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Frank M. Rabauliman
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May 17, 2016

NOAA Office of Coastal Management
1305 East West Highway
Silver Spring, MD 20910

Re : CNMI Final 2016 - 2020 309 Assessment Strategy and Report

Dear Joelle,

Enclosed please find the Commonwealth of the Northern Mariana Island's Final 2016 - 2020 309 Assessment Strategy and Report. We are submitting this document for NOAA's review and approval. We appreciate the opportunity to develop this updated five-year strategy and report.

Thank you in advance for your assistance and support.

Sincerely,

FRANCES A. CASTRO
Director, Division of Coastal Resources Management

Attachment

2016–2020 Section 309 Assessment and Strategy Report

Commonwealth of the Northern Mariana Islands

May, 2016

This 5-year Assessment Report and Strategy furthers planning efforts of and was funded by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration. The views expressed herein are those of the authors and do not reflect the views of NOAA or any of its subagencies.

This report is available on the Division of Coastal Resources Management's publications page at: http://crm.gov.mp/sec.asp?secID=20

For more information contact DCRM's Lead Coastal Resources Planner, Erin M. Derrington, at: erinderrington@becq.gov.mp or (670) 664-8510.

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Glossary of Key Acronyms and Terms

ACE	U.S. Army Corps of Engineers
APC	Area of Particular Concern
BECQ	Bureau of Environmental and Coastal Quality
BMP	Best Management Practice
CAP	Conservation Action Plan
CNMI	Commonwealth of the Northern Mariana Islands
CMP	Coastal Management Program
CRI	Coral Reef Initiative
CSI	Cumulative and Secondary Impacts
CUC	Commonwealth Utilities Corporation
CZMA	Coastal Zone Management Act
DCRM	Division of Coastal Resources Management
DEQ	Division of Environmental Quality
DFW	Division of Fish and Wildlife
DLNR	Department of Lands and Natural Resources
DOD	U.S. Department of Defense
DPL	Department of Public Lands
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Risk Maps
GIS	Geographic Information System

HANMI	Hotel Association of the Northern Mariana Islands
HPO	Historic Preservation Office
HSEM	Homeland Security and Emergency Management
MINA	Micronesia Islands Nature Alliance
MOU	Memorandum of Understanding
MSOs	Marine Sports Operators
MVA	Mariana Visitors' Authority
NMC CREES	Northern Marianas College Cooperative Research Extension and Education Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resource Conservation Service
OCRM	Office of Ocean and Coastal Resources Management
RAM	Rapid Assessment Methodology
SAMP	Special Area Management Planning
SLR	Sea Level Rise
SLUMP	Saipan Lagoon Use Management Plan
SSMP	Standard State Mitigation Plan
TNC	The Nature Conservancy
VA	Vulnerability Assessment
Zoning	CNMI Office of Zoning

Contents

I. Introduction

Section 309 of the Coastal Zone Management Act (CZMA), as amended in 1990 and 1996, established a voluntary coastal zone enhancement grants program to encourage states and territories to improve their program efforts.

The CZMA identifies nine coastal zone enhancement areas where work should be focused: wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management planning, ocean resources, energy and government facility siting, and aquaculture. In addition to these, endangered and threatened species and marine protected areas are considered priorities across all enhancement areas.

Under § 309, the U.S. Secretary of Commerce is authorized to make awards to the CNMI Department of Coastal Resources Management (DCRM) to implement federally approved program changes that support objectives of one or more of the enhancement areas. To be eligible for funding, DCRM must submit an appropriate § 309 Assessment and Strategy document to NOAA for evaluation every five years. This report is the sixth § 309 assessment of the CNMI Coastal Management Program (CMP), with prior evaluations completed in 1993, 1997, 2001, 2006, and 2011.

National guidance for the report was provided by the Office of Coastal Resources Management (OCRM) in the form of a questionnaire framework to facilitate consistency in responses from the many state and territorial programs, and to ensure that sufficient factual data was considered when developing a program strategy.

Assessments and strategies for 2016–2020 were developed on the basis of information gained by survey questionnaires, research, interviews with resource managers in several key agencies, stakeholder meetings, and written comments. As such, the report provides a factual basis for our coastal management program priorities and a strategy framework to ensure program progress. The report was written to help our program recognize issues that may be affecting our coastal areas, identify areas where the CRM program can be strengthened, and determine the effectiveness of past efforts.

The 2016–2020 Section 309 Assessment shows a need to maintain a “high” priority focus on Coastal Hazards, Cumulative and Secondary Impacts, Ocean Resources, and Wetlands enhancement areas, and Special Area Management Planning as a medium priority area. The priority focus on Marine Debris and Aquaculture enhancement areas have been increased from “low” in the previous report to “medium” in this assessment. Other enhancement areas of Public Access and Energy and Government Facility Siting are important, but it has been determined that either the state already has effective management mechanisms for dealing with these coastal issues or that these areas will be most effectively addressed outside of CZMA § 309. These areas are deemed as “low” priority for the Section 309 Assessment.

II. Summary of Completed 309 Efforts 2011 - 2015

Review and Guidance Regarding CRM Wetlands Policy

Issue Areas: Wetlands

A "*Wetlands of the Northern Mariana Islands*" poster and "*Wetland Plants of the Northern Mariana Islands*" booklet were designed and printed to raise awareness of the importance of wetland protection in the CNMI. Each highlighted DCRM's role in regulation of wetlands. These materials are made available to the public, and were distributed to teachers and students at the 2015 Environmental Expo in conjunction with a short 309-driven presentation.

A review of the current DCRM and other agency regulations pertaining to wetlands resulted in the report "*A summary of background to the CRM wetland regulation changes and steps for moving forward*". This document included recommendations for how to proceed with wetland regulation and policy amendments.

Preliminary Exploration of Sea Level Rise and Associated Climate Change Impacts

Issue Areas: Cumulative and Secondary Impacts, Coastal Hazards, Ocean Resources, Public Access

A CNMI Climate Change Working Group was established in the summer of 2012 to assess coastal threats of sea level rise and associated climate change impacts. Over thirty different agencies and organizations have participated in and contributed to CCWG meetings over the past two years. Using the CCWG as a source of information and data collection, a vulnerability assessment for the island of Saipan was completed in January 2014 (*2014 Saipan Vulnerability Assessment*). Vulnerability assessments for the islands of Tinian and Rota were completed and published in September 2015.

Based upon the vulnerabilities highlighted in the *2014 Saipan Vulnerability Assessment*, the Coastal Hazards Area of Particular Concern (APC) will be updated to account for sea level rise and climate change. A final draft of this update was completed in 2015 and proposed changes will be presented to the Agency Board and adopted into DCRM's regulations in conjunction with additional regulatory updates.

Development of Highly Erodible Soils and Highly Permeable Soils Guidance

Issue Areas: Cumulative and Secondary Impacts, Special Area Management Planning

After a CMP-driven review of the current regulations and discussions with NOAA and NRCS staff, it was determined that rather than creating highly erodible and highly permeable soils APCs, it would be more effective to address the issue of soil erosion by updating DCRM regulations throughout. A review of the DCRM regulations revealed several sections where soil erosion could be addressed. These sections were revised to better address soil erosion and

sedimentation, and the changes were adopted in January 2015.

A "*Soil Erosion and Stormwater Sedimentation*" poster and brochure were designed and printed outlining the problems of soil erosion, and current regulatory measures that are in place to prevent soil erosion in the CNMI, including those of the DCRM, Division of Environmental Quality, and U. S. Environmental Protection Agency. These were distributed at outreach events including the Environmental Expo and festivals, and were delivered to government offices and public schools as well as through the DCRM office to interested applicants; they are also available online.

Revision of the Saipan Lagoon Use Management Plan

Issue Areas: Cumulative and Secondary Impacts, Special Area Management Planning planned

The Saipan Lagoon User Survey & Mapping project was completed in February 2016, which used participatory mapping to map the locations of lagoon uses. This information will help inform the update and revision of the Saipan Lagoon Use Management Plan (SLUMP). A Request for Proposals to initiate the SLUMP was published and closed in April 2016 and a contractor will be selected and the revision and update will commence. This project will be completed no later than summer of 2017. Once the update is complete, DCRM will use this information to update our regulations. We anticipate the next review and revision will occur in the 2021-2025 Assessment and Strategy cycle.

III. Section 309 Enhancement Area Assessment

This section addresses the questions provided in Appendix A of NOAA's 2014 Coastal Zone Management Act Section 309 Program Guidance for the 2016 to 2020 Enhancement Cycle, detailing "Phase 1" information for each of the nine enhancement areas. The purpose of these questions and responses is to determine the status of each enhancement area since the previous Assessment. The questions and answers also help to identify program changes needed to expand the program's ability to meet enhancement area objectives. Each enhancement area is ranked as a high, medium, or low priority based upon this assessment process, as informed by the priorities and outcomes identified in the previous Assessment and future planning objectives. These priority rankings are intended to reflect the applicability of Section 309, with an emphasis on potential program changes to address identified challenges and management concerns, but may also consider and further the enhancement area's priority for overall management of the coastal zone beyond the use of Section 309 funding.

Pursuant to Section 309(d)(1), the final determination of each program's priority enhancement areas rests with OCRM, however, this determination is made with full consultation with CMPs during development of the Draft Assessment and with due consideration of public comment. "Phase 2" assessment information reflected in Appendix B of NOAA's 2014 Coastal Zone Management Act Section 309 Program Guidance for the 2016 to 2020 Enhancement Cycle is included for the four "High Priority" enhancement areas: Coastal Hazards, Cumulative and Secondary Impacts, Ocean Resources, and Wetlands. The purpose of these assessments is "to quickly determine whether the enhancement area is a high priority enhancement objective for the CMP" and Phase 1 and to "help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems" in Phase 2. The following enhancement area assessments resulted from analyses of information gathered through interviews, stakeholder meetings, written comments, project reports, and input from key members from the CNMI's Coastal Management Program. The term "community" is used in the assessments below to mean the four island municipalities: Saipan, Tinian and Aguiguan, Rota, and the Northern Islands.

In 2015, DCRM held two meetings involving agency and nonprofit representatives as well as marine service operators (MSOs) to obtain stakeholder feedback regarding challenges and opportunities for DCRM's priority enhancement areas. The nine survey respondents at the agency and NGO stakeholder meeting represented MINA, HANMI, MVA, NPS, Zoning, DPL, DFW, HPO, and BECQ-DEQ. When asked to rank the top three high-priority areas for DCRM, the majority of agency and nonprofit representatives ranked wetlands a top priority, followed by coastal hazards, public access, and cumulative and secondary impacts. Representatives of MSOs ranked coastal hazards as their lead concern, followed by marine debris, cumulative and secondary impacts, and ocean resources. This feedback, which is discussed in more detail in Section V of this report, was taken into consideration as DCRM developed this 309 Assessment Report and Strategy for 2016 - 2020.

The following assessments and priority rankings consider the four communities of Saipan, Tinian, Rota, and the Northern Islands of the CNMI.

Wetlands[1]

Section 309 Enhancement Objectives: Protection, restoration, or enhancement of the existing coastal wetlands base, or creation of new coastal wetlands. § 309(a)(1).

Resource Characterization:

1. *Land cover data – trends for USACE wetlands and wetland types*

Extent, Status, and Trends of Wetlands in the CNMI*		
Current state of wetlands in 2011 (acres)	641.79 Total Acres on Saipan, Tinian, Rota, and Pagan	
Percent net change in total wetlands (% gained or lost)	1996–2011	2006–2011
	N/A	N/A
Percent net change in freshwater (palustrine wetlands) (% gained or lost)	1996–2011	2006–2011
	N/A	595.05 acres total
Percent net change in saltwater (estuarine) wetlands (% gained or lost)	1996–2011	2006–2011
	N/A	46.74 acres total
*No change reported due to lack of updated C-CAP data. Baselines indicated here from 2005 C-CAP data. C-CAP updates for CNMI are underway, but no new data is available for the current reporting cycle. CNMI has a more expansive definition of wetlands than the USACE definition applied here, and local mapping updates are also underway that will provide enhanced data regarding land cover and management trends.		

2. *Results of additional state- or territory-specific data or reports on the status and trends of coastal wetlands since the last assessment to augment the national data sets.*

The Bureau of Environmental and Coastal Quality's Department of Environmental Quality (BECQ-DEQ) conducts year-round watershed monitoring and provides quarterly water quality and nonpoint source program reports. The 2014 Integrated Report, discussed in more detail below, identifies watershed quality management challenges and impairment of Lake Susupe, the only freshwater lake in CNMI that has multi-year water quality data available.[2] The most recent quarterly reports confirm ongoing violations including unpermitted dredge and fill as well as water diversion and incompatible activities such as siting of pig farms and septic drain fields in local wetlands, highlighting use management challenges that continue to degrade the quality and extent of wetlands in the CNMI.[3]

[1] For the purposes of the Wetlands Assessment in this report, wetlands are "those areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3(b)). CNMI's definition of wetlands on public lands requires only one of these three criteria be present (Commonwealth Code § 4111, PL 9-72 § 3). Mapping efforts supported by CZMA § 306 are currently underway at DCRM to identify, delineate, and rate wetlands in the Northern Mariana Islands. These efforts are focusing on Saipan, Tinian, and Rota through 2015, and may be expanded to Pagan and other northern islands after this reporting period.
[2] BECQ-DEQ, 2014.
[3] BECQ-DEQ, 2015a; BECQ-DEQ, 2015b.

Federal datasets for wetlands in the CNMI include NOAA's 2005 C-CAP, which was used to populate initial cover data included in the land cover chart on page 6 of this subsection, and USFWS' 2014 National Wetlands Inventory (NWI) for Saipan, Tinian, and Rota (no data available for the Northern Islands). While available, the resolution on this data is still somewhat coarse for planning purposes (Figures at the end of this section for examples of NWI mapping resolution). Efforts are currently underway to ground-truth these layers on Saipan and Tinian, and to develop additional layers for Rota and Pagan. Once mapping data has been standardized, DCRM will be able to more accurately report on changes in land cover and wetland conversion trends throughout the CNMI.

Management Characterization:

As reported in the 2011 - 2015 Assessment and Strategy Report, loss of open water due to exotic plant invasion and conversion of year-round wetlands to perennial wetlands due to sedimentation continue to be considered threats to wetland functions in the CNMI. Overgrowth by *Eichhornia crassipes* (water hyacinth) decreases open water habitat necessary for the Mariana Common Moorhen (*Gallinula chloropus guami*) and wetland vegetation overgrowth of scarlet gourd vine significantly degrades Nightingale Reed Warbler (*Acrocephalus luscinia*) habitat; both of these bird species are listed as endangered. Constructed mitigation wetlands in the CNMI include those cared for by local government agencies, federal government agencies (USDA NRCS), and private businesses. The 1989 the National Wetlands Inventory indicated there were ~590 acres of palustrine wetlands, 40 acres of lacustrine wetland – an estimated total of 630 acres – and over 1000 linear feet of riverine habitat on Saipan.[4] Based on 2005 C-CAP layers, wetlands cover less than 2% of the total land area in CNMI.[5]

In addition to being limited in extent, development pressures pose challenges to the quality of surface waters. In 2014, BECQ's Division of Environmental Quality reported that 93% of CNMI's surface waters were not meeting water quality standards (Table 1). There are limited data available regarding water quality in CNMI's wetlands: the only lake which is monitored is Lake Susupe in the Susupe Watershed on Saipan, and additional data are needed to assess Lake Susupe's attainment of designated uses. However, widespread watershed degradation is well documented in Saipan, reflecting numerous causes of impairment that are associated with impacts of development, alteration, and pollution of wetlands (see Tables 2 and 3 included at the end of this subsection). Bacteriological and dissolved oxygen data collected since 2010 indicate that Lake Susupe is severely impaired (Table 4), and a 2008 assessment reported the presence of several invasive species,[6] highlighting several management challenges for Saipan's most significant wetland system.

[4] National Wetlands Inventory, USFWS, 1989.
[5] C-CAP 2005; BECQ-DEQ, 2014.
[6] BECQ-DEQ, 2014.

DCRM is continuing to explore ways to improve compliance with federal mitigation wetland maintenance requirements and "no net loss" policies as well as to enhance protection of local wetlands. It is important to note that wetlands are defined more broadly by CNMI (for public lands) and USFWS than they are by the US Army Corps of Engineers, a differentiation that has presented some challenges to consistent assessment and regulation of wetlands in the CNMI. DCRM is working to survey existing wetland conditions and a valuation methodology has been developed to inform future wetland management, regulations, and policies. In the future, DCRM hopes to increase intra- and inter-agency coordination to improve wetland protection and standardize restoration and mitigation methodologies to improve the quality of this enhancement area and achieve increased watershed-based protection of these valuable ecosystems.

1. *Significant changes at the state or territory level (positive or negative) that could impact the future protection, restoration, enhancement, or creation of coastal wetlands since the last assessment.*

Management Category	**Significant Changes Since Last Assessment** (Y or N)
Statutes, regulations, policies, or case law interpreting these	N
Wetlands programs (e.g., regulatory, mitigation, restoration, acquisition)	N

There have been no significant changes to wetlands management during the last planning period. Wetlands and mangroves are regulated as "Areas of Particular Concern" and any project that would have a significant adverse impact on natural drainage patterns, the destruction of important habitat, and the discharge of toxic substances is prohibited (§ 15-10-330(b)(1)), national ecological and hydrological processes of mangrove areas must be preserved (§ 15-10-330(b)(2)), and critical wetland habitat must be maintained and, where possible, enhanced (§ 15-10-330(b)(3)). Despite APC regulations that encourage protection and enhancement and prohibit significant adverse impacts and unacceptable uses such as filling wetlands, a recent increase in development pressure has brought increasing violations of these policies—there have been three wetland-specific enforcement issues encompassing numerous use violations in the wetlands APC in the last year alone. This increase in development and subsequent permit violations is itself a change that will require continued updates of DCRM policies to ensure the wetland protection goals outlined in the APC regulations and permit conditions are achieved.

Threats to wetlands, including development/fill and alteration of hydrology, are increasing due to limited land availability, lack of education, and inadequate tools to support permitting and enforcement in this APC—shortcomings that DCRM will continue to address in the upcoming planning cycle. Heightened development pressures are a leading threat to the protection of

wetland quality and functions in the CNMI, especially on Saipan and Tinian, which are experiencing a rapid resurgence of development proposals.

Development/Fill:

There have been numerous instances in the past where CRM has become aware of illegal filling of wetlands on private or leased public land. Though DCRM does have a map of wetland areas, due to the resolution of this data it is difficult to enforce regulations at some of the smaller wetland sites, especially those on private lands where information on wetland boundaries is less reliable. With limited land space, especially on Saipan, private landowners are often reluctant to report filling activity. This may be partially due to a lack of knowledge regarding the importance of wetlands and/or misconceptions regarding DCRM's permitting process. Though the government has tried to purchase or exchange remaining wetlands for public land in the past, there are not adequate funds to compensate landowners and the status of this program is currently uncertain.

Alteration of hydrology:

DCRM enforcement staff report that the CNMI's wetlands are at high risk of hydrologic alteration due to illegal filling. Further, with heavy rain much of the year, it has been found that wetlands are sometimes filled or hydrologically altered by landowners to redirect standing water from their properties. DCRM is committed to increasing public education and enhancing permitting and enforcement mapping tools as well as regulations in order to address threats to wetland hydrology.

2. *For any management categories with significant changes briefly provide the information below.*
   a. Describe the significance of the changes;
   b. Specify if they were 309 or other CZM-driven changes; and
   c. Characterize the outcomes or likely future outcomes of the changes.

During the last planning cycle education and outreach efforts to support wetland protection and restoration included the development and distribution of a “Wetlands of the Northern Mariana Islands” poster and “Wetland Plants of the Northern Mariana Islands” booklet, which were designed to raise awareness of the importance of wetland protection in the CNMI. Each highlighted DCRM’s role in regulation of wetlands, and were supported by section 306 funding. While these materials have been distributed at some outreach events to support primary and secondary education activities, use in campaigns to address more specific user groups such as developers and land owners is being planned through upcoming project tasks. Continued regulatory enhancements and education efforts are anticipated, with the expectation that these efforts will expand DCRM’s ability to identify priority wetlands for conservation and help build public support of wetland protection and restoration efforts.

While no significant changes in regulations, policies, or programs occurred in the last planning cycle work to update GIS layers for wetlands and mangroves and develop and apply rapid assessment valuation is also ongoing and will inform future recommendations. Future outcomes are expected to include improved mapping capabilities that will be used to support enhanced management and protection of wetland ecosystems.

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High _X_

Medium _____

Low _____

2. *What is the justification for this priority level?*

The Wetland Enhancement Area was given a high level of priority in the 2006 and 2011 reports. DCRM will maintain a high level priority for this enhancement area as threats to wetland resources are increasing, numerous opportunities to address increasing resource pressures exist, and due to the fact that this focus area is supported by projects and recommendations from the previous 309 Assessment (Strategy 1). The CNMI has relatively few wetland areas, making identification and conservation of these areas a critical need. Localized flooding and stormwater quality issues that already present challenges, especially on Saipan, will only increase if wetland acreage continues to decrease and functions continue to be degraded. High-quality wetlands in particular provide home to two federally listed endangered species: the Mariana Common Moorhen and the Nightingale Reed-Warbler, which further increases the need to conserve these critical areas.

Stakeholders throughout the CNMI are increasingly recognizing the importance of wetland conservation and restoration, but few regulatory tools and programs encourage or incentivize changes in behaviors or management trends. Public education remains an important program objective that will help management agencies achieve their "no net loss" policy. DCRM will continue to work to expand public education and inter-agency coordination to achieve this goal. DCRM will also continue to update wetland map layers and will apply the rapid assessment valuation methodology developed under NA14 to identify and prioritize critical environmentally sensitive areas. Agency regulations will be updated to reflect new data and expanded management policies. Wherever possible and politically feasible, DCRM will work to build inter-agency coordination to further protect these valuable resources.

Phase II Assessment - Wetlands

In-Depth Resource Characterization

Purpose: To determine key problems and opportunities to improve the CMP's ability to protect, restore, and enhance wetlands.

1. *Three most significant existing or emerging physical stressors or threats to wetlands within the coastal zone.*

	Stressor / Threat	Geographic Scope - (throughout coastal zone or specific areas most threatened)
Stressor 1	Development	Primarily Saipan and Tinian
Stressor 2	Pollution	Primarily Saipan and Tinian, but also some watershed management challenges in Rota as well as current concerns due to proposed land use activities in Pagan
Stressor 3	Invasive species	Saipan, Tinian, and to some degree in Rota and the Northern Islands

2. *Why these are currently the most significant stressors or threats to wetlands within the coastal zone.*

While wetlands are limited in extent, covering about 2% of the land in Saipan, Tinian, Rota, and Pagan, they provide habitat for unique and endangered plants and animals as well as function to provide stormwater runoff storage and pollutant uptake. The 1991 CNMI Wetland Conservation Plan states that only 36% of the original wetland acreage still exists, and DCRM has adopted a policy of no-net-wetland loss.[7] Despite this goal, growing development pressures and associated threats of pollution, filling, and spread of invasive species, as well as hydrological alteration are continuing to threaten wetlands. DCRM is working to ground-truth and update wetland layers in order to better inform permitting decisions and support enforcement actions when wetland areas are impacted. Notably, during the January 2015 stakeholder surveys, several respondents emphasized the importance of continued support of watershed planning to address pollution from urban runoff impacting natural resources and human health in wetlands and associated waters.

[7] CNMI Wetland Conservation Plan, 1991.

3. *Emerging issues of concern which may lack sufficient information to evaluate the level of the potential threat.*

Emerging Issue	Information Needed
Impacts of climate change on wetlands and water resource management.	Localized data on precipitation patterns and continued development of localized / regional modeling.

In-Depth Management Characterization:

Purpose: To determine the effectiveness of management efforts to address identified problems related to the wetlands enhancement objective.

