessment and Strategies document. The responses to these comments may be addressed as part of the revised Assessment and Strategies; it is not necessary to reply to this letter or address the comments in a separate correspondence. Bill O’Beirne and I would like to schedule a call with you and your staff in early January to discuss our comments. I’ll contact you soon to arrange scheduling. We look forward to working with you on revising your document on or before the deadline of February 28, 2011.

Sincerely,  
Kathy Chaston  
Coastal Management Specialist