1. For each additional wetland management category below that was not already discussed as part of the Phase I assessment, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred since the last assessment.

Management Category	Employed by State or Territory (Y/N)	Significant Changes Since Last Assessment (Y/N)
Wetland assessment methodologies	Y – Rapid Assessment Methodology (RAM) finalized in 2015.	Y – RAM finalized in 2015, adopted as rule in January, 2016.
Wetland mapping and GIS	Y – mapping and ranking using RAM in progress for Saipan, Tinian, and Rota	Y – mapping and ranking using RAM in progress for Saipan, Tinian, and Rota
Watershed or special area management plans addressing wetlands	Y	N
Wetland technical assistance, education, and outreach	Y	N
Other (please specify)		

2. Management categories with significant changes since the last assessment, relationship to 309 or other CZM-driven changes, and likely outcomes of the changes.

DCRM has developed a rapid assessment methodology (RAM) for wetland valuation. An internal draft was available in September, 2015, and the field-tested version was finalized in December. Rulemaking is underway to support adoption and application of the RAM procedure. This tool, which was developed using CZMA funding, will be applied to implement existing wetland management policies as well as identify and ground-truth high priority protection areas moving forward. Rankings, which reflect the quality, size, and habitat functions of wetland, will be used to inform regulatory updates including the potential addition of enhanced buffer and mitigation guidance for permitting decisions as well as support enforcement proceedings when necessary.

3. Conclusions of studies illustrating the effectiveness of the state's or territory's management efforts in protecting, restoring, and enhancing coastal wetlands since the last assessment or assessment of lacking information to support management efforts.

Current C-CAP data are available from 2005. The lack of more recent high-resolution data makes it difficult to report change of land cover. DCRM anticipates that producing current ground-truthed wetland layers will support further protection, restoration, and enhancement efforts. Additionally, there is very limited data available on the extent and quality of mangroves and streams. There are few streams in CNMI, most of which are ephemeral, and thus riparian wetland systems are rare. Mangroves on Saipan were reported as covering seven hectares in 1984 and five hectares in 1990.[8] DCRM is currently engaged in efforts to update and ground-truth geo-referenced maps of wetlands, streams, and mangroves in CNMI, which will provide important data to support ongoing management efforts in this enhancement area.

Identification of Priorities:

1. Considering changes in wetlands and wetland management since the last assessment and stakeholder input identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively respond to significant wetlands stressors.

Management Priority 1: Adopt BMPs to Protect and Enhance Wetlands

Description: Despite ongoing efforts to achieve wetland protection and watershed level management planning, identified gaps reflect inconsistent application of best management practices and enhancement tools. Lack of uniformly applied buffers and conservation mechanisms or incentives make wetland protection and enhancement a challenge, highlighting opportunities strengthen legislation and regulations to mitigate terrestrial and marine water quality management impairments in order to support healthier coastal ecosystems in the CNMI.

Management Priority 2: Establish Conservation, Protection, Restoration and Enhancement Tools

Description: Tools such as mitigation banking, permittee-pay, and in-lieu fee programs are currently unavailable in the CNMI, perpetuating land use policies that do not provide optimal wetland protection or incentivize changes in management behaviors. Thus, wetland degradation through hydrological alteration, including illegal dredge and fill, illicit discharge, and uncontrolled invasives continues to be a management challenge. Opportunities exist to design and implement area appropriate conservation tools to support watershed-targeted conservation and restoration efforts.

Management Priority 3: Protect High-Value Wetlands through Comprehensive Watershed-based

[8] Falanruw, M. C., T. G. Cole and A. H. Ambacher. 1989. *Vegetation survey of Rota, Tinian, and Saipan, Commonwealth of the Northern Mariana Islands.* Pac. SW Forest and Range Expt. Stn. Resource Bulletin PSW-27.
Mueller-Dombois, D. & F.R. Fosberg. 1998. *Vegetation of the tropical Pacific Islands.* Springer-Verlang, New York 733 pp.; accessed from FAO Data Repository, http://www.fao.org/docrep/007/j1533e/J1533E77.htm.

Planning and Management Prioritization

Description: A 1996 Interagency Report to the Governor recommended streamlining the wetland regulatory framework, maximizing benefits to wetlands from compensatory mitigation, implementing a "no net loss" policy and standardizing assessment methodology.[9] While the 2005 Saipan Wetland Management Plan did assign wetlands values, in the past there was no standardized mechanism with which to identify, assess, and protect high-value wetlands in CNMI. In 2015 the Rapid Assessment Methodology for CNMI was published; DCRM is currently in the process adopting this methodology in order to uniformly apply this tool. Moving forward DCRM plans to train agency staff and consultants in how to use this assessment, and will reassess opportunities to pursue comprehensive wetlands management and regulatory enhancement opportunities. By incorporating high-priority protection and enhancement area management into watershed-based planning efforts, DCRM will be able to work more collaboratively with other agencies and stakeholders to address impacts from development and pollution in the watersheds of the CNMI.

2. Priority needs and information gaps the CMP has to help it address the management priorities identified above.

Priority Needs	Need? (Y/N)	Brief Explanation of Need / Gap
Research	Y	Research to support adoption of appropriate BMPs will be instrumental in guiding future policies, regulations, and legislation.
Mapping / GIS	Y	Mapping / GIS efforts are currently ongoing.
Data and information management	Y	New Mapping / GIS data will be incorporated into developing data and information management system. Support of collection of surface water quality data may also further management objectives. CNMI-specific wetland plants identification guide would support further refinement of the RAM and continued comprehensive management planning.
Training / Capacity building	Y	Intra- and inter-agency and stakeholder training are needed to standardize wetland delineation and application of new valuation protocols, including use of GIS. Technical support would also be helpful to guide the re-convened Watershed Working Group or similar ecosystem-scale focused planning body.
Decision-support tools	Y	Decision-support tools to guide permitting conditions and enforcement actions would further enable an agency-wide standardized approach to wetland management.
Communication and outreach	Y	Education and outreach efforts would support ongoing and expanded wetland management focus, and would be necessary to build buy-in of new enhancement and conservation programs.

[9] Joint Federal / CNMI Working Group, Report to Governor Frolian C. Tenorio, 1996.

Enhancement Area Strategy Development:

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

Yes __X___ No _____

2. Why a strategy will or will not be developed for this enhancement area.

Strategies are needed to mitigate wetland loss and degradation in CNMI. Development of conservation tools and establishment of enhanced protection mechanisms for wetlands will be necessary to change behaviors and current development patterns that do not reflect current best management practices of these critical systems. This enhancement area was identified as a high priority management area by DCRM staff and agency stakeholders; furthermore, the CNMI legislature has expressed interest in supporting expanded watershed level planning and resource protection, making management objectives of this enhancement area such as adopting BMPs, establishing conservation tools, and supporting interagency collaboration to address wetland resource pressures particularly viable. Given the considerable use pressures in CNMI and potential impacts to wetland areas, DCRM will take actions to further protection relating to this enhancement area in the upcoming planning cycle.

Wetlands: Figures and Tables

Figure 1 – NWI Layers for Saipan, Tinian, and Rota
Maps and Positions Not to Scale

Table 1 – Wetland Designated Use Support Summary[10]

Designated Use	Size of Surface Waters				
	Total in State (acres)	Total Assessed (acres)	Supporting – Attaining WQ Standards (acres)	Not Supporting- Not Attaining WQ Standards (acres)	Insufficient Data and Information (acres)
CLASS 1 WATERS (All CNMI Fresh Waters)					
Support and propagation of aquatic and terrestrial life	669.7	620.6	43.3	577.3	49.1

Table 2 – Assessment of Saipan's Lakes and Wetlands Use Designations by Watershed[11]

		Saipan															
WATER BODY SEGMENT ID		12	13	14	15	16	17		18		19			20		21	22	23
							Isley		Susupe		W. Takpochau			Achugao				
							A	B	A	B	A	B	C	A	B			
	Designated Use	Kalabera	Talofofo	Kagman	Lao Lao	Dan Dan	(West)	(East)	(North)	(South)	(North)	(Central)	(South)	(North)	(South)	As Matuis	Banaderu	Managaha
Lakes	Aquatic Life									N								
	Fish Consumption									I								
	Recreation									N								
	Potable Water Supply									N								
	Aesthetic Enjoyment/others									F								
	CALM Assessment Category									5								
Wetlands	Aquatic Life		I	F		I	I		N		N			N				
	CALM Assessment Category		3	1		3	3		4c		4c			4c				

Table 3 – Assessment of Saipan's Coastal and Terrestrial Use Designations by Watershed[12]

WATER BODY SEGMENT ID		12	13	14	15	16	17		18		19			20		21	22	23
							Isley		Susupe		W. Takpochau			Achugao				
							B	A	B	A	C	B	A	B	A			
	Designated Use	Kalabera	Talofofo	Kagman	Lao Lao	Dan Dan	(East)	(West)	(South)	(North)	(South)	(Central)	(North)	(South)	(North)	As Matuis	Banaderu	Managaha
Coastal Waters	Aquatic Life	No new Nutrient Data, Decline in habitat	No new Nutrient Data	No new Nutrient Data	Poor Habitat	i	Poor Habitat	No new Nutrient Data	Good Habitat DO Exceeds No new Nutrient data	Fair Habitat, ***DO improves***	Poor Habitat, No new Nutrient data, DO exceeds	No new Nutrient data, DO exceeds	No new Nutrient data, DO exceeds	Poor Habitat, No new Nutrient data, DO exceeds	Poor/fair Habitat, No new Nutrients	Poor Habitat	F	Good Habitat, No new Nutrient data
	Fish Consumption	i	i	i	i	i	i	***Heavy metals detected in biota***	i	i	i	Mercury in Fish tissue	i	i	i	i	F	i
	Recreation	Enterococci exceeds	Enterococci exceeds	Enterococci exceeds, Sedimentation	Enterococci exceeds, Sedimentation	i	Enterococci exceeds	Enterococci exceeds	Enterococci exceeds	***Enterococi improved***	F	Enterococci exceeds	Enterococci exceeds	Enterococci exceeds	***Enterococi improved***	F	F	F
	Aesthetic enjoyment/others	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	5	5	5	5	2	5	5	5	5	5	5	5	5	5	5	1	5
Rivers and Streams	Aquatic Life	i	***Habitat supports natives***	***Habitat supports natives***	i		i		i		Introduced Species			***Habitat supports natives***		i		
	Fish Consumption	i	i	i	i		i		i		i			i		i		
	Recreation	i	i	i	i		i		i		i			i		i		
	Potable Water Supply	i	i	i	i		i		i		i			i		i		
	Aesthetic Enjoyment/others	*F*	*F*	*F*	*F*		i		F		N			F		*F*		
	CALM Assessment Category	*2*	*2*	*2*	*2*		3		2		4c			2		*2*		

Not Attaining Use Designation | Insufficient Information | Fully supporting Use Designation | No fresh water streams (See Table C-17 for Susupe Lake) | Impairment due to non-pollutant | ***Changes in bold italics***

[10] BECQ-DEQ, 2014.
[11] BECQ-DEQ, 2014.
[12] BECQ-DEQ, 2014

Table 4 – Lake Susupe Water Quality Monitoring Data[13]

COLOR LEGEND: = impaired; = severely impaired

Table VI-a. Lake Susupe Bacteriological Data

Fiscal Year	Number of Samples	Number of Violations	Percent Violations (%)
2010	20	2	10
2011	19	3	16
2012	19	1	5
2013	16	3	19

Table VI-b. Lake Susupe DO Data

Fiscal Year	Number of Samples	Number DO <75%	Percent (%)
2010	20	11	55
2011	18	12	67
2012	18	15	83
2013	16	8	50

13 BECQ-DEQ, 2014.

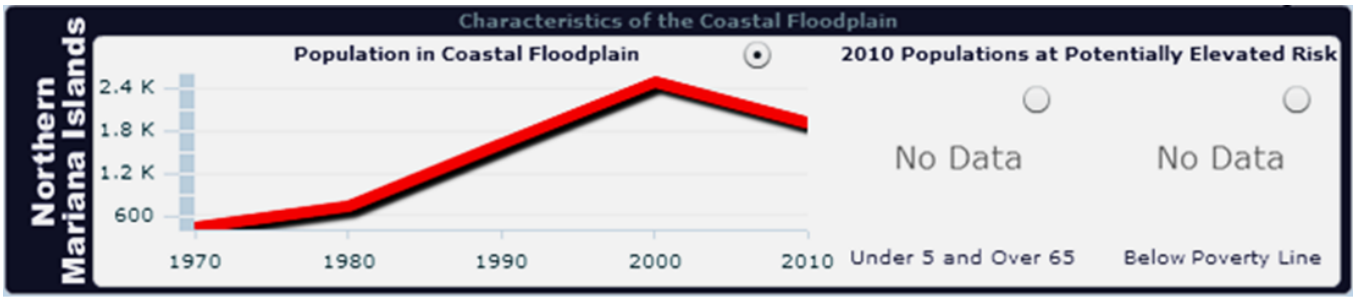
Coastal Hazards[14]

Section 309 Enhancement Objectives: 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. §309(a)(2)

Resource Characterization:

a. *Flooding data from NOAA's State of the Coast "Population in the Floodplain" viewer and summarized by coastal county through NOAA's Coastal County Snapshots for Flood Exposure.*

Population in the Coastal Floodplain			
	2000	**2010**	**Percent Change from 2000-2010**
No. of people in coastal floodplain[14]	2,480	1,912	-23%
No. of people in coastal counties[15]	69,221	53,883	-22%
Percentage of people in coastal counties in coastal floodplain	3.58%	3.55%	----------



Change in CNMI population located within the coastal floodplain. Source – NOAA State of the Coast

b. ***Shoreline Erosion*** *– No data reportable;* ***N/A – Island Territory***

c. ***Sea Level Rise*** *– No data reportable;* ***N/A – Island Territory***

[14] For purposes of the Hazards Assessment, coastal hazards include the following traditional hazards and those identified in the CZMA: flooding; coastal storms (including associated storm surge); geological hazards (e.g., tsunamis, earthquakes); shoreline erosion (including bluff and dune erosion); sea level rise; Great Lake level change; land subsidence; and saltwater intrusion.

[15] From NOAA State of the Coast "Population in the Floodplain" viewer: http://stateofthecoast.noaa.gov/pop100yr/welcome.html.

[16] From NOAA Digital Coast http://www.csc.noaa.gov/digitalcoast/data/stics.

d. ***Other Coastal Hazards:*** *General level of risk in the coastal zone for each of the coastal hazard*

Type of Hazard	General Level of Risk[17] (H, M, L)
Flooding (riverine, stormwater)	M
Coastal storms (including storm surge)	H
Geological hazards (e.g., tsunamis, earthquakes)	H
Shoreline erosion	H
Sea level rise	H
Great Lake level change	N/A
Land subsidence	L
Saltwater intrusion	H
Other (please specify) Military activities and debris – unexploded munitions, ongoing training exercises and related activities resulting in coastal habitat degradation	H

e. *Briefly list and summarize the results of any additional data or reports on the level of risk and vulnerability to coastal hazards within your state since the last assessment.*

Several studies and reports have been conducted or updated since the last 309 Assessment, including a 2014 update to the CNMI's Standard State Mitigation Plan, Climate Vulnerability Assessments for the Islands of Saipan (2014), Tinian and Rota (2015) and an assessment of shoreline erosion rates for the Garapan Watershed Conservation Action Plan (2013).

The 2014 Standard State Mitigation Plan (SSMP) completed by the CNMI Emergency Management Office was approved and distributed by the CNMI Office of Homeland Security and Emergency Management in spring of 2015. The 2014 SSMP notably includes the addition of climate change as a new hazard profile, and includes threats identified in the 2014 Saipan Vulnerability Assessment findings – results of a 309-driven CMP project – as well as mitigation actions to address risk profiles that are exacerbated by climate change impacts. The 2014 SSMP highlights risks of coastal hazards including coastal and inland flooding and storm surge in low-lying coastal areas (below 10 feet in elevation), coastal erosion, and droughts. The plan notes that flash flooding is especially problematic in urban areas due to the removal of vegetation and the replacement of ground cover with impermeable surfaces. While the SSMP notes that additional data regarding tsunamis is needed, it indicates that risk of inundation is considered "high" in coastal areas below the 10-meter inundation line and along the shore.

[17] 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.*

When discussing climate change impacts the plan notes that there is high level of confidence that the Western North Pacific region will experience increased mean surface air temperature, increased frequency of heavy precipitation and proportion of mean rainfall, rising mean sea level, enhanced wave energy level and more extreme ocean wave environments, and increased sea surface temperature and ocean acidification. These changes are likely to increase risks of coastal hazards and stress coral reef habitats that tend to mitigate these risks. Coastal inundation models included in the 2014 SSMP demonstrate that projected flooding due to 10-year storm as a result of climate-change induced sea level rise varies greatly depending on the model applied.

The plan includes projections for several models, noting that "if the USACE high curve is used to calculate 50 years of sea level rise, a 10-year storm in 2063 might flood over twice the area that it currently would. … In that particular scenario, increasing sea level by ~30% leads to a 116% increase in coastal inundation."[18] These increased storm surge and flood extents would have negative impacts to ecosystems, infrastructure, and communities within the flood zone. Discussion of climate change impacts in the 2014 SSMP concludes by emphasizing the important role that monitoring and impact assessments play in addressing overall climate impacts to marine ecosystem health.

Identified goals of the 2014 SSMP planning process for disaster mitigation in the CNMI include:

- Promoting sustainable development by reducing vulnerability to natural hazards in existing and planned development;
- To improve public awareness and decision making for land use planning by accurately mapping hazard-prone areas;
- To improve hazard risk management by the insurance industry and to help maintain adequate protection against any catastrophe for the region; and
- To promote community-based disaster preparedness and prevention activities with support from both the public and private sector.[19]

The next SSMP update is anticipated to be conducted on a five-year planning schedule. Coastal resource monitoring and management planning will continue to play important roles in hazard identification and mitigation in the CNMI.

Information concerning the following hazards is based on any risk assessments conducted for the 2014 and 2010 SSMPs, along with updates and additional findings from the Saipan Vulnerability Assessment and Garapan Conservation Action Plan. Additionally, DCRM partnered with the University of Guam's Sea Grant Program to develop, publish, and distribute a guide to coastal hazards and climate change impacts for homeowners in Guam and the CNMI, a CMP supported effort. This guide was published in September, 2015, and copies were received in the DCRM

[18] Standard State Mitigation Plan, 2014, pg. 113.

[19] Standard State Mitigation Plan, 2014.

office in October. Detailed CNMI-focused fact sheets will be produced as companion materials to this guide, and will reflect highlights of some of the information from recent reports, summarized below.

Flooding:

Saipan has a medium level of risk for riverine and stormwater flood hazards. This risk level is consistent with the 2011-2015 309 Assessment and Strategy, and the 2010 SSMP's characterization of flood hazards. The balance between the CNMI's highly porous geology and heavy, seasonal rainfall events ensures flood risk remain moderate in most areas; however, several areas on Saipan and Rota are prone to short-term flooding. These areas include Kanat Tabla, San Roque Village, Tanapag Village, Lower Base Industrial area, Garapan, and the Lake Susupe floodplain on Saipan. On Rota, certain sections of Song Song village are prone to stormwater flooding.[20]

Two additional factors – changes in sea level and changing land cover – may further increase future risk levels for flooding. Changes in sea level, and especially climate change-induced sea level rise, may create a backwater effect among some of the stormwater drainages. This is particularly true in the Garapan area, where heavy precipitation events may not drain into the Saipan Lagoon in an efficient manner.[21] This effect will enhance the potential for flooding throughout Garapan Village and other low-lying areas. Additionally, numerous proposals for extensive development related to tourism infrastructure, hotels and resorts, and road improvement projects are likely to significantly increase the amount of impervious surface on Saipan. This change in land cover may further increase flood risk levels over the next decade.

Coastal Storms & Surge:

The CNMI's greatest risks are associated with coastal storms and storm surge. As in the last 309 Assessment, these hazards continue to pose a high level of risk, and new studies suggest this risk will remain elevated in the coming decades. The *Saipan Climate Vulnerability Assessment* (2014) analyzed the extent and depth of coastal flooding due to storm surge, sea level rise, and a combination of both. Total water level rise on Saipan's west coast due to 10 and 50 year storms was included in modified bathtub models to assess inundation. These models suggest that Saipan's western coastal plain, and particularly the low-lying areas around Garapan and Lower Base, are highly exposed to coastal storms and surge. The Vulnerability Assessment also illustrated that with the addition of a moderate amount of sea level rise, coastal storm surge may breach a critical threshold along the shoreline, allowing for widespread inundation in Garapan's urban core and tourist district.[22]

[20] DCRM Rota Climate Vulnerability Workshop, 2014; Tinian and Rota Vulnerability Assessment, 2014; 2015 Rota CAP Update.
[21] Climate Change Vulnerability Assessment for the Island of Saipan, Greene & Skeele, 2014.
[22] See Figures 1-2 at the end of this section for analysis and mapping of two representative scenarios.

Geologic Hazards:

Geologic hazards continue to pose a high level or risk in the CNMI, particularly due to the high frequency and unpredictability of earthquakes. The 2010 CNMI SSMP contains a detailed summary of earthquake sources and history in the CNMI, and this information was summarized in the last 309 Assessment. No new studies or reports concerning CNMI earthquakes have been conducted since the last 309 Assessment, aside from USGS records of additional earthquakes that have occurred since 2011. No significant damage or impacts from these earthquakes were documented in the CNMI.

Tsunamis have not impacted the CNMI in recent history; however, the high level of earthquake activity throughout the Marianas Archipelago and the Western Pacific Basin in general has warranted additional study. In 2013 the NOAA Pacific Marine Environmental Laboratory (PMEL) completed a Tsunami Hazard Assessment of the CNMI.[23] The NOAA Tsunami Forecast Propagation Database was used to model potential tsunami impacts along the coasts of Saipan, Tinian, and Rota. These potential tsunamis were modeled using 349 distinct earthquake sources throughout the Pacific. Results show that a total of 26 potential earthquake scenarios pose tsunami hazards to the CNMI. In particular, a magnitude 9.0 earthquake originating from a source south of Japan could result in waves exceeding 11 meters in Saipan, and a magnitude 9.0 earthquake occurring in the East Philippines could trigger tsunami waves exceeding 3 meters at Rota and 4 meters at Saipan and Tinian. The degree to which Saipan's fringing reefs might attenuate wave energy and impacts is still uncertain.

Shoreline Erosion:

Shoreline erosion remains a concern for both private and public interests in the CNMI, particularly along the Saipan Lagoon shoreline and on Mañagaha Island. This hazard continues to pose a high level of risk, especially with the compounding effects of sea level rise.

In September 2012 the National Park Service lost a significant segment of pedestrian infrastructure due to chronic erosion on the west shoreline of American Memorial Park, Saipan (see Figure 3a). This event, combined with the loss of additional protective shoreline vegetation and trees at the Park, and along Beach Road generated elevated interest in erosion hazards, and consequently became a focal point in the Saipan Vulnerability Assessment.

Shoreline erosion and change rates were quantified for the years 2003, 2005, and 2011 using the USGS Digital Shoreline Analysis System.[24] Results indicate steady erosion of the Park's western shoreline, threatening additional infrastructure (see Figure 3b). It has also been noted that Mañagaha Island continues to erode, and has lost additional shoreline and endangered bird habitat along its east side since the last 309 Assessment.

[23] Uslu, Eble, Arcas & Titov, 2013.
[24] Greene & Skeele, 2014; Office of the Governor, 2013.

Sea Level Rise:

Sea level rise has been characterized as a high risk phenomenon due to its potential to complicate other coastal hazards in the 309 Assessment (e.g. shoreline erosion, surge, saltwater intrusion). While sea level changes and rise were not assessed in the last 309, the CNMI's Climate Vulnerability Reports studies suggest future implications on Saipan (*see* Sapain, 2014; Rota and Tinian 2015).

In 2013 and 2014 the Saipan Climate Vulnerability Assessment (VA) was conducted by the Division of Coastal Resources Management and published for local and regional distribution. The VA process included the development and analysis of nine future sea level scenarios based on climate change projections,[25] as well as modeled storm surge scenarios for the Saipan Lagoon.[26] Results of various VA study components, including Figures 1-3, indicate high levels of vulnerability to sea level rise along Saipan's western coastal plain, particularly for public and private infrastructure from the Micro Intersection on Beach Road, through Garapan, and throughout the Lower Base industrial area. The compounding effects of sea level rise and other climate phenomenon on the CNMI's coastal hazards will likely remain a high management priority.

Land Subsidence:

Land subsidence continues to have a low risk profile for the populated islands of the CNMI. While some historic events related to subsidence have been noted in the Northern Islands (see previous 309 Assessment), there is no record of anthropogenic land subsidence in the CNMI, and no substantial studies have been conducted in recent years.

Saltwater Intrusion:

Saltwater intrusion remains a concern in the CNMI, particularly for Saipan, and is characterized as high risk. The phenomenon has already been observed in response to high well withdrawal rates, drawdown effects, and drought conditions during the 1997-1998 El Nino.[27] Intrusion is expected to become more frequent due to increases in development and associated infrastructure demands, as well as rising sea levels.[28] Studies and assessments from the USGS[29] have demonstrated increases in salinity among Saipan's coastal wells following extreme La Nina events, when sea levels are typically higher than El Nino or ENSO-neutral years. Saltwater intrusion may become a more pressing issue along Saipan's western coastal plain in the coming decades. This hazard will require continued monitoring and study due to limited information and complexity of modeling the CNMI's sub-surface hydrologic processes.

[25] USACE 2011
[26] Chou, L. 1989
[27] Caruth 2003.
[28] Greene & Skeele 2014.
[29] *Caruth 2003.*

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred that could impact the CMP's ability to prevent or significantly reduce coastal hazards risk since the last assessment.*

Management Category	Employed by State or Territory (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these that address:		
Elimination of development/redevelopment in high-hazard areas	Y	N
Management of development/redevelopment in other hazard areas	Y	N
Climate change impacts, including sea level rise or Great Lake level change	N	No, but policies and regulations are being drafted.
Hazards planning programs or initiatives that address:		
Hazard mitigation	Y	N
Climate change impacts, including sea level rise or Great Lake level change	Y	Y
Hazards mapping or modeling programs or initiatives for:		
Sea level rise or Great Lake level change	Y	Y
Other hazards	Y	Y

2. *Briefly state how "high-hazard areas" are defined in your coastal zone.*

"Coastal Hazards" that would qualify as "high-hazard areas" due to flooding risks are considered an "Area of Particular Concern" (APC) under DCRM regulations, Section 15-10-345. These areas are defined as FEMA's coastal flood hazard Zones V and VE.[30] Any proposed development in the Coastal Hazards APC is evaluated to determine whether the application is compatible with the following standards:

- If the project will have a detrimental impact on existing landforms or coastal processes that provide natural resistance from the forces of coastal hazards such as beaches, wetlands, and cliff lines, impacts to these coastal resources shall be avoided to the maximum extent possible;

[30] See §15-10-345(a). FEMA defines Zone V as "the coastal area subject to a velocity hazard (wave action) where Base Flood Elevations (BFEs) are not determined on the Flood Insurance Rate Map (FIRM)" and Zone VE as "the coastal area subject to a velocity hazard (wave action) where BFEs are determined on the FIRM." FEMA, Flood Studies and Maps, Figure 3-10 at 3-29, http://www.fema.gov/pdf/floodplain/nfip_sg_unit_3.pdf.

FEMA further clarifies that "Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves." FEMA, Zone V, https://www.fema.gov/floodplain-management/zone-v.

a. If the project is located in a geologically unstable zone such as cliff lines, severe slopes, coastal headlands, or outcroppings, appropriate mitigation to prevent threat to human life, safety, and the environment must be applied, (§15-10-345(b)(2);

b. If the project design, form, or use tends to make the structure (or auxiliary structures) more vulnerable to the effects of coastal hazards such as high winds, wave energy, flooding, and storm surge, the plans must be certified by a CNMI licensed structural engineer to ensure potential impacts and threats to human life and safety are minimized, (§15-10-345(b)(3);

c. If the project is located within an area which has historically been known to flood or be at high risk to storm wave inundation or erosion, all design plans must be approved by the DPW Building Control Officer for compliance with the applicable building code, (§15- 10-345(b)(4); and

d. If construction of the project may endanger human life or safety due to its design or siting, it shall not be allowed (§15-10-345(b)(5)).

In addition to requiring conformity with the above standards, DCRM reviews permits to consider other regulatory restrictions and use priorities. DCRM regulations define the highest use of projects in Coastal Hazard APCs as those which "preserve or enhance the natural defense of the shoreline against storm wave attack and flooding."[31] Other priority uses for these areas include public recreational uses of beach areas,[32] traditional cultural and historic practices,[33] preservation of fish and wildlife habitat,[34] or preservation of natural open areas of high scenic beauty and/or scientific value.[35] Lowest priority uses include projects that result in the start, growth, or improvement of commercial or residential uses,[36] transportation facilities, public infrastructure, or shoreline dependent projects that cannot be reasonably accommodated in other areas,[37] or projects that require installation or placement of shore protection structures.[38] "Unacceptable" uses that will not be permitted include projects which degrade or modify natural shoreline protective features such as beaches, cliffs, or rocky shorelines[39] or interfere or disrupt the natural shoreline process such as littoral transport or coastal dynamics.[40] DCRM anticipates continuing to identify opportunities to incorporate coastal hazard reduction measures in regulations and policies moving forward.

[31] See §15-10-345(d)(1)(i).
[32] See §15-10-345(d)(1)(ii).
[33] See §15-10-345(d)(1)(iii).
[34] See §15-10-345(d)(1)(iv).
[35] See §15-10-345(d)(1)(v).
[36] See §15-10-345(d)(3)(i).
[37] See §15-10-345(d)(3)(ii).
[38] See §15-10-345(d)(3)(iii).
[39] See §15-10-345(d)(4)(i).
[40] See §15-10-345(d)(4)(iii).

3. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*
    c. *Characterize the outcomes or likely future outcomes of the changes.*

Climate Change Impacts (Regulations and Policy):

Upon completion of the Saipan Vulnerability Assessment, and with the development of a shoreline change monitoring program, DCRM will be updating regulatory language related to its Coastal Hazards APC and Shoreline APC that suggest additional buffer requirements that are sensitive to the relative vulnerability of shoreline parcels to sea level rise, storm surge, and chronic coastal erosion. Specifically, as FEMA continues to update FIRMS every 5 to 10 years, and will likely be taking projected sea level rise into account, there is a basis for updating coastal hazards APCs based on flood-zones with sea level rise overlays from vulnerability assessments produced for Saipan, Tinian, and Rota during the last planning cycle. These assessments led to the recommendation that "standard" and "high hazard" overlays be delineated with the Coastal Hazard APC to address projected impacts, especially to soft shorelines. As soft shorelines are more susceptible to natural coastal processes and can be fairly easily mapped and classified, and since inundation in these areas can result in negative impacts to human health and the environment, establishing additional protections for these areas could substantially enhance regulatory protections of coastal resources. It is likely that "high hazard" overlay areas would be subject to a stricter tier of regulation, permitting discretion, or required conditions for development. These changes are CMP-driven, through Section 309-1 projects in 2012 – 2014 (*Preliminary Exploration of Sea Level Rise* and *Climate Change Education and Outreach*), and DCRM plans to incorporate overlays in upcoming regulatory updates.

It is expected that future permitting decisions and coastal development or re-development conditions will involve consideration of relative vulnerability levels, and require additional mitigation measures or buffer requirements in properties with high vulnerability levels. DCRM hopes to coordinate with other relevant agencies to ensure future development is "climate smart" to the greatest degree practicable. Cooperative agreements or memorandums of understanding could support the joint publication of guidance or adoption of "climate smart" development BMPs in high hazard areas with DPW, CUC, and Zoning. Additionally, changes in setback requirements beyond 150 feet from cliff lines and the mean high water mark of shorelines may need to be coordinated with the Zoning Office to avoid regulatory conflicts. While some coordination may be required, opportunities also exist to incentivize soft shoreline stabilization using green infrastructure, re-vegetation measures, and other "living shoreline" alternatives within the existing regulatory framework. These 309-driven changes would likely increase the attractiveness and viability of such projects and provide incentives for developers. The projects themselves would increase the ability of these systems to attenuate wave energy during storm events and support more resilient ecosystems and communities in the face of climate change.

Climate Change Impacts (Hazards Planning Programs):

In the summer of 2012 DCRM led the creation and implementation of a CNMI-wide climate adaptation task force, the Climate Change Working Group (CCWG). From 2012 to 2014 the CCWG met on a quarterly basis to work toward a series of goals that were developed at stakeholder meetings. A Planning Committee, consisting of representatives from CNMI government agencies, met on a monthly basis to design CCWG activities and workshops. The CCWG has been the primary mechanism through which community and stakeholder-based participation in vulnerability assessments and adaptation planning is accomplished.

The CCWG was developed and implemented through CZMA Section 309-1 projects, but has connections to other CNMI agency initiatives, including the FEMA-mandated mitigation planning efforts at the Office of Homeland Security and Emergency Management.

The CCWG has not met regularly in 2015. This is primarily due to a decrease in participation following political shifts and an attempt on the part of DCRM to delegate responsibilities for CCWG actions and meetings to the agencies on the CCWG Planning Committee. However, the CCWG, as a hazards planning initiative, will remain involved in the coming years as DCRM pursues opportunities to integrate climate adaptation with the CNMI's multi-agency Conservation Action Plans (CAPs). The first climate-CAP integration took place in March 2015, and resulted in updated strategies for adaptation.

The establishment of the CCWG was also significant as an introduction to the concepts behind climate change and adaptation, which most CNMI government agencies had not been aware of before. DCRM expects to leverage the members of this collaborative body in the development of a more comprehensive adaptation planning efforts during the 2016-2020 309 cycle.

Sea Level Rise Mapping:

Several sea level rise mapping and modeling initiatives have been initiated since the last 309 Assessment. NOAA's Office for Coastal Management (formerly CSC) added Saipan to its Sea Level Rise and Coastal Flooding Impacts Viewer in 2013, allowing for interactive visualization of coastal inundation on Saipan. The Saipan Vulnerability Assessment expanded upon this effort by utilizing the Sea Level Rise Viewer methodology to develop nine custom inundation layers, which were specific to locally modeled sea level projections and storm scenarios. This data is being incorporated into DCRM's online geospatial data portal for interactive viewing and download. The latter change was driven by CZMA Section 309 projects (*Preliminary Exploration of Sea Level Rise*), and it is expected that any future mapping or modeling projects related to climate change and hazards will build upon these 309-driven efforts.

The Saipan sea level rise and storm inundation maps will partially inform any updates to CNMI regulatory language or policies, including enhancement of shoreline setback policy and characterization of shoreline properties as they relate to coastal hazard vulnerabilities. DCRM

will also continue to pursue opportunities to acquire LiDAR data for the islands of Tinian and Rota, which would allow for similar inundation mapping initiatives for those communities.

Tsunami Modeling:

The NOAA Pacific Marine Environmental Laboratory completed an extensive tsunami modeling study for the CNMI in 2013. The study provides detailed information on a large quantity of potential earthquake and consequent tsunami scenarios. This effort was driven by NOAA and the Pacific Risk Management ‘Ohana, and is separate from any CZMA or 309-driven projects.

In the summer of 2015 NOAA began a complimentary mapping project to revise and enhance the CNMI’s tsunami evacuation routes. This project will likely aid DCRM’s partner agencies, and particularly the Office of Homeland Security and Emergency Management, in their hazard mitigation efforts, and can supplement any future coastal hazards work related to tsunamis.

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High _X_

Medium _____

Low _____

2. *Reason for this level of priority.*

Coastal hazards remain a high priority for the CNMI Coastal Management Program due to historic, current, and projected impacts on CNMI shorelines, coastal infrastructure, and freshwater resources. Studies conducted since the last 309 Assessment recommend the significant addition of resources to both mitigation and adaptation efforts. These recommendations are particularly important in light of recent proposals for large-scale tourism development and re-development in the coastal zone. DCRM is working to make meaningful revisions and additions to its management policies and regulations with respect to coastal hazards. These changes will be crucial in ensuring future coastal resiliency for the islands of the CNMI.

Phase II Assessment - Coastal Hazards[41]

In-Depth Resource Characterization

Purpose: To determine key problems and opportunities to improve the CMP's ability to prevent or significantly reduce coastal hazard risks by eliminating development and redevelopment in high-hazard areas and managing the effects of potential sea level rise and Great Lakes level change.

1a. Flooding In-depth: assessment of people at potentially elevated risk located within the state's coastal floodplain as of 2010.

2010 Populations in Coastal Counties at Potentially Elevated Risk to Coastal Flooding*				
	Under 5 and Over 65 years old		In Poverty	
	# of people	% Under 5/Over 65	# of people	% in Poverty
Inside Floodplain	847	76% under 5 24% over 65	21,398	40%
Outside Floodplain	6,393	75% under 5 25% over 65	32,458	60%

* This CNMI-wide data is from the 2010 Census report. Numbers and percentages for population inside and outside the floodplain are based on the ratio of populated place area inside or outside the floodplain. This is a general estimate, and in some cases may differ from actual counts.

1b. Flooding In-depth: location of different establishments (businesses or employers) and critical facilities are located in the FEMA floodplain based on local data.

Critical Facilities in the FEMA Floodplain[1]						
	Schools	Police Stations	Fire Stations	Emergency Centers[2]	Medical Facilities	Communications Towers[2]
Inside Floodplain	6	1	1	0	1	0
Outside Floodplain	19	3	4	1	2	11

1. The critical facilities data used in these calculations reflect DCRM's best available GIS layers for Saipan, Tinian, and Rota, but these layers lack metadata. It may be out of date or spatially incorrect. With the exception of the schools layer for Saipan, all of the critical facilities are represented as point locations. This can provide questionable results when determining flood risk. While certain points may not fall within the flood zone, the true areas of the facility may be partially impacted. For example, on Rota, none of the critical facilities are within the

[41] For purposes of the Hazards Assessment, coastal hazards include the following traditional hazards and those identified in the CZMA: flooding; coastal storms (including associated storm surge); geological hazards (e.g., tsunamis, earthquakes); shoreline erosion (including bluff and dune erosion); sea level rise; Great Lake level change; land subsidence; and saltwater intrusion.

flood zone. However, the point locations for a school, hospital and fire station are all within 75 meters of the flood zone boundary. It is likely that at least some of the actual grounds for these facilities overlaps the flood zone, but it cannot be determined with the data that is currently available. Efforts are underway to update this information.

2. This report only classified Saipan's Emergency Response Center on Capitol Hill. As detailed in the Saipan Climate Change Vulnerability Assessment, four of the nine shelter sites on island are also located in low-lying areas (Green & Skeele, 2014, pg. 23). Since these facilities are located at schools, and are not technically "emergency centers" this data was not reported in the "Emergency Centers" category. This data is not currently available for Rota and Tinian.

2. The three most significant coastal hazards within the coastal zone.

	Type of Hazard	**Geographic Scope - (throughout coastal zone or specific areas most threatened)**
Hazard 1	Coastal erosion due to sea level rise and storm surge	Saipan (Micro Beach/American Memorial Park, Beach Road) Mañagaha Island Rota (beaches along the NW shoreline)
Hazard 2	Coastal inundation and adjacent inland flooding and associated pollution from stormwater and wastewater	Saipan (western coastal plain) Rota (Song Song village and roads/beaches along the northwest side of the Island)
Hazard 3	Increasing risks from coastal storms and other impacts from climate change	Climate change is a global challenge, but coastal areas are particularly vulnerable to impacts including rising sea levels, more intense storms, and ocean acidification.

3. Why these are currently the most significant coastal hazards within the coastal zone.

In 2012 the Climate Change Working Group (CCWG) was convened on Saipan to begin climate change adaptation planning efforts. The next year the Working Group – made up of representatives from government agencies, non-governmental organizations, business associations, and the community – developed a collaborative structure and identified a process to achieve a series of goals and objectives. The first objective, which served as a source of cohesion and guidance for the Working Group, was to identify the social, physical, and natural features in the CNMI that are most susceptible to the impacts of climate change. In 2014 the Climate Change Vulnerability Assessment for the Island of Saipan was published (Saipan Climate Change Vulnerability Assessment), and in 2015 the Tinian and Rota Vulnerability Assessment was finalized.

The Climate Change Working Group and subsequent report identified flooding as a key concern. Flooding from storm surge has the potential to critically impact vulnerable emergency facilities when they are needed most – for example, the Commonwealth Health Center (CHC) is Saipan's primary public medical facility, and CCWG expressed concern that the main medical facility on

Saipan is located in proximity to a flood-prone area. Similarly, while the public has the option of using evacuation centers and disaster recovery centers as a means of coping with disasters such as Typhoons, CCWG participants noted potential issues related to coastal flooding with several of the large-capacity shelters. The fact that these facilities are schools further heightens concerns about flooding impacts at these locations.

Additionally, the 2014 Saipan Vulnerability Assessment highlights the fact that CUC and DEQ have reported concerns with the municipal wastewater system, including a lack of funding to extend the existing wastewater system and to afford the regular maintenance of lift station pumps, as well as the seepage of rainfall into the collection systems during heavy precipitation events. The wastewater system in Garapan is a topic of ongoing concern as certain areas contain crumbling infrastructure, requiring ongoing updates to wastewater lines and lift stations. CCWG members were quick to point out the occasional olfactory assaults that come with a dysfunctional wastewater system. As history has repeatedly demonstrated, ineffective transfer of waste through municipal water systems can pose significant public health hazard. Garapan's low-elevation profile compounds the potential for such hazards. Under extreme sea level change scenarios, both short-term (storm-related) and long-term (climate change induced), wastewater systems will be susceptible to hydrologic complications and back-ups from coastal inundation. In addition to the potential for pollution and negative impacts to the terrestrial and marine environment, an outbreak of water-borne health consequences from such a scenario would expose Saipan's medical infrastructure to significant stresses.[41]

Saipan's seaport facilities face similar challenges, being located in an extremely low-lying area with access corridors occupying the lowest points on Saipan's road system. CCWG participants suggested that the Port was by far one of the most integral assets for Saipan's economic and social well-being, and simultaneously one of the most exposed resources to changing ocean conditions. The Port of Saipan is part of a high concentration of industrial-sector operations and crucial services, including the adjacent Exxon-Mobil Tank Farms, which collectively warrant a detailed vulnerability assessment. The dock is over 1,000 feet long and has a capacity of three large cargo vessels (250-300 feet long) that can be docked simultaneously. The port facility features 2,600 linear feet of berthing space, a 22-acre container yard, a water line, an underground fuel line protected by a concrete vault, and an underground sewage removal system. The channel, turning basin, and berthing areas have been widened and deepened to a uniform -40 feet to support medium to deep draft vessels' movement into port, further enhancing facility services. This entire complex is partially exposed to wave and surge action during periods of southwest swell and storm conditions. The ship channel is oriented toward the west-southwest (leaving the docking facilities), and any prolonged extreme wave event associated with a passing typhoon or shift in wind conditions could negatively impact the Port.[42] Despite threats of increased impacts due to higher frequency or intensity storms and storm surge, CCWG

[42] 2014 Saipan Climate Change Vulnerability Report, pg. 30.
[43] Saipan Climate Change Vulnerability Report, 2014, pg. 24.

participants also noted that rising sea levels associated with climate change are likely to yield beneficial impacts to low-berth port channels – as sea levels increase, these channels will be able to accommodate larger vessels assuming supporting infrastructure is developed. Expansion of port facilities and vessel traffic may warrant reassessment of the prioritization of the energy and government facility siting enhancement area in the future.

Coastal erosion was also identified as a major issue along Micro Beach and American Memorial Park on Saipan. Stakeholders expressed their concern about this issue during participatory mapping workshops for the Saipan Vulnerability Assessment, and erosion rates at these locations were quantified along 100 transects using the USGS Digital Shoreline Analysis System.[43] Erosion and loss of total island volume were calculated for Mañagaha Island[44] showing a general east to west migration, with implications for Wedge-tailed Shearwater nesting habitat. In addition, coastal inundation, flooding, and coastal erosion related to storms and perceived sea level changes were identified as ongoing concerns by residents of Song Song village on Rota.[45]

4. *Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat?*

Emerging Issue	Information Needed
Extent of infrastructure management / modifications needed to address risks associated with flooding and storm surge	Hydrological modeling to indicate the capacity of existing drainage facilities and the extent of rain / storm surge / sea level rise needed to cause overtopping and system failure.
Groundwater salinization due to future sea level change on Saipan	Updates to USGS Hydrological studies that focus on this specific issue.

In-Depth Management Characterization:

Purpose: To determine the effectiveness of management efforts to address identified problems related to the coastal hazards enhancement objective.

1. *For each coastal hazard management category below, indicate if the approach is employed by the state or territory and if there has been a significant change since the last assessment.*

[44] Garapan Watershed Conservation Action Plan 2013.
[45] Fletcher et al, 2010.
[46] Rota & Tinian Vulnerability Assessment, 2015.

Management Category	Employed by State or Territory (Y/N)	Significant Change Since the Last Assessment (Y/N)
Statures, Regulations, and Policies:		
Shorefront setbacks/ no build areas	Y	N
Rolling easements	N	N
Repair/rebuilding restrictions	N	N
Shoreline protection structure restrictions	Y	N
Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)	Y	N
Repair/replacement of shore protection structure restrictions	N	N
Inlet management	N	N
Protection of important natural resources for hazard mitigation benefits (e.g., dunes, wetlands, barrier islands, coral reefs) (other than setbacks/no build areas)	Y	N
Repetitive flood loss policies (e.g., relocation, buyouts)	N	N
Freeboard requirements	N	N
Real estate sales disclosure requirements	N	N
Restrictions on publicly funded infrastructure	Y	N
Infrastructure protection (e.g., considering hazards in siting and design)	N	N
Other (please specify)		

Management Planning Programs or Initiatives:		
Hazard mitigation plans	Y	N
Sea level rise/Great Lake level change or climate change adaptation plans	N	N
Statewide requirement for local post-disaster recovery planning	N	N
Sediment management plans	N	N
Beach nourishment plans	N	N
Special Area Management Plans (that address hazards issues)	Y	N
Managed retreat plans	N	N
Other (please specify)		
Research, Mapping, and Education Programs or Initiatives:		
General hazards mapping or modeling	Y	Y
Sea level rise mapping or modeling	Y	Y
Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks)	Y	Y
Hazards education and outreach	Y	Y
Other (please specify)		

2. Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's management efforts in addressing coastal hazards since the last assessment.

NOAA has recently published a report on resilience, highlighting management opportunities and challenges for coral reefs in Saipan and Tinian. Studies that have been conducted since the last assessment are detailed in the resource characterization section above, but do not specifically demonstrate the efficacy of CNMI's management efforts. Lack of LiDAR data for Tinian and Rota is a challenge to effective vulnerability assessments and planning on these islands, and obtaining this data would enhance the effectiveness of management efforts throughout the CNMI. While not direct assessments of effectiveness, it should be noted that work related to coastal hazards through the Saipan Vulnerability Assessment has been integrated into the CNMI Standard State Mitigation Plan and the Garapan Watershed Conservation Action Plan. DCRM views this incorporation as a metric for effectiveness on ongoing efforts to address management challenges in this enhancement area.

Identification of Priorities:

1. Considering changes in coastal hazard risk and coastal hazard management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively address the most significant hazard risks.

Management Priority 1: Adopt regulations and policies to reduce exposure to risk in coastal hazard areas, including shoreline setback requirements and buffer enhancement incentives in high-risk areas.

Description: Current static shoreline setback requirements are insufficient to address relative rates of shoreline change and vulnerability to sea level rise. While these hazards are not a concern across much of the CNMI, the highest concentrations of CNMI's tourism and economic assets do lie within or nearshore vulnerable areas, leading to high exposure to risk in certain shoreline areas. Expanded inundation models present significant opportunities to identify and adopt policies and regulatory changes to reduce risks to ecosystems and communities in CNMI.

Management Priority 2: Adopt policies and laws to incorporate coastal hazard considerations in the permitting process and enhance public support and awareness of these risks and potential solutions.

Description: While recent vulnerability assessments have identified high risk areas, these risks and opportunities to build resilience and reduce vulnerability are not reflected in regulatory requirements. Additionally, currently no programs exist to encourage or incentivize standard application of low impact development and "green infrastructure" deployment that would perform especially important functions in highly flood-prone areas. Efforts to adopt official policies and update regulations to reduce risk exposure due to development in high-hazard and environmentally sensitive areas in the permitting process are needed. Flooding risks to communities may be especially pronounced in low-lying highly developed areas of Saipan as well as Song Song Village in Rota. Risks to infrastructure appear to be elevated along Beach Road on Saipan, Rota's East/West docking facilities, and Tinian's Seaport and Taga Beach.

While recent vulnerability assessments identify risks in these areas, they also identify opportunities for enhancement of natural vegetative buffers that reduce risks of flooding and storm surge. Where development already exists or "soft shoreline enhancements" are not an option, the vulnerability assessments suggest identifying priority sites for shoreline protection and armoring where loss of infrastructure would be unavoidable without "hard" protection options and investment in improvements to drainage capacity and stormwater infrastructure to reduce inundation time associated with storm events. Such efforts would likely be most successful if coupled with education for the public as well as CNMI government and agencies to build understanding of how risks can be reduced through long-term planning, as coordinated management efforts will likely yield more substantial results when working to support climate- smart development region-wide.

Management Priority 3: Develop policy support and incentives to facilitate protection of natural hazard mitigation features.

Description: Strand vegetation, sea grass, and fringing reef structures all work in combination to attenuate wave energy prior to its impact on CNMI shorelines. Currently, however, these natural hazard mitigation features are not well protected. Technical support and capacity building are needed to help the CNMI understand risk exposure due to climate change impacts and enable DCRM to work with other agencies and developers to strike a balance between growth and conservation that places greater emphasis on the protection or restoration of these features in light of impending coastal development and longer term changes in sea level and coastal inundation.

2. Identify and briefly explain priority needs and information gaps the CMP has for addressing the management priorities identified above.

Priority Needs	Need? (Y/N)	Brief Explanation of Need / Gap
Research	Y	Analysis of future shoreline change on select stretches of shoreline is necessary considering the combined effects of both erosion and sea level change. An updated study of erosion dynamics on Mañagaha and general migration could be useful.
Mapping / GIS	Y	LiDAR for Rota and Tinian should be acquired. This would aid in multiple analyses, including the addition of these islands to NOAA's SLR Viewer, local inundation analysis, stream/NHD delineation, etc.
Data and information management	Y	As additional data is acquired, the GIS specialist will ensure QA/QC protocols to effectively manage new information and incorporate it with existing data.
Training / Capacity building	Y	General data management training is needed for most staff, and any training that increases spatial literacy would also be helpful.
Decision-support tools	Y	Regarding the permitting and development review process: the 2015-2017 NOAA Coastal Fellow will be developing a decision-support tool to integrate DCRM project data into an application that allows the user to query and visualize significant issues (including coastal hazards) affecting individual coastal parcels. GIS Specialist will continue to work with DCRM sections to further support geo-spatially based decision-making to support program objectives.
Communication and outreach	Y	Community education and outreach will continue to be important for information sharing and to build support of efforts to build resilience and reduce vulnerabilities throughout the CNMI.
Other (Specify)		

Enhancement Area Strategy Development:

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

Yes __X____ No _____

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

A strategy will be developed as stakeholders have continuously identified coastal hazards as a priority, a foundation has been laid for additional coastal hazards research through vulnerability assessments, there has been a flurry of development proposed near shoreline properties, there is strong staff support for this priority area (GIS, Fellow, Hazards Specialist), and in general coastal hazards are expected to increase over time. Expanding local knowledge of coastal hazards and risk reduction opportunities is a critical undertaking that will increase the resilience of the human, built, and ecological communities of CNMI. The management priorities discussed above are achievable and will yield tangible results through program changes that will benefit the coastal environment and human populations that are particularly vulnerable to negative impacts in high-hazard coastal areas.

Coastal Hazards: Select Figures from Saipan Vulnerability Assessment

Figure 1a – Mapping and analysis of inundation from a coastal storm

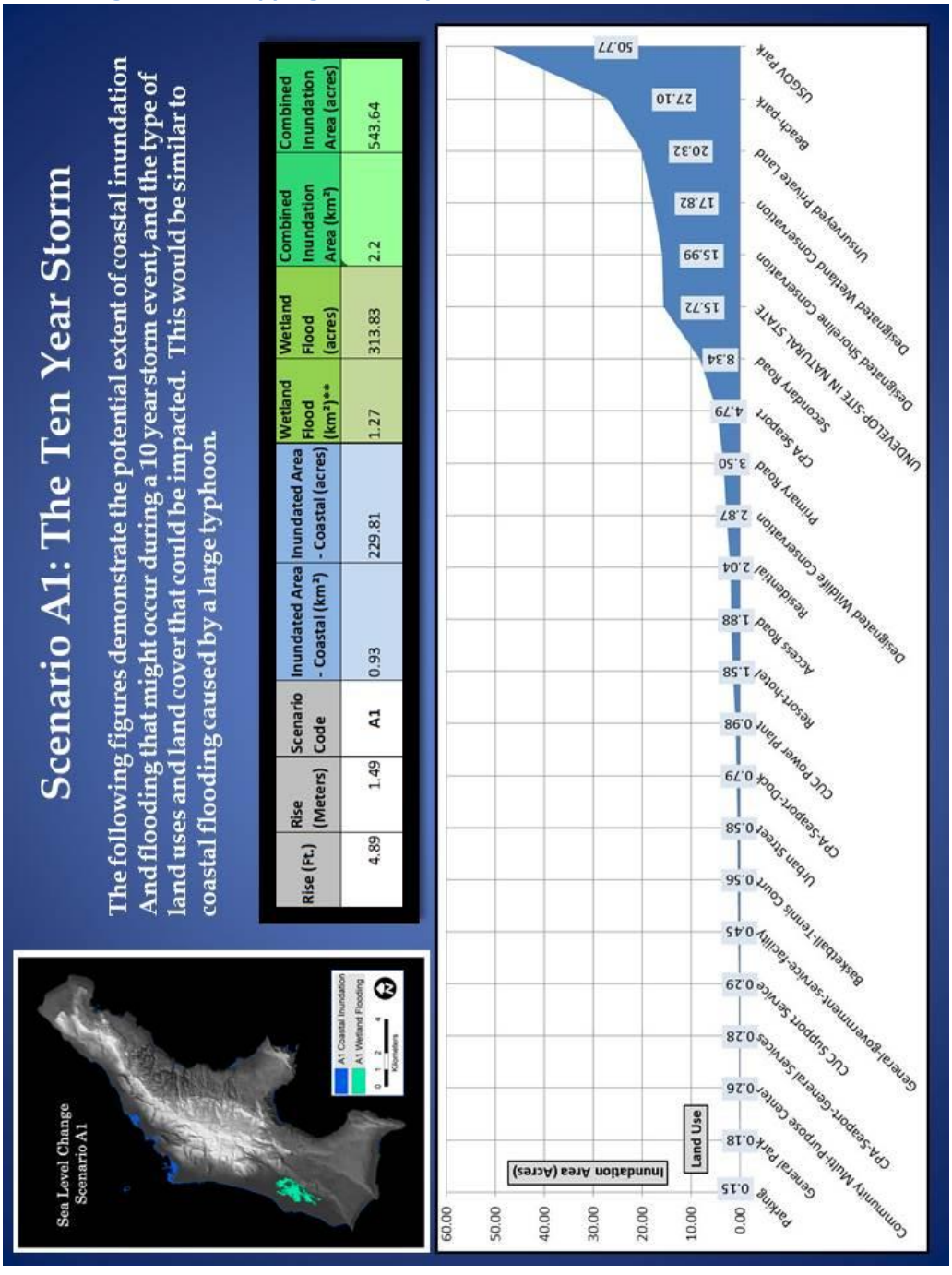


Figure 1b – Mapping and analysis of inundation from a coastal storm

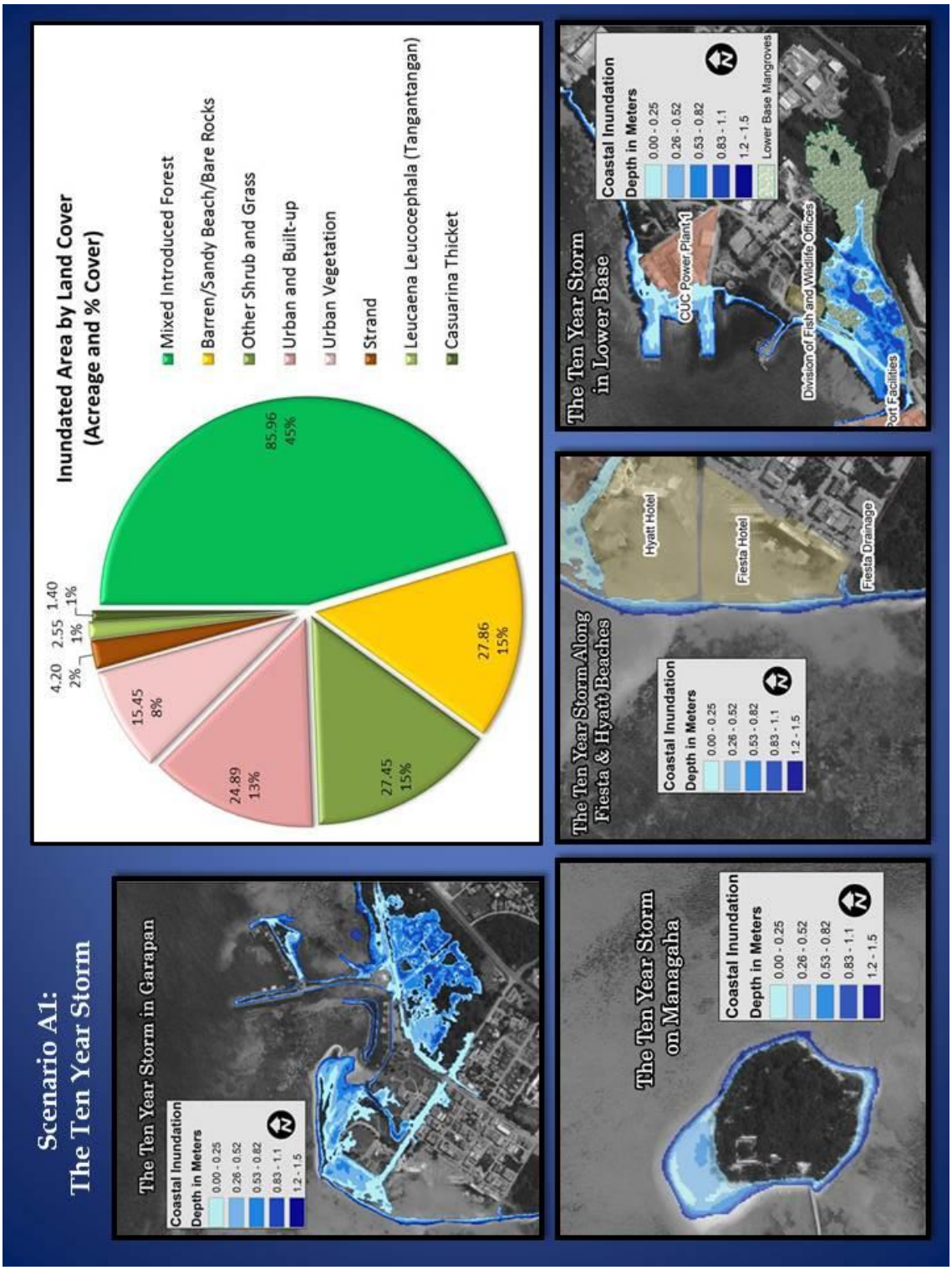
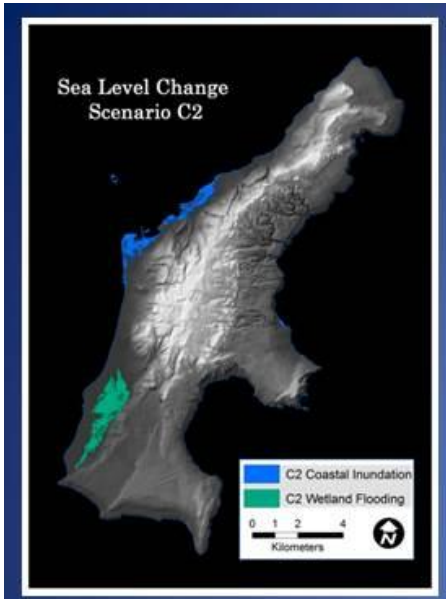


Figure 2a– Mapping and analysis of inundation from a coastal storm + fifty years of sea level rise



Scenario C2: The Ten Year Storm and 50 Years of Accelerated Sea Level Rise

The following figures demonstrate the potential extent of coastal inundation and flooding that might occur in 50 years (assuming an accelerated rate of sea level rise) with a 10 year storm event. Figures also illustrate land uses and land cover that could be impacted. This is what your grandchildren might experience in a large typhoon.

Rise (Ft.)	Rise (Meters)	Scenario Code	Inundated Area - Coastal (km²)	Inundated Area - Coastal (acres)	Wetland Flood (km²)**	Wetland Flood (acres)	Combined Inundation Area (km²)	Combined Inundation Area (acres)
6.53	1.99	C2	2.49	615.30	2.27	560.94	4.76	1176.24

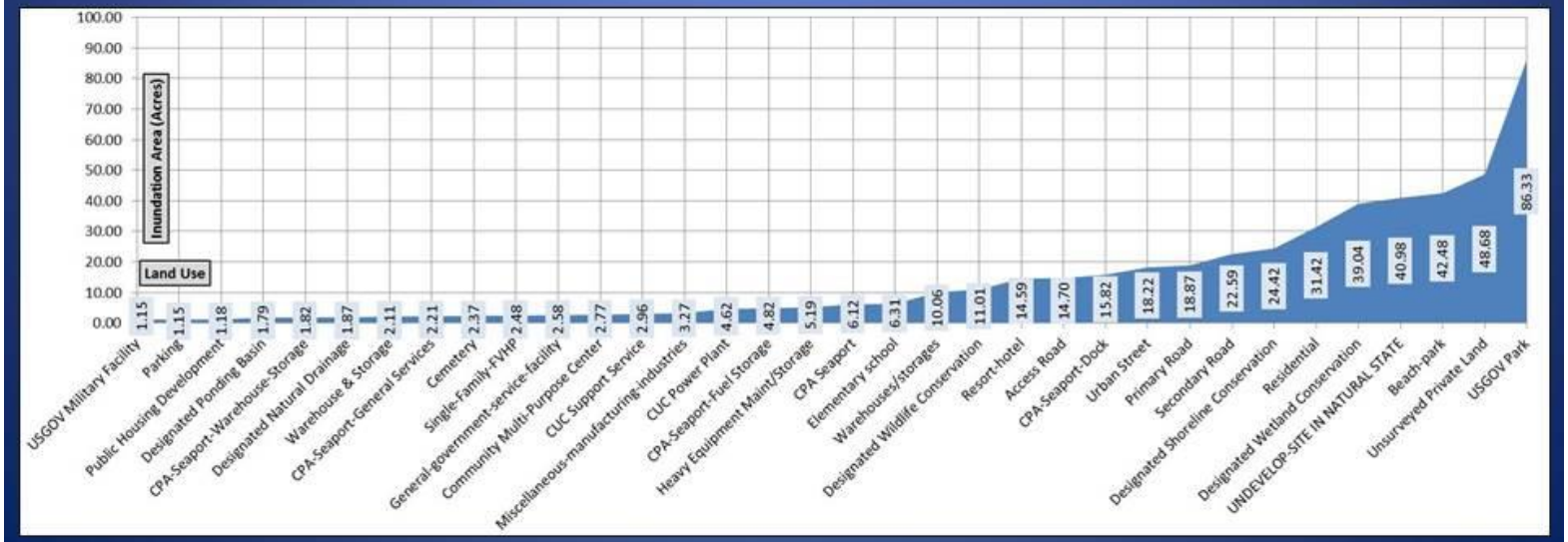


Figure 2b– Mapping and analysis of inundation from a coastal storm + fifty years of sea level rise

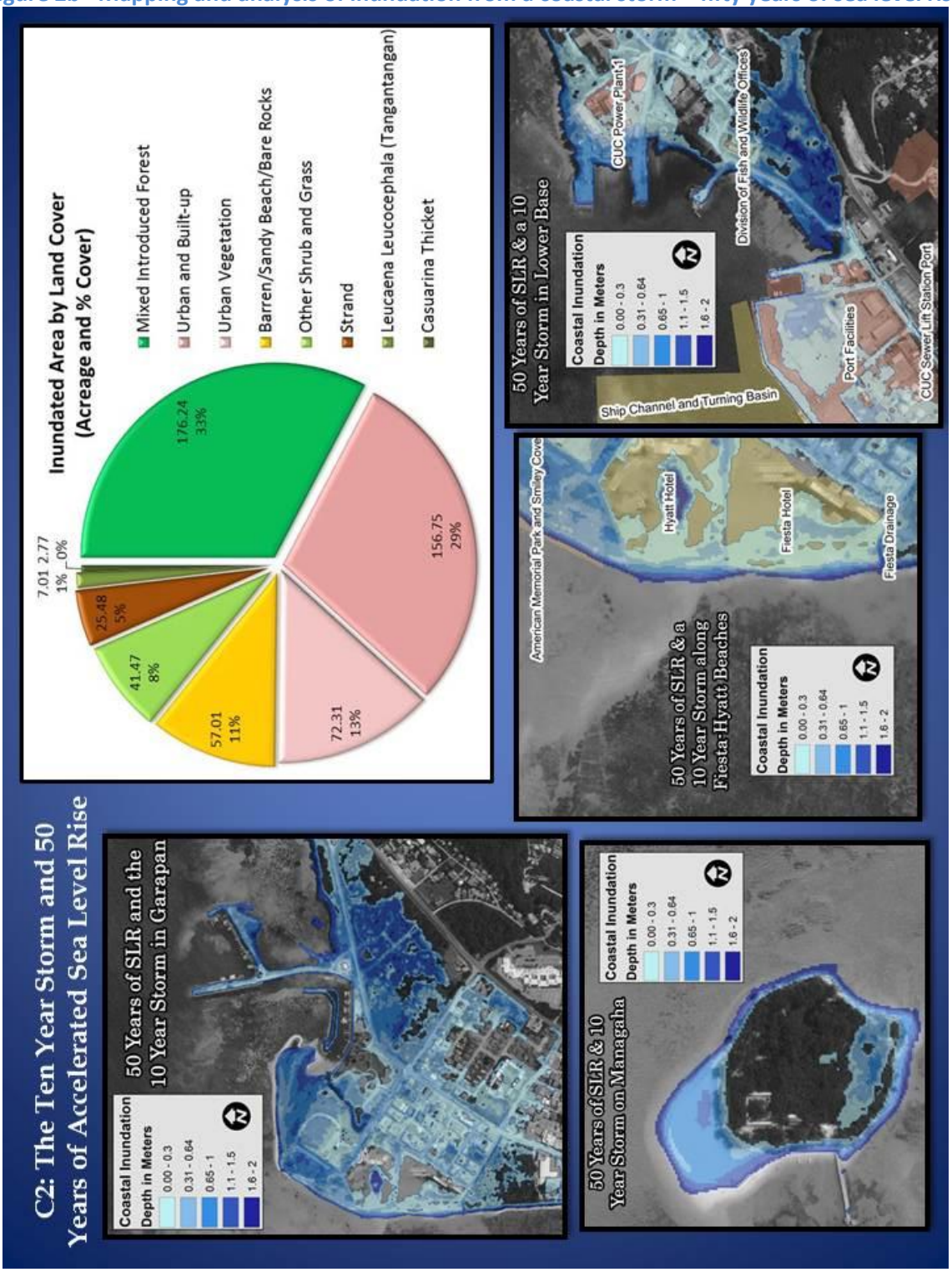


Figure 3a – Shoreline Erosion Rates at American Memorial Park, 2003-2011

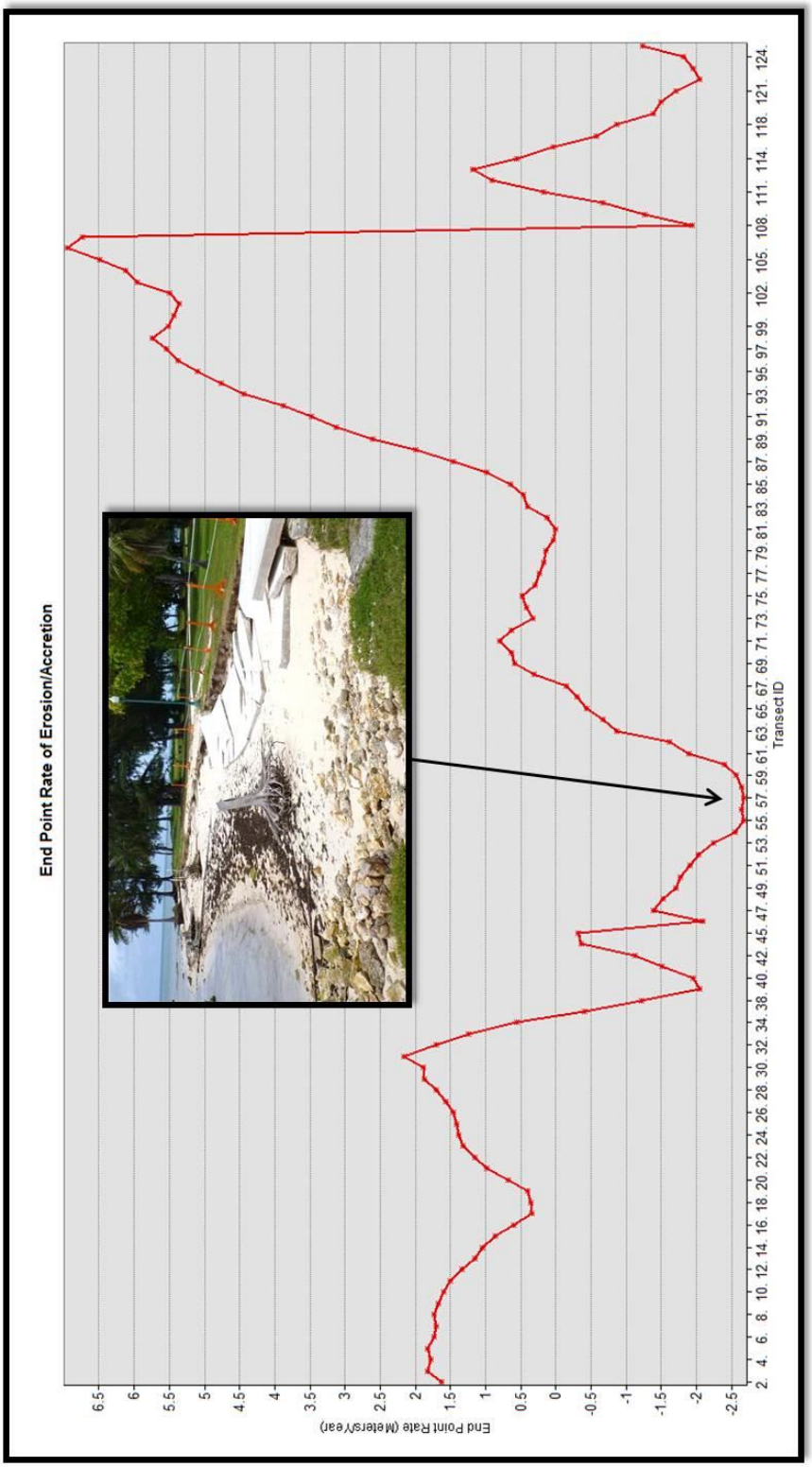
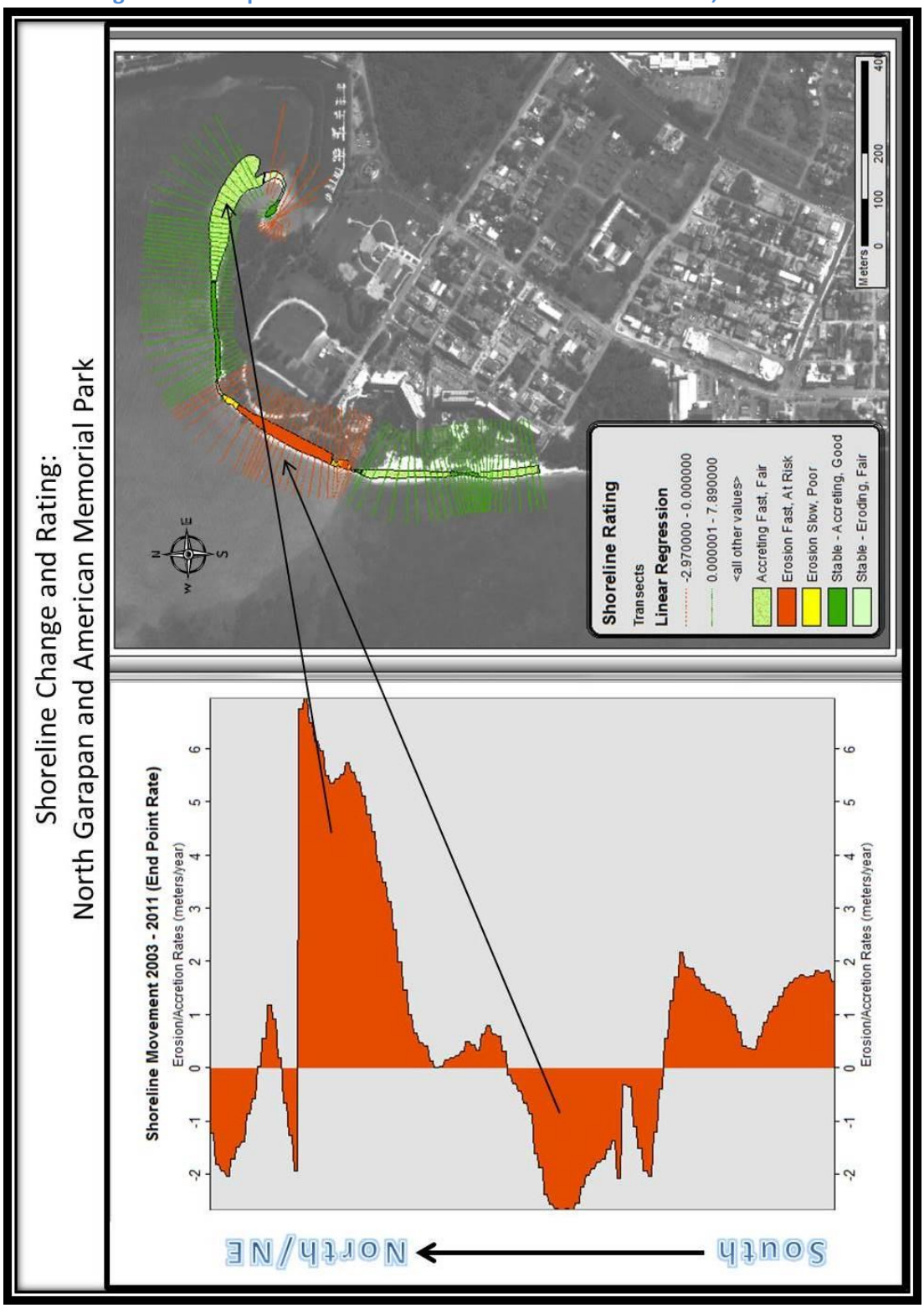


Figure 3b – Map of erosion rates at American Memorial Park, 2003-2011



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. §309(a)(3)*

Resource Characterization:

1. Use the table below to provide data on public access availability within the coastal zone.

Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment** (+ / - / unkwn)	**Cite data source**
Beach access sites	40 official (28 on Saipan, 6 on Tinian, 6 on Rota) 34 unofficial (11 on Saipan, 2 on Tinian, 15 on Rota; 4 on Pagan; 2 on Anatahan)	No significant change	2015 Shoreline Access Survey Report[46]
Shoreline (other than beach) access sites	13 official (3 on Saipan; 4 on Tinian; 6 on Rota) 11 unofficial (5 on Saipan, 2 on Tinian, 4 on Rota)	No significant change	2015 Shoreline Access Survey Report
Recreational boat (power or nonmotorized) access sites	8 official (5 on Saipan, 1 on Tinian, 2 on Rota) 1 official, but no infrastructure (Saipan)	No significant change	2015 Shoreline Access Survey Report
Number of designated scenic vistas or overlook points	4 official (2 on Saipan, 1 on Tinian, 1 on Rota) 3 unofficial (1 on Saipan, 2 on Rota)	No significant change	2015 Shoreline Access Survey Report

[47] The numbers contained within this table are based upon shoreline surveys and consultations with partner managers and resource users, which will be reported in the 2015 Shoreline Access Survey Report. At the time of drafting of this Assessment & Strategy, this Report was in draft form. This draft was distributed to partner managers and resource users for final verification and edits, and a Final Report was published in 2015. Partner feedback did not result in alteration of the original table published in the Draft Report for public comment.

Public Access Status and Trends			
Type of Access	**Current number**	**Changes or Trends Since Last Assessment** (+ / - / Unknown)	**Cite data source**
Number of fishing access points (i.e. piers, jetties)	1 unofficial (Saipan)[47]	No significant change	2015 Shoreline Access Survey Report
Coastal trails/ boardwalks	2 official coastal trails (1 on Saipan, 1 on Tinian) 3.25 miles of coastal trail (2.5 on Saipan, .75 on Tinian)	No significant change	2015 Shoreline Access Survey Report
Number of acres parkland/open space	33 total coastal parks, conservation areas, or cultural spaces Sites per miles of shoreline	No significant change	2015 Shoreline Access Survey Report
Other (please specify)	5 unofficial boat landing sites (1 on Aguijan; 1 on Maug; 1 on Agrihan; 2 on Alamagan)[48]	No significant change	2015 Shoreline Access Survey Report

2. *Characterize the demand for coastal public access and the process for periodically assessing demand. Include a statement on the projected population increase for your coastal counties.*

Since the entire CNMI population lies within just a few miles of at least one - if not many - shoreline access points, the demand for public access to the CNMI's shoreline remains high. The CNMI public uses access points for recreational activities (picnicking and BBQ-ing, swimming, snorkeling, boating, etc.), subsistence activities (fishing), and commercial activities (marine sports, diving, etc.). The pressure on existing coastal public access varies between the islands, but is generally coming from two distinct sources: a rapidly growing tourism industry and the

[48] Each access point was classified using only its primary characterization, adding "number of acres of parkland" where appropriate. Fishing or fishing access occurs at most shoreline access sites, but there are no designated areas specifically designed for fishing, hence the very low number listed. However, it is important to note that many different kinds of fishing is one of the primary uses that the public has for public access points. Most of the fishing that does occur is subsistence.

[49] These "boat landing sites" have no infrastructure to assist with landings, but are merely areas of coastline that are conducive to getting ashore. At several of these sites it is even necessary to swim/wade ashore.

proposed expansion of military presence. According to the Marianas Visitors Authority, tourist arrivals have increased by over 20% since 2010, and will likely continue to grow. The demand for coastal public access and the potential impacts of these two pressures vary between the islands, and are summarized below:

Saipan:

Saipan has quite a few public access points - many within parks or conservation areas - that are heavily used by the public and tourists alike. Many of these sites are in need of repair, maintenance, or general enhancement, but they do fall within publicly protected lands that are not available for lease. However, there are also quite a few commonly used "unofficial" shoreline access points that lie either within privately owned land or within public land that has been leased out to private entities. To address the second concern, DCRM is currently working with the Department of Public Lands and through DCRM's own permitting process to ensure that public access is maintained to these sites in the face of potential large scale developments. However, as the demand for shoreline property increases, of larger concern are the popular shoreline access sites that actually lie on privately owned property. For example, the Laolao dive site parking lot - a very popular access point used by local dive shops to access some of Saipan's best shore diving - is completely located within private property. This poses a management challenge for two reasons: (1) local or federal public funds may not be used to improve such sites, despite the need; and (2) the landowner could, at any time, close the site to the public. Sites such as these were marked as "unofficial" access sites in the access table included at the beginning of this subsection.

Tinian:

Tinian is facing shoreline access pressure from both tourism and the military expansion. Several large resorts have been proposed or are being permitted along the coastline of the island that could impact traditional fishing access. Furthermore, the military has a leasehold on the northern two thirds of Tinian and has recently released the CNMI Joint Military Training (CJMT) Draft Environmental Impact Statement (DEIS). This DEIS proposal includes a large-scale military buildup on this property that could drastically limit public access to key shoreline access sites and tourist attractions. The CJMT proposes the construction of four separate live-fire ranges on the military leasehold area. Live-fire training, and likely closure or periods of limited access to the leasehold area are proposed for at least 20 weeks and up to 45 weeks annually – the DEIS contemplates fencing the leased area and establishing controlled entry points, as well as conducting training activities outside of the discussed 20 week live-fire training window, but is vague in terms of what access will be allowed during training periods. Ten of the seventeen shoreline access points that were surveyed under the 2015 Shoreline Access Survey Report are located in the military lease area, including several very popular tourist sites. Four of the beaches within this leasehold are included in the CJMT proposal as sites that will host amphibious landing trainings, which will either drastically modify or possibly destroy the

integrity of the beaches. One of these four – Unai Chulu or White Beach – is a popular tourist destination where local vendors sell coconuts and other items to visitors. Under the CJMT proposal, ten acres of coral at Unai Chulu would be dredged and a concrete landing ramp will be built leading up to the beach.[49] These proposed actions would significantly restrict and alter the quality of public shoreline access that is currently available on Tinian.

Rota:

Rota has multiple beach parks along the main highway between Rota Resort and Song Song Village. Most of the access points on Rota are unofficial truck trails or fishing trails, with many even crossing through alleged private property, although data are uncertain at best and property ownership is sometimes debated. There is currently little development pressure on Rota, and therefore few threats to access. With the recent tourism buildup on Saipan and Tinian it is conceivable that Rota might soon be eyed for tourism expansion, however any significant expansion is unlikely until transportation to/from Rota is improved.

Northern Islands:

There is relatively little demand for coastal public access on the ten islands north of Saipan, as most of them are uninhabited. There is a small population that lives on the island of Pagan and Agrihan for at least part of the year, and many fishermen from Saipan, Tinian or Rota will travel to these northern islands to fish. There have been ongoing efforts to resettle Pagan through the establishment of homesteads, as well as speculation of eco-tourism ventures on several northern islands, in particular Pagan. However with little to no infrastructure on these islands these plans have remained cost prohibitive. The primary threat to public access on the Northern Islands is from the military's live-fire training activities. The island of Farallon de Medinilla (FDM) is currently under lease by the military and is used for bombing target practice, and therefore the island and its surrounding waters are periodically effectively closed to the public, including fishermen. Pagan is currently being targeted by the military under the proposed CJMT as an expansive military training ground, including live-fire training exercises and application of a 12-mile "danger zone" around the island that would effectively make it inaccessible for significant periods throughout the year, with the DEIS contemplating 16 weeks initially with possible expansion to 40 weeks of use annually.[50] This proposed use would alter traditional fishing practices and present access issues for current and future residents and tourists alike should proposed ecotourism of the Northern Islands be developed.

[50] CJMT, 2015. See Chapter 2, Proposal Action, and Appendix C, Unconstrained Training for Tinian and Pagan.

[51] CJMT, 2015. The DEIS's description of the Proposed Action in Chapter 2 notes that the "EIS/OEIS analyzes 20 weeks per year of live-fire training on Tinian and 16 weeks per year of live-fire training on Pagan. In addition to the weeks of live-fire training for Tinian and for Pagan, other activities including pre-training and post-training activities (arrival and departure of trainees and equipment), non-live-fire training (e.g., logistics training), and RTA maintenance and management functions would occur outside of the livefire training durations throughout the year. … Potential future live-fire training could be accommodated up to a total of 45 weeks of training on Tinian and a total of 40 weeks of training on Pagan" (pg. 2-3). See also CJMT Appendix C, Unconstrained Training for Tinian and Pagan.

3. *If available, briefly list and summarize the results of any additional data or reports on the status or trends for coastal public access since the last assessment.*

DCRM is currently finalizing an internal, comprehensive report that will include all official and unofficial public access sites on Saipan, Tinian and Rota. . Information contained in this report has been used to inform an update to the publically available Public Access Guide for Saipan, and expand the Public Access Guide to include Tinian and Rota. Additionally, the Marianas Visitors Authority releases monthly statistics on tourist arrivals,[51] which informs managers of the tourism trends and demand for tourism-related shoreline access.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could impact the future provision of public access to coastal areas of recreational, historical, aesthetic, ecological, or cultural value.*

Management Category	**Employed by State or Territory** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Statutes, regulations, policies, or case law interpreting these	Yes	No
Operation/maintenance of existing facilities	Yes	No
Acquisition/enhancement programs	No; although DCRM will build off of the 2015 Shoreline Access Survey Report to develop a "Wish List" of access sites that could be enhanced	No

2. *For any management categories with significant changes, briefly provide the information below.*
   a. *Describe the significance of the changes;*
   b. *Specify if they were 309 or other CZM-driven changes; and*
   c. *Characterize the outcomes or likely future outcomes of the changes.*

Not applicable.

[51] See e.g. Marianas Visitors Authority News Release, Oct. 2014. http://www.mymarianas.com/resources/files/Press%20Releases/Press%20Releases%202014/PR%20NMI%20September%202014%20Arrival%20Trends.pdf.

3. *Indicate if your state or territory has a publically available public access guide. How current is the publication and how frequently it is updated?*

Public Access Guide	Printed	Online	Mobile App
State or territory has? (Y or N)	Yes. A new Access Guide was finalized in September 2015.	Yes, updated 2015 version published online	No, not at this time, but "story map" is available on DCRM's Open Data Portal
Web address (if applicable)	N/A	2015 Access Guide www.crm.gov.mp	N/A
Date of last update	2015	N/A	N/A
Frequency of update	Update completed in 2015. Future updates will be planned for every 5 years.	Future updates will occur as needed. At a minimum every 5 years.	N/A

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High _____

Medium __X__

Low _____

2. *Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.*

Public Access is a continuing priority for DCRM, especially in the face of growing pressure from tourism development and military buildup. It was identified by several partner agencies and other stakeholders as a priority. However, DCRM is currently working to address the CNMI's public access needs through a variety of projects and partnerships. In 2015 DCRM finalized a year of shoreline surveys and analysis to inform an update to the Public Access Guide. Using the information detailed in the 2015 Shoreline Access Survey Report, DCRM will work to identify opportunities for enhancement and development of existing public access sites. We are also working to develop a more formal relationship with the Department of Public Lands to ensure that public access is maintained as public land is leased to private entities for development. Therefore, while maintaining and enhancing public access remains a priority for DCRM, existing regulations and policies are in place to address threats to this enhancement area through current and ongoing projects.

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. §309(a)(4)

Resource Characterization:

1. *In the table below, characterize the existing status and trends of marine debris in the state's coastal zone based on the best available data.*

Source of Marine Debris	Existing Status and Trends of Marine Debris in Coastal Zone		
	Significance of Source (H, M, L, Unknown)	**Type of Impact** (aesthetic, resource damage, user conflicts, other)	**Change Since Last Assessment** (+ / - / Unknown)
Land-based			
Beach/shore litter	H	Aesthetic, Resource Damage, User Conflict, Other – threat to wildlife (impacts to animals including some listed species such as sea turtles, as well as other marine life due to ingestion of or entrapment by debris)	+
Dumping	M	Aesthetic, resource damage, public health risk, threat to wildlife (e.g. marine turtles)	+
Storm drains and runoff	H	Resource damage, public health risk	+
Fishing (e.g., derelict fishing gear)	L	Resource damage	Unknown
Other: Unexploded Ordinances (UXO)	H	Resource damage, public health risk	Unknown – Some cleanup activities underway, but continued use of FDM and proposed use of Tinian and Pagan for live-fire training may yield increased deposition of UXO debris on coastal lands.
Ocean or Great Lake-based			
Fishing (e.g., derelict fishing gear)	L	Resource damage	Unknown; in the Northern Islands this is the primary source of marine debris – many beaches are covered in old fishing gear that has washed in (therefore M – H in Northern Islands; baseline data lacking)
Derelict vessels	H	Aesthetic, resource damage	No change
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	L	Resource damage	Unknown
Hurricane/Storm	L	Resource damage	Unknown
Tsunami	L	Resource damage	N/A
Other - UXO	H	Resource damage, public health risk	Unknown – Some cleanup activities underway, but continued use of FDM and proposed use of Tinian and Pagan for live-fire training may yield increased deposition of UXO debris in the ocean.

2. *If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends or potential impacts from marine debris in the coastal zone since the last assessment.*

Marine debris impacts the environment, economy, and human health and safety.[52] There have been no noted changes in the above sources of marine debris since the 2011 Assessment and Strategy Report, and no specific data reports are available. However, several CNMI efforts are underway, including DCRM 306-funded projects to reduce impacts of land-based beach litter, as described in more detail below. Comparing 2010 to 2014 collection data highlights the fact that marine debris continues to be a management challenge – in 2010, Saipan's ICC clean-up collected 6,280 pounds of debris; in 2014 Saipan's ICC collected 17,202; DCRM is establishing a data reporting protocol for the International Coastal Cleanups so this information can be easily accessed and shared. While this increase in collection reflects growing community participation in this CRI/DCRM-led event, it also demonstrates a continued need to address this ongoing problem.

Data is also limited regarding the extent of unexploded ordinances (UXO) in the CNMI, however, EPA's 2003 survey of the Marpi Village Homestead Brownfields site indicated that eventual cleanup of the island's unexploded ordnance will help protect groundwater - a highly valuable and limited resource on the islands - and open up attractive opportunities for investment and redevelopment.[53] The Saipan Tribune reported that over 12,000 pieces of unexploded ordinance were removed from a 624,000 square meter public land site in the Marpi area in 2010 thanks to funding from EPA's Brownfields grant program.[54] Ongoing use of FDM for live-fire training and the proposed use of Tinian and Pagan for live-fire activities creates uncertainty regarding whether the trends of ocean and terrestrial deposition of unexploded as well as spent ordinance, which together present risks of leaching of heavy metals and hazardous or toxic chemicals and pose potential health hazards to humans and the marine environment.[55] Despite focused clean-up efforts in Marpi, UXO continue to present a unique marine debris concern,[56] which, along with continued debris management challenges from trash and storm drain run-off, warrants the elevation of this enhancement area category to "medium" for this planning cycle. The impacts of these management challenges are addressed in more detail in the cumulative and secondary impacts enhancement area discussion in the subsequent subsection.

[52] Marine Debris Impacts, EPA, http://water.epa.gov/type/oceb/marinedebris/md_impacts.cfm. Accessed 3/2015.
[53] Bombfields to Brownfileds, EPA Region 9, http://www.epa.gov/region9/waste/features/ordnance/. Accessed 3/2015.
[54] H.V. Eugenio, *WWII Ordinance Cleared From Saipan Project Site,* Pacific Islands Report, Saipan Tribute, 2/26/2010, http://pidp.eastwestcenter.org/pireport/2010/February/02-26-12.htm. Accessed 3/2015.
[55] See e.g. EPA. (2012). *EPA Federal Facilities Forum Issue Paper: Site Characterization for Munitions Constituents,* EPA 505-S-11-001, http://www2.epa.gov/sites/production/files/documents/site_characterization_for_munitions_constituents.pdf. Accessed 3/2015.
[56] See e.g. D.B. Chan, *UXO found near vessel: port closed,* Saipan Tribune, 9/11/2014, http://www.saipantribune.com/index.php/uxo-found-near-vessel-port-closed/; A.V. Zotomayor, *Unexploded ordinance a major concern in Tinian harbor project,* Marianas Variety, 11/10/2014, http://www.mvariety.com/cnmi/cnmi-news/local/70945-unexploded-ordnance-a-major-concern-in-tinian-harbor-project; F. De La Torre, *Unexploded ordinance found off Managaha coast,* Saipan Tribune, 2/9/2015; http://www.saipantribune.com/index.php/unexploded-ordnance-found-managaha-coast/. Accessed 3/2015.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) for how marine debris is managed in the coastal zone.*

Management Category	Employed by State/Territory (Y or N)	Significant Changes Since Last Assessment (Y or N)
Marine debris statutes, regulations, policies, or case law interpreting these	Y	N
Marine debris removal programs	Y	N

2. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*
    c. *Characterize the outcomes and likely future outcomes of the changes.*

While there have not been major significant changes in statutes, regulations, policies, or programs addressing marine debris, several ongoing programs continue to support marine debris control and removal in a variety of ways. Additionally, at the time of the drafting of this report, four bills furthering environmental protection are before the Legislature. One of these specifically proposes a tax on plastic bags,[57] a measure that may help reduce use and improper disposal of a frequently collected waste product, as well as create revenue for BECQ-driven coastal clean-up and resource management programs. A 2009 attempt to ban plastic bags was unsuccessful;[58] however, as noted by the Governor at the 2015 Environmental Awareness Month Proclamation signing, there are indications that the legislature may be more inclined to support such a proposal in this term, especially given the fact that other islands (American Samoa, Yap, Hawaii, etc.) have already adopted similar measures. To further address marine debris, DCRM's Adopt-A-Beach program was re-launched in January of 2015. The program currently has nineteen partner-groups committed to cleaning their adopted beach locations four times a year with the help of materials provided with NOAA 306 project funding and tip fee waivers through the Department of Environmental Quality (DEQ), DCRM's sister organization under the Bureau of Environmental and Coastal Quality. DEQ also holds monthly beach cleanups across Saipan,

[57] C.A.E. Villahermosa, *Bill to Eliminate Plastic Bags in CNMI Hailed*, Marianas Variety, 02/19/2015, http://pidp.eastwestcenter.org/pireport/2015/February/02-19-18.htm. Accessed 3/2015.
[58] H.B. 16-166 was introduced in February, 2009, but was not enacted. See http://www.cnmileg.gov.mp/documents/house/agenda/16/50.pdf.

and additional private pick-up efforts are funded through the CNMI's beautification tax, although it is uncertain how long this funding will be available.

In addition to these programs, each year the CRI/DCRM's Education and Outreach Coordinator (funded 90% through the Coral Reef Conservation Program, and 10% DCRM) facilities CNMI's participation in The Ocean Conservancy's International Coastal Cleanup (ICC). In 2014, ICC was held on the islands of Saipan, Tinian, and Rota on September 26 and 27. Saipan had 500 participants collect 17,202 lbs. of trash, Rota had 657 participants collect 2,244 lbs. of trash, and Tinian had 147 participants collect 278 lbs. of trash. This program has inspired hundreds of volunteers to take action by removing and recording trash during the International Coastal Cleanup. Participants include government agencies, non-government agencies, schools, clubs, businesses, and individuals. International Coastal Cleanup is an annual September event.

Past anti-littering efforts have focused on Laolao Bay. Beginning in 2011 extensive work went into developing the "Our Laolao" anti-littering campaign, which was launched on Saipan in March 2012 with CRCP funding; the campaign continued through 2013. DCRM, DEQ, DFW, and MINA partnered to support these efforts, which included a targeted "gorilla marketing" campaign that leveraged social media and community events to raise public awareness and engagement. Activities included youth art campaigns featuring the slogan *"Litter Free on Land and Sea",* flash-mob actions at local festivals and sports events, and even the "Knock-Out" of the "Litter Monster" at a Mixed-Martial-Arts competition, where the Our Laolao campaign premiered a commercial emphasizing "there's no room for trash here in our bay."[59] These social marketing efforts were featured in NOAA's Coastal Services publication in July 2014, which reported that the "[p]ost-campaign survey results showed a keen public awareness of the anti-litter message."[60] Tasi Rangers, a group engaged in monitoring beach litter, was also organized to support these efforts. In 2012 Tasi Rangers were trained in a MINA-led, agency-supported community enforcement workshop, and a number of dedicated volunteers continue these efforts today.

Other agency and privately funded beach clean-up efforts are also underway on the islands. Despite the extent of ongoing efforts to clean up marine debris, due to the fact that much of the marine debris at issue is washed up regularly from ocean sources and washed down to the shore from terrestrial sources, managing land-based beach/shore litter continues to be a challenge and an ongoing concern for the aesthetic and ecological integrity of our coastal resources.

[59] Our Laolao, Dec. 2012 http://www.ourlaolao.com/content/mma-vs-litter-monster. Accessed 3/2015.
[60] NOAA Coastal Services, *A social marketing campaign in Saipan targets litter in Laolao Bay,* Vol. 17, Issue 3, 2014, http://coast.noaa.gov/digitalcoast/sites/default/files/files/publications/11062014/July-Aug-Sept-2014.pdf?redirect=301ocm. Accessed 3/2015.

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High _____

Medium __X__

Low _____

2. *Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.*

The priority level of this enhancement area has been elevated from "low" in the 2011 - 2015 Assessment to "medium" in this current assessment, in part due to concerns expressed by stakeholders involved in the tourism industry, as well as input from agency representatives. While marine debris management continues to be a challenge, multiple agencies and institutions are addressing specific concerns within this enhancement area. DCRM anticipates continuing support of key programs such as the International Coastal Cleanup (ICC) and encouraging ongoing efforts to address land-based beach litter, and hopes to support marine debris removal efforts in coordination with other agencies as opportunities arise. BECQ submitted comments on the military's DEIS for the CJMT proposal emphasizing the need to remediate UXO and reduce sources of terrestrial and marine debris. Our agency is committed to continuing to encourage and support ongoing clean-up efforts of existing UXO and FUD sites, as well as mitigation of any new sources of pollution associated with live-fire training activities. DCRM's continued commitment to addressing sources of marine debris is reflected in programmatic goals to expand interagency coordination as well as existing education and outreach efforts. These efforts will continue, however, this enhancement area will not be given a high priority in this planning cycle.

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. §309(a)(5)

Resource Characterization:

1. *Using National Ocean Economics Program Data on population and housing,[61] please indicate the change in population and housing units in the state's coastal counties between 2012 and 2007.*

Trends in Coastal Population and Housing Units				
Year	**Population**		**Housing**	
	Total (# of people)	% Change (compared to 2000)	Total (# of housing units)	% Change (compared to 2000)
2000[1]	69,221 people	-22%	17,566 units	+18.7%
2010[2]	53,883 people		20,850 units	

1. 2000 Source: U.S. Census Bureau, 2000 Census for the Commonwealth of the Northern Mariana Islands
2. 2010 Source: U.S. Census Bureau, 2010 Census for the Commonwealth of the Northern Mariana Islands

2. *Using provided reports from NOAA's Land Cover Atlas[62] or high-resolution C-CAP data[63] (Pacific and Caribbean Islands only), please indicate the status and trends for various land uses in the state's coastal counties between 2006 and 2011. Puerto Rico and CNMI should just report current land use cover for developed areas and impervious surfaces.*

Distribution of Land Cover Types in Coastal Counties[1]		
Land Cover Type	**Land Area Coverage in 2011 (Acres)**	**Gain/Loss Since 2006 (Acres)**
Developed, High Intensity	4,389	N/A
Developed, Low Intensity	N/A	N/A

[61] See www.oceaneconomics.org/.
[62] www.csc.noaa.gov/ccapatlas/. Summary data on land use trends for each coastal state is available on the ftp site.
[63] www.csc.noaa.gov/digitalcoast/data/ccaphighres. Summary data on land use trends for each coastal state is available on the ftp site.

Distribution of Land Cover Types in Coastal Counties[i]		
Land Cover Type	**Land Area Coverage in 2011 (Acres)**	**Gain/Loss Since 2006 (Acres)**
Developed, Open Space	4604.5	N/A
Grassland	12,813	N/A
Scrub/Shrub	6,754	N/A
Barren Land	4,568	N/A
Open Water	4,102	N/A
Agriculture	715	N/A
Forested	52,579	N/A
Woody Wetland	266	N/A
Emergent Wetland	375	N/A
i. CNMI data based on 2005 C-CAP for Saipan, Tinian, Rota, and Pagan. Reported acreage is rounded to the nearest significant digit.		

3. *Using provided reports from NOAA's Land Cover Atlas or high-resolution C-CAP data (Pacific and Caribbean Islands only), please indicate the status and trends for developed areas in the state's coastal counties between 2006 and 2011 in the two tables below. Puerto Rico and CNMI report current land use cover for developed areas and impervious surfaces.*

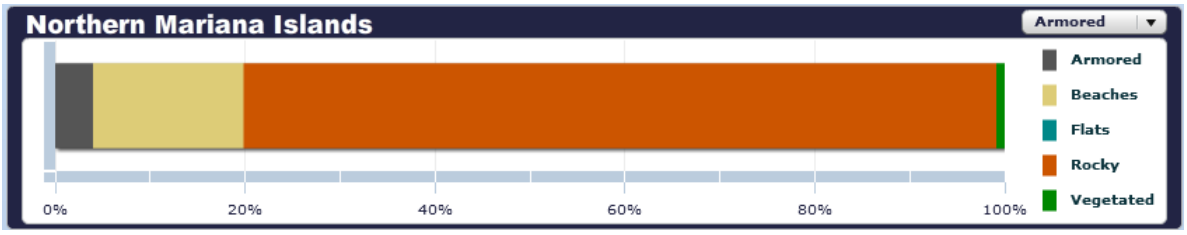
Development Status and Trends for Coastal Counties*			
	2006[i]	**2011**	**Percent Net Change**
Percent land area developed	32.3%	N/A	N/A
Percent impervious surface area	5.6%	N/A	N/A
** Note: Islands likely have data for another time period and may only have one time interval to report. If so, only report the change in development and impervious surface area for the time period for which high-resolution C-CAP data are available. Puerto Rico and CNMI do not need to report trend data.*			
i. Impervious cover provided for Saipan, Tinian, and Rota based on 2005 C-CAP data.			

4. *Using data from NOAA's State of the Coast "Shoreline Type" viewer,[64] indicate the percent of shoreline that falls into each shoreline type.*

Shoreline Types[i]	
Surveyed Shoreline Type	**Percent of Shoreline**
Armored	4%
Beaches	16%
Flats	N/A
Rocky	98%
Vegetated	2%
i. Shoreline types extrapolated from NOAA's State of the Coast Shorelines Assessment, based on 2005 Environmental Sensitivity Index Maps.	

[64] NOAA State of the Coast Shoreline Assessment, 2005, http://stateofthecoast.noaa.gov/shoreline/welcome.html.

Shoreline Characterization, NOAA State of the Coast Shorelines Assessment



5. *List and summarize results of any additional state- or territory-specific data or reports on the cumulative and secondary impacts of coastal growth and development, such as water quality and habitat fragmentation, since the last assessment to augment the national data sets.*

Increasing Coastal Growth

As the U.S. Department of Commerce reports, the CNMI was smallest in population in 2010, with nearly 54,000 residents, most residing on the island of Saipan. Between 2000 and 2010, CNMI's population decreased by more than 15,000, or 22.2 percent. This trend contrasted with the one in the previous decade, when CNMI's population increased by 59.7 percent, with a majority of the growth in Saipan Municipality. However, a population increase of 7 percent has been projected for CNMI for the 2010–2020 decade. Census data also reflects an increase in housing units despite a reduction in population, highlighting growing development pressures despite a significant decrease in population. Expansion of development poses particular concern for water quality on Saipan, and DCRM's Marine Monitoring Team and Nonpoint Source Pollution Program continue to assess marine sites for potential impacts on Saipan, Tinian, and Rota. Additionally, BECQ-DEQ provides quarterly reports on water quality and nonpoint source pollution. These ongoing surveys indicate continued nutrient loading concerns, and the DEQ lab is in the process of seeking funding to expand testing capabilities to assess levels of specific contaminants of concern including heavy metals. Survey details and results from the most recent reporting period are included as figures at the end of this subsection, and discussed in the water quality characterization below.

Water Quality Impairment

In 2014 BECQ-DEQ's CNMI 305(b) and 303(d) Integrated Water Quality Assessment Report indicated that almost all coastal marine waters for the southern inhabited islands are not attaining at least one designated use, and therefore are listed as Category 5 using the Consolidated Assessment and Listing Methodology (CALM).[65] Category 5 waters are impaired or threated for one or more designated uses by a pollutant(s) and a TMDL is required. There are some exceptions to this trend in nonattainment. Aguigan Island (Tinian) and Banaderu Watershed on Saipan are unthreatened and fully supporting all uses and are therefore listed as "Category 1".

Additionally the Dugi/Gampapa/Chenco Watershed on Rota, Carolinas on Tinian, and the Dandan Watershed on Saipan was listed as "CALM Category 2" because some uses are met but not all are fully supported. Based on available studies and professional judgment BECQ-DEQ reports that the northern islands are attaining all of their designated uses and are thus designated as "CALM Category 1".[66] Impairment details from the 2014 report are included as tables at the end of this subsection.

Biological monitoring data on the three inhabited southern islands has generally been assessed as "fair" or "good" when situated away from large populated watersheds, and all sites on the outer barrier reef of Saipan have consistently received "high" or "fair" rankings. Similarly, most sites on the less populated islands of Tinian, Aguigan, and Rota also show ecologically resilient assemblages, with notable maintenance or improvement in coral metrics since 2003 and 2006 natural disturbance events (coral eating starfish predation). Although there has been no decline in rankings, a few sites have received consistently poor ratings over time. Biological monitoring suggests that degradation at these sites is likely due to a reduction in herbivory and/or water quality. These trends coincide with *Enterococci* water quality violations that are consistently higher in the more populated watershed and those with piggeries and cattle near streams and shorelines.[67] This data has been tracked to identify areas of management concern, and corroborates stakeholder observations that development and agricultural uses are significant CSI-driven stressors of concern.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if there have been any significant state-level changes (positive or negative) in the 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, since the last assessment.*

Management Category	Employed by State or Territory (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	Y
Guidance documents	Y	N
Management plans (including SAMPs)	Y	Y

[66] BECQ-DEQ, 2014, pg. 25.

2. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*
    c. *Characterize the outcomes or likely future outcomes of the changes.*

Management of Stormwater and Sedimentation Impacts on Water Quality

Development, especially on highly erodible soils, creates sedimentation that can lead to significant cumulative and secondary impacts to coastal resources including reef systems. After a CMP-driven review of the current regulations and discussions with NOAA and NRCS staff, it was determined that rather than creating highly erodible and highly permeable soils APCs, it would be more effective to address the issue of soil erosion through updating DCRM policies. A review of the DCRM regulations revealed several sections where soil erosion could be addressed. Adoption of locally feasible stormwater management best management practices and support of watershed management may be especially viable approaches to improving water quality and reducing risk of land-based pollution to coastal resources.

In 2005 Winzler & Kelly developed a Stormwater Management Plan for the Garapan II Drainage in Saipan, and the Horsely Witten Group published the CNMI and Guam Stormwater Management Manual the following year. A 2008 paper emphasized that sedimentation and water quality are particular concerns in the increasingly developed Garapan Watershed, where surface water sampling indicates elevated levels of fecal coliform, nitrates, phosphates, and turbidity, and recommended use of Low Impact Development to address stormwater challenges.[68] In 2007 the Office of Zoning published the Garapan and Beach Road Revitalization Plan, identifying short-term and long-term actions,[69] however, progress towards these goals has been slow. Permits were issued for a new phase of associated stormwater improvement projects in March 2015, and this project is proceeding. As discussed in more detail in the "in-depth resource characterization" section below, the 2014 CNMI 305(b) and 303(d) Integrated Water Quality Assessment Report indicates ongoing water quality impairment reflecting management challenges for coastal and terrestrial surface water systems.[70] Additionally, a 2015 nitrate report tracking groundwater quality on Saipan using data from 301 public and private wells provided detailed characterization and mapping of nitrate plus nitrite as nitrogen on Saipan.[71] While based on 2008-2009 data, this study indicates strong correlations between use of undeveloped areas for unsewered homesteading and agriculture with nutrient loading concerns. This is especially true in areas with thin soils over limestone, conditions which lead to poor attenuation of nitrate and other wastewater contaminants due to the presence of fractures and solution channels which promote very rapid infiltration.[72] These resources and studies highlight areas where DCRM may

[68] Kaspari, P. and Allen, S., 2008.
[69] CNMI Office of Zoning, 2007.
[70] BECQ-DEQ, 2014.
[71] Bearden, 2015 (publication pending).
[72] Bearden, 2015 (publication pending).

have opportunities to expand permitting regulations for new major development projects and enhance APC requirements and prohibitions to further minimize cumulative and secondary impacts associated with land uses that cause erosion, sedimentation, undesirable infiltration, and increased run-off.

Development Pressures Associated with Military Build-out

While management status addressing cumulative and secondary impacts has not changed significantly beyond the APC update in the past reporting cycle, development pressures are notably increasing, exacerbating threats that were highlighted in the 2011 - 2015 Assessment and Strategy Report. In addition to commercial development, as noted in prior sections, the expansion of military activities to Pagan and intensification of use on Tinian has been proposed in the draft Environmental Impact Statement (DEIS) for the CJMT, which was released on Friday, April 3, 2015. To whatever degree these actions are permitted, as currently written, this proposal is expected to increase impervious surface as well as land clearing and deposition of UXO and munitions constituents, which include potentially toxic and hazardous chemicals of concern. This proposed use will likely have negative impacts on stormwater runoff and groundwater recharge, posing additional management challenges in terms of cumulative and secondary impacts in the future.

The U.S. Department of Defense already holds a lease to the northern two-thirds of the island of Tinian (~60%), and their "no-action alternative" described in the current CJMT DEIS is to proceed with building the four firing ranges that have already been approved in the 2010 Mariana Islands Range Complex (MIRC) Record of Decision (ROD).[73] The MIRC consists of three primary components: ocean surface and undersea areas, training land areas, and Special Use Airspace. The first two of these three components are relevant to coastal resource protection under the Coastal Zone Management Act, as the DOD's MIRC ROD encompasses 501,873 square nautical miles (1,299,851 square kilometers) of open ocean and coastal areas extending from the waters south of Guam to north of Pagan and from the Pacific Ocean east of the Mariana Islands to the middle of the Philippine Sea, as well as range complexes totaling 64 square nautical miles (220 square kilometers) of land on Guam, Rota, Tinian, Saipan, and Farallon de Medinilla.[74] These activities are likely to result in additional negative cumulative and secondary impacts to coastal and marine resources due to physical and chemical changes associated with the proposed activities.

The CJMT proposal aims to increase training capacity and link ground-based activities with air and amphibious training on Tinian[75] and acquire land interests in order to implement combined

[73] CJMT EIS/OEIS, April 2015, pg. 2-102 – 2-108, citing Department of the Navy, Record of Decision for Mariana Islands Range Complex Training, July 20, 2010.
[74] CJMT EIS/OEIS, April 2015, pg. 2-103.
[75] CJMT EIS/OEIS, April 2015, pg. ES-7.

range and training areas that "maximize land use on Northern Pagan."[76] The CJMT proposal's preferred alternative for Tinian (Alternative 2) would disturb 2,025 acres (820 hectares) of ground and create 784 acres (319 hectares) of new impervious surface in the approximately 15,353 acre (6213 hectare) Military-Leased area.[77] Tinian's total land area is approximately 25,500 acres (10319.5 hectare). DCRM considers the proposed heavy use and disturbance of an additional 8% of the land on this small island to present potentially significant impacts, and will be submitting comments and recommended mitigations through the NEPA process. Comments from BECQ on the DEIS, written collaboratively by DCRM and DEQ staff, were submitted before the August 4, 2015 deadline.

The CJMT proposal aims to "acquire a real estate interest for the entire island of Pagan (approximately 11,964 acres, 4,443 hectares) from the CNMI government.[78] The CJMP proposal's preferred alternative for Pagan (Alternative 2) would disturb 697 acres (282 hectares) of ground and create 347 acres (140 hectares) of new impervious surface. Given the fact that Pagan is considered "conservation land" under the 1989 CNMI Public Land Use Plan, DCRM considers the CJMT's proposed acquisition of real estate interests and use of the northern portion of the island as a live-fire range to be incompatible with current management objectives and to pose risks of significant impacts to coastal and marine resources. BECQ-DCRM has and will continue to submit comments to this effect as well as address numerous potential conflicts with the CZMA through NEPA and the Federal Consistency process.

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High	X
Medium	
Low	

2. *Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.*

Given the increase in development pressures and continued threats to water quality associated with changing, intensifying land uses, existing live-fire activities on Farallon de Medinilla, as well as proposed live-fire activities on Tinian and Pagan, addressing cumulative and secondary impacts remains a high priority. Stakeholder input from 309 planning meetings identified management concerns regarding cumulative and secondary impacts, particularly in terms of impacts from degraded water quality and increased sedimentation and erosion.

[76] CJMT EIS/OEIS, April 2015, pg. ES-10.

[77] CJMT EIS/OEIS, April 2015, pg. 2-122.

[78] CJMT EIS/OEIS, April 2015, pg. 2-113.

Phase II Assessment - Cumulative and Secondary Impacts

In-Depth Resource Characterization

Purpose: To determine key problems and opportunities to improve the CMP's ability to address cumulative and secondary impacts of coastal growth and development.

1. What are the three most significant existing or emerging cumulative and secondary stressors or threats within the coastal zone? Coastal resources and uses can be habitat (wetland or shoreline, etc.); water quality; public access; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.

	Stressor / Threat	**Coastal Resource(s)/Use(s) Most Threatened**	**Geographic Scope - (throughout coastal zone or specific areas most threatened)**
Stressor 1	Polluted runoff from insufficient wastewater and stormwater management as well as sedimentation and erosion due to land clearing, conversion activities, and natural processes such as wave action and storms that may be increased due to climate change (as well as potential impacts associated with live fire activities proposed on Tinian and Pagan)	Water quality (surface, ground, and coastal), habitat	Primarily more developed areas of Saipan, but development pressures also increasing on Tinian and Rota, and CJMT poses additional use concerns on Pagan.
Stressor 2	Modification of shoreline (tree removal) and marine vegetation (sea grass removal) for "beautification" for tourism purposes	Habitat	Primarily on beaches near hotels on Saipan, but an increasing concern on Rota, and may be a concern if development proposals on Tinian move forward.
Stressor 3	Increasing extent and intensity of marine use for recreation and commercial activities	Habitat, water quality	Primarily on the heavily populated and high-tourist use areas on the west side of Saipan.

2. Briefly explain why these are currently the most significant cumulative and secondary stressors or threats from coastal growth and development within the coastal zone.

Polluted Runoff and Water Quality Concerns

In Saipan's Climate Change Vulnerability Assessment, the Climate Change Working Group indicated that water infrastructure has high exposure and a high likelihood of climate impacts island-wide. While wastewater infrastructure was rated as "fair and improving", stormwater infrastructure was rated as "poor to fair and deteriorating". In addition to compounding challenges of increased precipitation of extent of storm events due to climate change, the declining status was reported to be due to numerous non-climate threats including lack of funding, lack of capacity to maintain, confusion regarding who is responsible for managing stormwater infrastructure, and lack of education where people don't view stormwater management as a problem.[79] The current status of drinking water resources was also reported to be "fair/poor".[80]

Coastal aquifers and groundwater are also at risk of saltwater intrusion due to human use of Saipan's well systems,[81] as well as leaching pollution from a variety of land-based contaminants, including contaminants of concern from unexploded ordnances.[82] From 1998 through 2000 the sea level at Saipan's Sea Port varied between 0.55 ft. and 2.15 ft. above mean sea level. During this same period of time water levels in the coastal aquifers underneath the western coastal plain of Saipan ranged from 1.45 ft. to 2.55 ft.[83] This relationship demonstrates a strong hydraulic connection between sea levels and Saipan's coastal freshwater supply. These groundwater resources have an inherent sensitivity and exposure to sea level rise via the island's freshwater lens and aquifers, and the closer one gets to the coastline, the thinner the freshwater lens gets, increasing the chances of saltwater intrusion. Rising sea levels due to climate change may increase groundwater vulnerabilities.

During Conservation Action Planning (CAP) sessions for the Garapan Watershed (03/2015) and the Talakhaya-Sabana Watershed in Rota (04/2015), stakeholders expressed particular concerns regarding water quality and impacts of erosion and sedimentation on coastal resources. In Garapan conversations focused on impacts from increasing development pressures In Talakhaya, CAP participants expressed particular concern regarding impacts from illegal burning in the watershed area, as well as regarding pollutant loading from agricultural operations in the steep watershed. Participants in both CAPs noted concerns about negative effects from these impacts on coastal resources – in Garapan concerns focused primarily on aesthetic issues, while in Talakhaya stakeholders were concerned about food fish and invertebrate species. Reef health was implicated and discussed in both of these forums, and strategies to address these impacts were explored. In the Garapan CAP there was resounding consensus that improved management of development within this watershed is critical to address ecological and economic threats to coastal resources. Talakhaya stakeholders focused on the need for enhanced enforcement

[79] Saipan Climate Change Vulnerability Assessment Report, 2014, pg. 27.
[80] Saipan Climate Change Vulnerability Assessment Report, 2014, pg. 27.
[81] Wong & Hill 1990; Carruth 2003.
[82] Block, D., 2003; Pichtel, J, 2012; US EPA, 2014a & 2014b.
[83] Carruth, 2003.

capacity to reduce instances of illegal burning, as well as continued research and restoration of the highly erodible slopes. Recent outcomes and updates of the CAPs are discussed in further detail in the subsequent subsection on Special Area Management Planning.

Modification of Shorelines and Marine Vegetation

Shoreline modification and management of marine vegetation are commonly employed – especially in tourist areas – to make beaches appear more aesthetically inviting. Unfortunately, removal of native terrestrial and marine vegetation can have cumulatively negative impacts. Clearing of land vegetation can expose shorelines to increased wave energy and reduce sediment stability.[84] In addition to the habitat, shading, air quality, and carbon sequestration benefits, vegetative shoreline buffers stabilize the coastline. Removing these natural features can potentially make these areas more vulnerable to storm impacts and increases in sea level rise over time.

Similarly, removal of seagrass can destabilize marine sediments and negatively impact water quality. Seagrass meadows also dampen wave energy, reducing shoreline erosion, and providing essential food, habitat, and nursery grounds for a variety of ecologically, economically, and culturally important marine species such as parrotfish and sea cucumbers. Already sensitive to land-based pollution, disturbance from storm events, and seasonal environmental cycles,[85] cumulative effects of large-scale removal of seagrass may be detrimental to many marine species that are in turn already under stress due to depletion, habitat degradation, and impacts from climate change such as temperature increases and ocean acidification. Evidence further suggests that seagrass meadows are important CO^2 sinks[86] and may mitigate ocean acidification in coastal areas,[87] making their presence in CNMI's lagoon systems even more critical. Currently, beachfront hotels can legally remove seagrasses from up to 50% of designated swimming areas. DCRM's Marine Monitoring Team has been conducting biological monitoring of seagrass beds biannually and uses water quality data from 30 fixed stations collected by the BECQ-DEQ's Water Quality Surveillance and Nonpoint Source Pollution program to assess the impacts of water quality on the ratio of seagrass to algae. These findings are used to assist in determining whether or not a water body meets its "Aquatic Life and Propagation" designated use, which is incorporated into BECQDEQ's periodic CNMI Integrated 305(b) and 303(d) Water Quality Assessment Report. As coastal development and tourism continue to increase, DCRM will continue to work with hotels and other members of the marine tourism industry to encourage wise stewardship of seagrass beds and vegetative shoreline buffers.

[84] FAO, 2007.
[85] Houk, P., & R. Camacho, 2010.
[86] NOAA Coastal Blue Carbon, http://www.habitat.noaa.gov/coastalbluecarbon.html.
[87] Hendriks, 2014.

Cumulative Impacts from Increasing Commercial and Recreational Use

As noted above, small changes to the environment such as clearing of coastal vegetation, unchecked grazing activities, improper sewage management[88] and soil pollution,[89] can have significant cumulative and secondary impacts. DCRM enforcement staff have been conducting regular site visits of Marine Protected Areas, and frequently observe violations such as fish-feeding, littering, and standing on corals, as well as illegal harvest of marine resources in these restricted use areas. These seemingly insignificant acts can accumulate to disrupt habitat and alter species compositions in reef systems. Added to these stressors are noise, wave, and potential pollution impacts of increased boat traffic in surrounding areas.

3. Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat?

Emerging Issue	Information Needed
Threats to water quantity and quality	Water use modeling for Saipan, Tinian, and Rota, and enhanced water testing capabilities to support flow and littoral studies.
Possible cumulative and secondary impacts to coastal resources from climate change	Trends assessment of impacts of increasing temperatures, rainfall and storm events, and ocean acidification on indicator species and studies of implications for resources of concern.

In-Depth Management Characterization:

Purpose: To determine the effectiveness of management efforts to address identified problems related to the cumulative and secondary impacts enhancement objective.

1. For each additional cumulative and secondary impact management category below that is not already discussed as part of the Phase I assessment, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred since the last assessment.

Management Category	Employed by State or Territory (Y / N)	Significant Changes Since Last Assessment (Y / N)
Methodologies for determining CSI impacts	Y	Y

[88] Rapapaport, 1995.
[89] US EPA, 2001.

CSI research, assessment, monitoring	Y	Y
CSI GIS mapping/database	Y	Y
CSI technical assistance, education and outreach	Y	Y
Other (please specify)		

2. For management categories with significant changes since the last assessment briefly provide the information below.

a. Describe significant changes since the last assessment;

b. Specify if they were 309 or other CZM-driven changes; and

c. Characterize the outcomes or likely future outcomes of the changes.

Changes associated with vulnerability assessment mapping were discussed in the Coastal Hazards enhancement section and noted in the management characterization section above. Shoreline monitoring and coastal hazard assessments provide some level of baseline data for mapping, determining, and providing outreach regarding cumulative impacts from erosion due to sea level rise, storm surge, and coastal flooding. Extensive marine monitoring (DCRM-MMT) and water quality monitoring (DEQ) continues, and DCRM's planning team is working to incorporate this information into a data management system that will support permitting, enforcement, and planning efforts, as well as interagency needs in the future. It is anticipated that DCRM sections will rely on this system to track permit applications, communicate notice of hearings and decisions to the public, and easily inform enforcement officers of relevant conditions of permitted developments. Once this geo-spatial data management system has been launched, this 309-driven change will enhance the ability of DCRM to coordinate intra- and interagency actions to develop targeted regulations and policies to address specific causes of impairment and reduce cumulative and secondary impacts to the marine environment. BECQ is also exploring ways that this platform may be used to support public outreach efforts through citizen science projects, "see / click / fix" programs, or other engagement campaigns. Improvements in BECQ-DEQ water quality monitoring, such as inclusion of heavy metal and other specific contaminant data as well as integration of DEQ and DRCM data in a compatible geospatial management system will further enhance efforts to coordinate monitoring, permitting, and enforcement activities between these sister agencies under BECQ in the future

3. Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's or territory's management efforts in addressing cumulative and

secondary impacts of development since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state and territory's management efforts?

No studies have been conducted to specifically illustrate the efficacy of current efforts to address cumulative and secondary impacts, however, recent resiliency studies and continued marine monitoring from BECQ-DCRM and annual water quality reports from BECQ-DEQ do demonstrate overall system health, with Class AA marine waters,[90] and Class 1 freshwaters,[91] cumulative and secondary impacts remain a concern. Specifically, water quality data indicates impairment trends associated with impacts of development, alteration, and pollution of wetlands, especially in the more developed areas of Saipan. In the 2014 reporting cycle a total of 84.9 miles of coastline were reported as impaired for at least one use, and 74.3 miles of coastline in Saipan, Rota, and Tinian (or 87.5% of the impaired coastal mileage) was listed due to microbiological contamination as measured by the presence of *Enterococci* bacteria, resulting in impairment for recreational use designations. These challenges also present opportunities for interventions such as terrestrial pollution control efforts that address leading impairment sources such as wastewater and stormwater management. Continued monitoring and coordination will support adaptive management assessments of the success or shortcomings of programs developed to reduce cumulative and secondary impacts to marine resources.

Identification of Priorities:

1. Considering changes in cumulative and secondary impact threats and management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve the effectiveness of its management effort to better assess, consider, and control the most significant threats from cumulative and secondary impacts of coastal growth and development.

Management Priority 1: <u>Ensure monitoring programs are collecting necessary data to support management objectives.</u>

Description: The cumulative impacts of natural events such as shoreline change as well as certain currently permitted activities such as intensive motorized use in lagoon/reef systems and clearing of sea grass in designated swim zones are not well understood. Collection of data to help DCRM determine change rates, ecological thresholds, and carrying capacities of coastal systems

[90] As the 2014 Integrated 305(b) and 303(d) Water Quality Assessment Report from BECQ-DEQ report describes "[t]he CNMI WQS defines two classes of marine water uses, Class AA, and A. The majority of which are Class AA meaning that these waters should remain in their natural pristine state as much as possible with an absolute minimum of pollution or alteration of water quality from any human-related source or actions. The uses protected in these waters are the support and propagation of marine life, conservation of coral reefs and wilderness areas, oceanographic research, and aesthetic enjoyment and compatible recreation inclusive of whole body contact (e.g. swimming and snorkeling) and related activities. Class A waters in the CNMI are limited to the existing harbors. Two areas of Class A waters exist on Saipan including an area around the commercial seaport and an area centered on the outfall for the Agingan Point municipal wastewater treatment plan." BECQ-DEQ, 2014, pg. 4.

[91] As the 2014 Integrated 305(b) and 303(d) Water Quality Assessment Report from BECQ-DEQ report describes, the CNMI Water Quality Standards define "two classes of fresh water uses, Class 1 and 2. However, there are no Class 2 fresh surface waters in the CNMI. All fresh surface water bodies including intermittent streams, perennial streams, and wetlands are Class 1. … Therefore, all fresh waters should remain in a pristine state with an absolute minimum of pollution or alteration of water quality from any human-related source or actions in order to meet their Class 1 use designation." BECQ-DEQ, 2014, pg. 5.

would ensure regulations reflect best available science and are in fact achieving a healthy balance between resource use and protection.

Management Priority 2: Identify and adopt best management practices to address CSI of development and use activities to address pollution and erosion concerns.

Description: Impacts associated with development, land conversion, and heavy use continue to present threats to coastal and marine resources; control of stormwater runoff in flood-prone areas is a leading source of resource impairment. Lack of formal guidance regarding when it is appropriate to apply specific best management practices to development and resource use activities has led to a lack of standardized use of permitting conditions or mitigation requirements. While it is important to maintain flexibility, having a list of best management practices to address common use conflicts and resource impact mitigation requirements would expedite processing of APC and Major Siting permits as well as development of settlement terms if violations do occur. Expanding APC-specific mandatory conditions while creating incentives to support implementation of identified BMPs throughout the CNMI could provide DCRM as well as developers with a more streamlined and resource-responsive permitting system. In order to address threats of pollution and erosion from terrestrial land uses APCs that may especially benefit from expanded mandatory conditions include Shorelines and Wetlands and Mangroves. Particularly viable best management practices that could be incorporated into regulatory requirements include use of permeable pavement in well-draining areas, green infrastructure installation or enhancement in flood-prone areas, and pollutant removal mechanisms in highly impacted areas to address negative impacts associated with stormwater. Opportunities to enhance land management practices will enable DCRM to better address pollution and erosion concerns.

Management Priority 3: Promote wise use and management of marine resources through continued interagency coordination and education efforts.

Description: Opportunities to build buy-in and collaborate in policy development to address CSI impacts include interagency forums such as meetings with the Watershed Working Group and the Climate Change Working Group. These forums, however, require interagency commitments to continue collaborative management dialogs to support these efforts and implement their outcomes. Additionally, lack of support and capacity has made effective implementation of identified best management practices a challenge. Efforts to reduce cumulative and secondary impacts would be furthered through resource and region-specific planning that identifies and promotes wise resource use.

2. Identify and briefly explain priority needs and information gaps the CMP has to help it address the management priorities identified above.

Priority Needs	Need? (Y/N)	Brief Explanation of Need / Gap
Research	Y	Continued research needed to identify impacts and address knowledge gaps.
Mapping / GIS	Y	Continued mapping / GIS needed to identify impacts and address knowledge gaps.
Data and information management	Y	Continued data and information management needed to identify impacts and address knowledge gaps.
Training / Capacity building	Y	Continued training and capacity building needed to address knowledge gaps and enhance management approaches.
Decision-support tools	Y	Decision support tools may be helpful for future siting decisions and to address current management challenges.
Communication and outreach	Y	Communication and outreach needed to address knowledge gaps and enhance management approaches.

Enhancement Area Strategy Development:

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

Yes __Y___ No _____

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

Management priorities for the CSI enhancement area reflect the need to address ongoing impacts from bacteriological impairment of water quality due to terrestrial flooding as well as reduce resource risks of overuse and shoreline erosion. Strategies to support programmatic adoption of best management practices and enhancement of BMP implementation requirements will address terrestrial pollution impacts. A strategy to address erosion rates should establish buffers that are based on quantified erosion rates over a set period of time. Regulatory mechanisms are already in place and can be strengthened to address leading threats identified in this enhancement area.

CSI: Select Figures from DEQ Water Quality Report

2014 CNMI Coastal Water Designations and Impairments (DEQ, 2014)

Table 1 - Ocean Coasts - Designated Use Support Survey

Designated Use	Total in State (miles)	Total Assessed (miles)	Size of Surface Waters Supporting – Attaining WQ Standards (miles)	Not Supporting- Not Attaining WQ Standards (miles)	Insufficient Data and Information (miles)
ALL WATERS: (Class A & AA)					
Support and propagation of shellfish and other marine life	235.3	208.4	123.5	84.9	26.9
Fish/shellfish consumption	235.3	126.5	123.5	3.0	108.8
Recreation with risk of water ingestion	235.3	197.8	123.5	74.3	37.5
Aesthetic enjoyment/other uses	235.3	235.3	235.3	0.0	0.0

Table 2 - Size of Ocean Coast Waters Impaired by Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (miles)
Orthophosphate	340	84.9
Enterococci	215	74.3
Dissolved Oxygen	205	21.8
Bio-indicators of nutrient enrichment	448	30.4
Mercury in fish tissue	467	3.0

Table 3- Size of Coastal Waters Impaired by Sources

Source Category	EPA Source ID	Size of Waters Impaired (miles)
Upland Erosion/Sedimentation	21	32.6
Unknown Source	140	35.8
On-site treatment systems	92	25.0
Urban Runoff/Storm Sewers	177	25.0
Livestock (grazing or feeding operation)	143	16.8
Sanitary Sewer Overflows	115	12.6
Unspecified non-point source	141	10.8
Municipal Point Sources	85	5.7
Landfills	69	4.1

Table 4 - Rivers and Streams Designated Use Support Survey

Designated Use	Size of Surface Waters				
	Total in State (miles)	Total Assessed (miles)	Supporting – Attaining WQ Standards (miles)	Not Supporting- Not Attaining WQ Standards (miles)	Insufficient Data and Information (miles)
CLASS 1 WATERS (All CNMI Fresh Waters)					
Support and propagation of aquatic life	73.4	9.2		9.2	64.2
Fish/shellfish consumption	73.4	0.0			73.4
Recreation with risk of water ingestion	73.4	0.0			73.4
Domestic water supplies & food processing	73.4	0.0			73.4
Groundwater recharge	73.4	0.0			73.4
Aesthetic enjoyment	73.4	9.2		9.2	64.2

Special Area Management Planning

Section 309 Enhancement Objective: *Preparing and implementing special area management plans for important coastal areas. §309(a)(6)*[92]

Resource Characterization:

1. *In the table below, identify geographic areas in the coastal zone subject to use conflicts that may be able to be addressed through a special area management plan (SAMP).*

Geographic Area	Opportunities for New or Updated Special Area Management Plans
	Major conflicts/issues
Saipan Lagoon	Impacts from stormwater runoff, point source pollution, sewage overflows, and closed industrial facilities as well as conflicts between motorized and non-motorized recreation remain issues of concern.
Northern Islands Conservation Area	The Northern Islands are classified as conservation areas that may qualify for future special area management planning efforts. Currently Military Build-up and associated use conflicts are at an elevated level of concern – especially on Pagan – due to the release of the CJMT in March, 2015. Endangered species conservation, management of conservation areas, control of environmental impacts due to feral animal damage (ungulates and rodents), possible homestead development, and lack of data regarding wildlife, terrestrial, and marine resources continue to present challenges.

2. *If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of SAMPs since the last assessment.*

Current 309-driven efforts to support the Saipan Lagoon Use Management Plan (SLUMP) revision are underway with the execution of an RFP to conduct a user survey of uses and potential conflicts in the Lagoon, funded by NA14. Reprogramming is currently being sought to support a SLUMP update, which is scheduled to be conducted every five years. Increased use of this area has been a concern, and the SLUMP revision is expected to identify carrying capacities and use trends in order to support management projects that will inform and support policies to identify and address management issues. Additional resource-focused area-wide planning is being conducted through Conservation Action Planning efforts in watersheds in Saipan

[92] The Coastal Zone Management Act 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."

(Garapan, Laolao Bay) and Rota (Talakhaya/Sabana),[93] and these CAPs can be integrated into components of any SAMPs developed in the future.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could help prepare and implement SAMPs in the coastal zone.*

Management Category	Employed by State or Territory (Y or N)	Significant Changes Since Last Assessment (Y or N)
SAMP policies, or case law interpreting these	N	N
SAMP plans	Y – Saipan Lagoon Use Management Plan	Y – Northern Monument Planning ongoing; Saipan Lagoon Use Management Plan – updates pending

2. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*
    c. *Characterize the outcomes or likely future outcomes of the changes.*

Saipan Lagoon	Impacts from stormwater runoff, point source pollution, sewage overflows, and closed industrial facilities as well as conflicts between motorized and non-motorized recreation remain issues of concern. Continued assessment and planning efforts to review erosion and the health of seagrass beds, as well as pollution / discharge concerns in the lagoon continue in the 309-driven SLUMP revision.
Northern Islands	Military Build-up and associated use conflicts are at an elevated level of concern – especially on Pagan – due to the release of the CJMT DEIS in March, 2015. Endangered species conservation, management of conservation areas, control of environmental impacts due to feral animal damage (ungulates and rodents), possible homestead development, and lack of data regarding wildlife, terrestrial, and marine resources continue to present challenges.

[93] Conservation Action Plans (CAP) are in place for three priority watersheds: Laolao Bay and Garapan in Saipan and Talakhaya in Rota. Conservation Action Planning is a natural resource management framework that is gaining widespread use and success in Micronesia and other Pacific Island regions. See The Nature Conservancy, 2007.

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High _____

Medium __X__

Low _____

2. *Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.*

Addressing issues within the Garapan urban area and watershed in particular continues to be a focus for DCRM, DEQ and the Coral Reef Initiative that are being address in the Conservation Action Planning process. The Saipan Lagoon Use Management Plan (SLUMP) is an ongoing 309-driven effort, but the SLUMP revision is anticipated to be complete in FY16, and thus will not be a high priority during this planning cycle. The next updated SLUMP is anticipated to be conducted in 2021, and the prioritization of this project will be revisited at that time or earlier if pressing needs are identified in the 2016 update.

Ocean and Great Lakes Resources

Section 309 Enhancement Objective: Planning for the use of ocean resources. §309(a)(7)

Resource Characterization:

1. *Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW),*[94] *indicate the status of the ocean and Great Lakes economy as of 2010, as well as the change since 2005, in the tables below. Note ENOW data are not available for the territories. Territories can provide alternative data or a general narrative to capture the value of their ocean economy.*

Status of Ocean Economy for Coastal Counties (2010)				
	Establishments (# of Establishments)	**Employment** (# of Jobs)	**Wages** (Millions of Dollars)	**GDP** (Millions of Dollars)
Living Resources	*Data not available*	*Data not available*	*Data not available*	*$950,000 GDP reported in 2005*
Marine Construction	*Not significant*	*N/A*	*N/A*	*Not significant / Not available*
Marine Transportation	*0*	*N/A*	*N/A*	*N/A*
Offshore Mineral Extraction	*0*	*0*	*0*	*0*
Tourism & Recreation	*Data not available*			$99 M GDP reported from "Accommodations and Amusement" in 2012[95]
All Ocean Sectors	*Data not available*	*Data not available*	*Data not available*	*Data not available*

[94] Not available for CNMI.
[95] BEA, 2014.

Bureau of Economic Analysis – Report on Gross Domestic Product in CNMI 2007 - 2013[96]

	Line	[Millions of dollars]						
		2007	2008	2009	2010	2011	2012	2013
Gross domestic product	1	**867**	**846**	**717**	**716**	**649**	**665**	**682**
Personal consumption expenditures	2	**560**	**585**	**508**	**518**	**527**	**565**	**623**
Goods	3	357	387	342	368	374	422	472
Durable goods	4	135	138	118	132	118	144	180
Nondurable goods	5	222	249	224	236	257	278	292
Services	6	389	397	355	366	358	389	416
Net foreign travel	7	-186	-199	-188	-215	-206	-246	-265
Private fixed investment	8	**24**	**27**	**27**	**26**	**24**	**24**	**26**
Net exports of goods and services	9	**-69**	**-109**	**-165**	**-202**	**-268**	**-263**	**-318**
Exports	10	526	376	218	241	229	268	288
Goods	11	333	172	23	19	17	15	16
Services	12	192	205	195	222	212	252	272
Imports	13	595	486	382	443	497	531	606
Goods	14	512	417	327	379	426	455	521
Services	15	83	69	55	64	71	75	85
Government consumption expenditures and gross investment	16	**352**	**343**	**346**	**373**	**367**	**339**	**351**
Federal	17	13	16	21	21	21	22	20
Territorial	18	339	327	325	352	345	317	331

NOTE. Detail may not add to total because of rounding.

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2010)				
	Establishments (% change)	**Employment** (% change)	**Wages** (% change)	**GDP** (% change)
Living Resources	*Not available.*	*Not available.*	*Not available.*	*Not available.*
Marine Construction	*N/A*	*N/A*	*N/A*	*N/A*
Marine Transportation	*N/A*	*N/A*	*N/A*	*N/A*
Offshore Mineral Extraction	*N/A*	*N/A*	*N/A*	*N/A*
Tourism & Recreation	*Not specified.*	*Not specified.*	*Not specified.*	*+15% from 2011 to 2012* (Commerce, 2014)[97]
All Ocean Sectors				

The CNMI economy is highly dependent on tourism- IUCN reported that tourism accounted for 42% of CNMI's GDP in 2005.[98] A 2006 report indicated that Saipan's marine environment was estimated at $61.6 million per year, with market values making up 73% of the assessed total value and non-market values such as coastal protection and research comprising the remaining

[96] BEA, 2014.
[97] BEA, 2014.
[98] IUCN, 2010.

27% of total assessed economic value.[99] Despite positive trends in the tourism sector, the industry is highly sensitive to external shocks and has suffered from the recent financial crisis and increases in international fuel prices.[100]

2. *In the table below, characterize how the threats to and use conflicts over ocean and Great Lakes resources in the state's or territory's coastal zone have changed since the last assessment.*

Significant Changes to Ocean and Great Lakes Resources and Uses	
Resource/Use	**Change in the Threat to the Resource or Use Conflict Since Last Assessment** (+ / - / unkwn)
Resource	
Benthic habitat (including coral reefs)	+
Living marine resources (fish, shellfish, marine mammals, birds, etc.)	+
Sand/gravel	Unknown / No change
Cultural/historic	Unknown / No change
Other (please specify)	
Use	
Transportation/navigation	+
Offshore development[101]	Unknown / No Change
Energy production	No Change (some geothermal exploration)
Fishing (commercial and recreational)	+
Recreation/tourism	+
Sand/gravel extraction	Unknown / No Change
Dredge disposal	No Change
Aquaculture	No Change
Other (please specify)	Increase in siting of Fish Attraction Devices (FADs)

[99] van Beurkering et al., 2006.
[100] IUNC, 2010.
[101] Offshore development includes underwater cables and pipelines, although any infrastructure specifically associated with the energy industry should be captured under the "energy production" category.

3. *For the ocean and Great Lakes resources and uses in Table 2 (above) that had an increase in threat to the resource or increased use conflict in the state's or territory's coastal zone since the last assessment, characterize the major contributors to that increase.*

Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources												
Resource	**Major Reasons Contributing to Increased Resource Threat or Use Conflict** (Note All that Apply with "X")											
	Land-based development	Offshore development	Polluted runoff	Invasive species	Fishing (Comm & Rec)	Aquaculture	Recreation	Marine Transportation	Dredging	Sand/Mineral Extraction	Ocean Acidification	Other (Specify)
Benthic habitat – sea grass	X		X		X		X	X			X	X (increasing temperatures)
Benthic habitat – coral reefs	X		X		X		X	X			X	X (increasing temperatures)
*Living marine resources**	X		X		X	X	X	X			X	X (increasing temperatures)
* Note: This includes corals, sea turtles, sea cucumbers, reef fish, etc.												

4. *If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of ocean and Great Lakes resources or threats to those resources since the last assessment to augment the national data sets.*

Benthic Habitat Monitoring

BECQ-DCRM's Marine Monitoring Team, Nonpoint Source Pollution program, and BECQ-DEQ's Division of Water Quality Surveillance conduct regular assessments of reef flats or benthic habitat. Although variable, in the 2014 CNMI 305(b) and 303(d) Integrated Water Quality Assessment Report, DEQ reported that much of the benthic habitat in Saipan's watersheds was in "fair" condition, additional water quality data is indicative of stress in these systems, resulting in lower ratings in several cases. For example, although the benthic habitat of Kalabera Watershed received a "fair" rating that is sufficient for the "Aquatic Life Support and Propagation," the report noted that the water quality is nonetheless impaired due to poor nutrient levels, which, in addition to insufficient new data collection, lead to an "impaired"

listing.[102] Benthic habitat of North Susupe's coastal waters received a "fair" rating, and there was no reported change in the seagrass assemblages in the two testing sites in this lagoon, however, DO concentration in this watershed lead to an "impaired" water quality listing. The South Susupe watershed was listed as "impaired" for the "Aquatic Life and Propagation Use" due to dissolved oxygen (DO) exceedances and past reported nutrient levels. The coastal waters and surface waters of South Susupe are ranked as "Category 5" due to introduced species and *E.coli* exceedances in Susupe Lake. Nearshore coral reef ranking, coral diversity tends, and benthic substrate ratios are included at the end of this subsection (Tables 1 – 5).[103]

Reef Resilience Assessments

Recent research has been conducted on coral reef resilience in Saipan. An initial field-based vulnerability assessment was published in 2012,[104] and in 2015 a CNMI-wide coral reef resiliency study was published,[105] with an information sharing-webinar held in April 2015. These studies indicate that coral reefs in Saipan are severely threatened by climate change and human activities. A subsequent 2015 report, *"Coral Reef Resilience and Management in CNMI"* identifies numerous sites with high relative resilience, based on coral diversity, bleaching resistance, recruitment, herbivore biomass, macroalgae cover, temperature variability, nutrient input, sedimentation, fishing access, coral disease, and anthropogenic impacts.[106] The report notes that coral recruitment as measured by densities of coral recruits <5cm per meter^2 was generally greater on average in Saipan and Tinian/Aguijan than in Rota, which had relatively lower resilience potential rankings in part due to the poor connectivity of this more remote island. These studies identify high and medium resilience sites, which are located throughout Saipan's reef habitats; low resilience sites are all located in the Saipan lagoon. These studies suggest management interventions may be needed to enhance coral reef resilience in CNMI.

Local Threats to Reef Health and Urban Runoff

Saipan's coral reef ecosystems continue to be stressed by human-induced threats that vary in nature, magnitude, extent, and location. Local land uses and development patterns as well as topography and soil types have led to increased sedimentation and nutrient pollution threats to Saipan's western and southeastern reefs. The impact of outfalls on Saipan (Tasi, Agingan, and Puerto Rico) is also suspected to be detrimental to the benthic habitat.[107] Historically, treatment of secondary roads with crushed limestone without addressing drainage problems created chronic sedimentation problems along Laolao Bay and Obyan Beach (see Figure 1 at the end of this subsection for a map of anthropogenic threats to coral reefs in Saipan).[108] Despite these

[102] BECQ-DEQ, 2014.
[103] BECQ-DEQ, 2014.
[104] Maynard et al., 2012.
[105] Maynard et al., 2015.
[106] Maynard et al., 2015.
[107] van Beurkering et al., 2006
[108] van Beurkering et al., 2006.

management challenges, recent restoration efforts in the Laolao watershed are expected to improve water quality and decrease algal cover, thus having a positive influence on the Laolao reef in the future.[109] Improvements at Laolao Bay were driven by multi-agency support of a Conservation Action Planning (CAP) process, finalized in 2008- 2009.

As the Conservation Action Plan published in February, 2009 described:

> *On December 10, 2008, representatives from various resource agencies and organizations came together to complete the CAP process for Laolao Bay using updated software called Miradi (www.miradi.org) and to use it to develop a management plan for the site. These agencies included: DEQ, CRM, DFW, and the Mariana Islands Nature Alliance (MINA). This effort was coordinated by the CNMI Coral Reef Initiative and facilitated by TNC – Micronesia Program, and the US National Oceanic and Atmospheric Administration NOAA. This group discussed and came to consensus around several major topics that were aimed at moving the group and plans forward, and made the following recommendations.*
>
> > *• The CAP should be part of an over-arching CNMI Local Action Strategy. Any further LASs (CAP or other) should be site specific, ridge to reef, ecosystem-based, coordinate agency efforts, and undergo a comprehensive management planning process such as the CAP.*
> >
> > *• CNMI should aim to implement four CAPs: one on Tinian, one on Rota, and two on Saipan (Laolao and one other). Other CAPs should begin development after the Laolao CAP begins implementation and it is shown that there is enough capacity, and funding to continue new sites.*
> >
> > *• The Laolao CAP Team should meeting at least annually to review CAP progress, prioritize projects for CRI grant funds and develop an annual workplan. This group will provide these annual workplan recommendations to the policy committee for adoption.*
> >
> > *• 70 – 80% of coral reef management grant funds should be used to support implementation of the CAP annual workplan. 20 – 30% should be left for coral coordination staff/ travel/ and other priority projects.*
> >
> > *• Future CAP/LAS processes should include community/stakeholder group input from the beginning of the process.*[110]

[109] Reef Resilience, 2014.
[110] Laolao Conservation Action Plan, 2009.

This project led to stormwater drainage infrastructure improvements as well as a continuing revegetation campaign. The Laolao CAP was not revisited as of 2015, but may present an opportunity for DCRM-supported review in the upcoming planning cycle.

The Conservation Action Plan (CAP) process is represented by four major steps which work together to form a cyclical analysis of conservation planning. The cycle starts with defining the project, which includes identifying stakeholders, as well as the project scope and focal targets. During this initial step, partners examine target viability, rate critical threats to the focal targets, and perform a situation analysis. Then, the project team develops objectives, strategies and actions to be performed and implemented in order to mitigate threats and improve the health of the focal conservation targets. These steps are followed by the gradual implementation of the strategies and measures, then the use of the results to adapt and improve before beginning the process again. The process helps groups to focus on certain conservation aims, threats and strategies by engaging key stakeholders and team members to achieve desired outcomes, measure their achievements and reevaluate and continue their progress.[110] In March 2015 the Garapan watershed CAP was updated, and updates are underway for the Talakaya watershed in Rota. While these efforts are led by the NOAA-CRI-funded Watershed Coordinator, DCRM staff attended and provided input to and support of these efforts. Stakeholder feedback received in these CAP meetings has been considered and in incorporated into DCRM planning objectives and management goals.

Additional coordinated efforts to address water quality challenges continue throughout the islands – especially in homestead areas with unconnected waste systems and lands in agricultural production. These include cooperative enforcement visits with members from DEQ, DCRM's Water Quality and Planning sections, Zoning, and coordination between DEQ and DCRM in the development of guidance regarding best management practices for infrastructure and development proposals. Similarly, DEQ and DCRM worked closely to identify and address water quality concerns regarding the proposed military build-up and live-fire training on Tinian and Pagan to develop comments on the CJMT. These activities connect directly to agency enforcement, permitting, and planning scopes and also further goals of supporting interagency efforts to identify and control terrestrial sources of pollution that may negatively impact ocean resources.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if any significant state- or territory-level changes (positive or negative) in the management of ocean and Great Lakes resources have occurred since the last assessment?*

[111] Garapan Conservation Action Plan, 2013; The Nature Conservancy, 2007.

Management Category	Employed by State or Territory (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	N
Regional comprehensive ocean/Great Lakes management plans	N	N
State comprehensive ocean/Great Lakes management plans	N	N
Single-sector management plans	Y	N

2. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*
    c. *Characterize the outcomes or likely future outcomes of the changes.*

No significant changes have occurred in territory-wide or regional management plans since the last assessment. While area-specific management planning has been implemented by DCRM in the Saipan Lagoon, and in other Marine Protected Areas by DLNR-DFW, as discussed in the previous SAMP section, resource conflicts still exist and are being amplified with increased development pressures. Resource-specific management efforts to address water quality concerns in key watersheds through the Conservation Action Plan (CAP) process have yielded policy guidance and continued interagency dialogs and support, and these plans are updated periodically, but these efforts are not CMP-driven or comprehensive in scale at this time.

As detailed in the SAMP enhancement area discussion in the 2011-2015 309 Assessment and Strategy Report, DCRM-supported conservation action planning efforts have facilitated several restoration projects in Laolao Bay that address sources of land-based and ocean-based pollution such as erosion, sedimentation, beach litter, and marine debris. These include DEQ-led ARRA-funded erosion and sedimentation control efforts through the implementation of stormwater control infrastructure as well as periodic revegetation and beach clean-up efforts. The Laolao Conservation Action Plan (CAP) is an ongoing cooperative effort between local stakeholders and resource management agencies including DCRM, DEQ, DLNR/DFW, HPO, MINA, and The Nature Conservancy (TNC), which emphasizes the need for collaboration between resource agencies and the Attorney General's Office to increase compliance with existing laws and regulations. The 2009 CAP called for CRI sponsorship of a neighborhood "Tasi Watch" (Ocean Watch) program that continues to enable local groups to partner with regulatory agencies to provide on the ground monitoring for violations, which includes a moratorium on the take of sea cucumbers in this area. The CRI-led Laolao Pride Campaign was launched in 2013 and continues outreach and education activities, including campaign-focused school visits and free watershed

hike field-trips. Ongoing management projects in this Marine Protected Area continue to engage many volunteers and community members through revegetation and maintenance activities, signaling ongoing community support of these efforts.

3. *Indicate if your state or territory has a comprehensive ocean or Great Lakes management plan.*

Comprehensive Ocean/Great Lakes Management Plan	State Plan	Regional Plan
Completed plan (Y/N) (If yes, specify year completed)	N	N
Under development (Y/N)	N	N
Web address (if available)	N/A	N/A
Area covered by plan	N/A	N/A

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High __X__

Medium _____

Low _____

2. *Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.*

Ocean resource management planning was identified as a high priority enhancement area in the previous 309 Assessment and Strategy Report due to user conflicts and threats that were being amplified by development pressures, climate change, and high demand for fisheries resources. These pressures have only increased in the last planning cycle, however, in the past planning periods sufficient funds and staff time were not dedicated to supporting development of a single strategy to address these threats. Instead of following the lead of Hawaii's Coastal Zone Management Program, as was proposed in the 2011-2015 plan, DCRM will focus on developing agency-specific regulations and guidance that address key user conflicts such as motorized and non-motorized use conflicts in the Saipan Lagoon and Areas of Particular Concern. Threats and impacts discussed in other sections of this report such as water pollution and marine debris will both be targeted through agency-driven rule-making as well as interagency management

discussions where possible. Agency representatives and stakeholders alike agree that addressing ocean resource management challenges is critical. The strategies described in this five-year plan will provide DCRM with a process to identify and incorporate critical regulatory updates into permitting, enforcement, and planning decisions, as well as ways to work with the community and other agencies to develop plans and projects that will address key stressors to ocean resources.

Phase II Assessment - Ocean and Great Lakes Resources

In-Depth Resource Characterization:

Purpose: To determine key problems and opportunities to enhance the state CMP to better address cumulative and secondary impacts of coastal growth and development.

1. What are the three most significant existing or emerging stressors or threats to ocean and Great Lakes resources within the coastal zone? When selecting significant stressors, also consider how climate change may exacerbate each stressor.

	Stressor / Threat	Geographic Scope - (throughout coastal zone or specific areas most threatened)
Stressor 1	Polluted runoff from nutrient loading, insufficient wastewater, and stormwater management as well as from hazardous UXO materials	Primarily more developed areas of Saipan; UXO impacts are primarily a concern on Saipan and Tinian, although some UXO recovery and control is also being conducted on Rota.
Stressor 2	Temperature increase / ocean acidification due to climate change	Global threat, marine systems in general
Stressor 3	Overuse / misuse and local depletion	Some areas are subject to higher use pressures or are more depleted than others, but these stressors are of concern throughout the regional.

2. Briefly explain why these are currently the most significant stressors or threats to ocean and Great Lakes resources within the coastal zone.

Stakeholder feedback and water monitoring data indicate that polluted runoff is a concern for terrestrial and marine water quality. Additionally, growing pressures within marine systems are leading to use conflicts, and misuse is increasing degradation of already limited ocean resources. Marine system operators specifically have expressed frustration regarding negative environmental impacts due to marine debris and misuse of resources due to lack of education and knowledge of some user groups as well as economic impacts due to activities of unpermitted

operators. Negative effects from climate change such as rising temperatures and ocean acidification will continue to exacerbate many of these pressures.

3. Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat?

Emerging Issue	Information Needed
Impacts of climate change on seagrass and keystone species and habit is unclear.	Continued / expanded monitoring and data collection.
Community resilience in terms of ocean resource livelihoods that may be impacted by changing climate conditions and increased use pressures.	Enhanced socio-economic data; long-term resource use studies.

In-Depth Management Characterization:

Purpose: To determine the effectiveness of management efforts to address identified problems related to the ocean and Great Lakes resources enhancement objective.

1. For each of the additional ocean and Great Lakes resources management categories below that were not already discussed as part of the Phase I assessment, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred since the last assessment.

Management Category	Employed by State or Territory (Y / N)	Significant Changes Since Last Assessment (Y / N)
Ocean and Great Lakes research, assessment, monitoring	Y	N
Ocean and Great Lakes GIS mapping/database	N	N
Ocean and Great Lakes technical assistance, education, and outreach	Y	N
Other (please specify)		

2. For management categories with significant changes since the last assessment, briefly provide the information below.

a. Describe significant changes since the last assessment;
b. Specify if they were 309 or other CZM-driven changes; and

c. Characterize the outcomes or likely future outcomes of the changes.

No significant changes in management since last assessment.

3. *Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's or territory's management efforts in planning for the use of ocean and Great Lakes resources since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state's or territory's management efforts?*

No studies have been published that directly illustrate the effectiveness of CNMI's ocean resource management efforts. In 2013 the Marine Conservation Institute published a report ranking CMP states based on "no-take %" of territorial waters.[111] CNMI was ranked 7th on this list, although only the top 13 of the 28 states and territories assessed actually had reportable no-take areas. At 0.21%, CNMI's marine protected areas still total significantly less than for example number one ranked Hawaii (22.94%) – Guam was ranked 8th, with 0.13% and American Samoa was ranked 10th with 0.08% no take area. While this report does not speak to effectiveness of protection, it is illustrative that CNMI policies have placed more of an emphasis on marine protection areas than other larger programs throughout the country.

A 2015 report, "Coral Reef Resilience and Management in CNMI" indicated that resilience potential varied greatly within and along islands in CNMI, with relative resilience of surveyed sites ranging from low to high.[112] Confirming management challenges associated with development and population growth, the report concluded that results strongly suggest human activities are impacting the resilience potential of coral reefs near population centers. Due to the relationship between herbivore grazing and coral settlement, the study suggests that conserving herbivorous fish is among the most important actions resource managers in CNMI can take to support resilience of local reefs, and notes that these results support continuing current gear restriction regulations. Despite discussion of stressors and management challenges, the 2015 Resilience study found that 70% – or 55 of the 78 survey sites – met at least one of 6 criteria researchers set to identify opportunities for potential management actions,[113] suggesting that continuing to target these resources may support enhanced system resilience and yield measurable results reflecting success of management efforts in the future.

[112] MCI, 2013.
[113] Maynard et al., 2015.
[114] Maynard et al., 2015.

Identification of Priorities:

1. Considering changes in threats to ocean and Great Lakes resources and management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to effectively plan for the use of ocean and Great Lakes resources.

Management Priority 1: Focus on building resilience and encouraging low-impact development to reduce terrestrial impacts on ocean resources through adoption of best management practices and incentive-based regulatory updates.

Description: Ocean resources are vulnerable to impacts from numerous terrestrial and marine uses. These impacts include chemical pollution, chemical changes, sedimentation, altered temperatures and ocean acidification due to global climate change. Addressing impacts from land and sea is essential to safeguard ocean resources. Local and regional efforts will be necessary to build resilience of ocean systems and reduce risks of negative impacts due to resource use, development, and global climate change to the ocean resources in CNMI.

Management Priority 2: Increase regulatory protection to address threats to reef health from urban runoff, sewage, and sedimentation by creating APC overlays to target specific anthropogenic threats to coastal reefs and ocean resources.

Description: Because threats to ocean resources are watershed specific, the absence of watershed-based planning that reflects current ecological conditions and future management priorities is a notable gap in the current regulatory framework. By assessing leading risks for specific watersheds regulatory guidance and requirements can be tailored to build resilience of coastal receiving waters that is responsive to the use pressures of each watershed.

2. Identify and briefly explain priority needs and information gaps the CMP has to help it address the management priorities identified above.

Priority Needs	Need? (Y/N)	Brief Explanation of Need / Gap
Research	N	
Mapping / GIS	Y	Some additional spatial tools may be helpful for informing planning efforts
Data and information management	N	
Training / Capacity building	Y	If enforcement / monitoring responsibilities expand additional training may be needed
Decision-support tools	Y	May be helpful to informing planning efforts

Communication and outreach	Y	Needed to gain support of changing rules / regulations and enhance resilience of human and marine communities

Enhancement Area Strategy Development:

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

Yes _X___No _____

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

Key concerns regarding threats to ocean resources management opportunities include climate change impacts and land- based pollution sources corresponding with efforts identified in other enhancement areas. Strategies to address these threats are complementary to those discussed in sections on Coastal Hazards and Cumulative and Secondary Impacts; building resilience and reducing terrestrial impacts are pressing needs that further management priorities across resource sectors, and these management goals will be furthered through combined strategies. Some foundation to address the resilience of coral reefs and associated resources has already been established through ongoing research supported by interagency partnerships, and as much as possible, DCRM will work to ensure 2016-2020 strategies align with existing and future management efforts. Because of the complex multi-jurisdictional nature of this enhancement area, DCRM will work to incorporate management considerations informed by ongoing research and best available science into correlating strategies to address impacts of land-based sources of pollution on ocean resources. Interagency collaboration will be critical to support these efforts. Additionally, although many of the management challenges identified in this assessment are large scale, due to the multi-jurisdictional nature of marine management resource-specific management focusing on pollution and stormwater management from land and specific use management in areas of particular concern may prove to be most viable over the next five-year planning cycle.

Figures and Tables – Ocean Resources

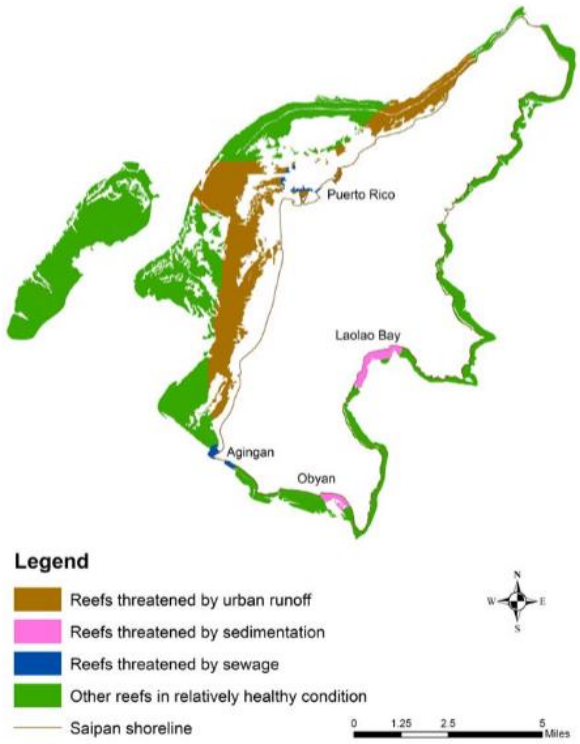


Figure 1 - Anthropogenic threats to coastal reefs in Saipan (van Beurkering et al., 2006).

Table 1 – Nearshore Coral Reefs, Aguigan (DEQ, 2014)

AGUIGAN								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
21	6	Aguigan	Significant decline from previous reporting period	No significant change during this reporting period	Good	Good	Not sampled during this reporting period	Fair

Table 2 - Nearshore Coral Reefs, Tinian (DEQ, 2014)

TINIAN								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
16	7	Masalok	No new data	No new data	Fair	Good	Good	Not sampled during this reporting period
17	9	Makpo	No significant change during this reporting period	No significant change during this reporting period	No ranking in previous reports	Fair	Poor[1]	Poor[1]
18	9	Makpo	No significant change during this reporting period	No significant change during this reporting period	Poor[1]	Poor[1]	Not sampled during this reporting period	Poor[1]
19	9	Puntan Diaplomani-bot	No significant change during this reporting period	No significant change during this reporting period	Fair	Fair	Not sampled during this reporting period	Fair
20	11	Puntan Tahgong	No new data	No new data	Poor[1]	Poor[1]	Poor[1]	Not sampled during this reporting period

Table 3 – Nearshore Coral Reefs, Rota (DEQ, 2014)

ROTA								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
22	1	Dugi/ Gampapa/ Chenchon	Significant decline from disturbance years	Significant recovery from disturbance year	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
23	2	Sabana/ Talakaya/ Palie	Significant decline from disturbance years, no significant recovery	Significant decline from disturbance years, no significant recovery	Fair	Fair	Fair	Fair
24	2	Sabana/ Talakaya/ Palie	No significant change throughout	No significant change throughout	Fair	Fair	Fair	Fair
25	2	Sabana/ Talakaya/ Palie	No significant change throughout	No significant change throughout	Good	Good	Good	Good
26	3	Songsong	No significant change during this reporting period	No significant change during this reporting period	Fair	Fair	Good	Good
27	3	Songsong	No significant change during this reporting period	No significant change during this reporting period	Poor[1]	Poor[1]	Fair	Fair
28	3	Songsong	Significant recovery from disturbance year	No significant change throughout	No ranking in previous reports	Fair	Fair	Good
29	4	Uyulanhulo/ Teteto	Significant recovery from disturbance year	Significant recovery from disturbance year	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Good
30	4	Uyulanhulo/ Teteto	No significant change during this reporting period	Significant decline from disturbance years	Fair	Fair	Good	Fair
31	5	Chaliat/ Talo	Significant decline from disturbance years	No significant change during this reporting period	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Poor[1]

Table 4 – Nearshore Coral Reefs, Saipan (DEQ, 2014)

SAIPAN								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
1	12	Kalabera	Significant decline from previous reporting period	No significant change during this reporting period	Fair	Fair	Good	Fair
2	14	Kagman	No significant change during this reporting period	No significant change during this reporting period	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Good
3	15	Laolao	Significant decline from disturbance years, no recovery	Significant decline from disturbance years, no recovery	Fair	Fair	Fair	Fair
4	15	Laolao	Significant decline from disturbance years, no recovery	Significant decline from disturbance years, no recovery	Poor[1,2]	Poor[1,2]	Poor[1,2]	Poor[1,2]
7	17a	Isley (west)	No new data	No new data	Fair	Poor[1,2]	Fair	Not sampled during this reporting period
5	17b	Isley (east)	No significant change during this reporting period	No significant change during this reporting period	Fair	Fair	Good	Good
6	17b	Isley (east)	No significant change during this reporting period	No significant change during this reporting period	Good	Poor[2]	Poor[2]	Poor[2]
8	18a	Susupe (north)	No significant change during this reporting period	No significant change during this reporting period	No ranking in previous reports	Good	Good	Good
9	19b	West Takpochau	No new data	No new data	No ranking in previous reports	Poor[1]	Fair	Not sampled during this reporting period
11	19b	West Takpochau	Significant recovery from disturbance year	No significant change during this reporting period	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Good
15	21	As Matuis	No significant change during this reporting period	Continuous significant recovery from disturbance year		Good	Good	Good
12	23	Managaha	No significant change during this reporting period	No significant change during this reporting period	Good	Good	Good	Good
13	23	Managaha	No new data	No new data	No ranking in previous reports	Good	Good	Not sampled during this reporting period

Table 5 – Nearshore Seagrass Assemblages, Saipan (DEQ, 2014)

SAIPAN							
Site No.	**Seg. No.**	**Segment Name**	**Description of Benthic Categories**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
53	18a	Susupe (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	No ranking in previous reports	Fair	Fair	Fair
55	18b	Susupe (south)	Seagrass abundance significantly greater than algae	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
56	18b	Susupe (south)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	Good	Not sampled during this reporting period	Not sampled during this reporting period	Fair
57	18b	Susupe (south)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	Good	Not sampled during this reporting period	Good	Fair
46	19c	West Takpochau (south)	No new data	Poor[1]	Poor[1]	Poor[1]	Not sampled during this reporting period
49	19c	West Takpochau (south)	Seagrass abundance significantly less than algae	Good	Good	Not sampled during this reporting period	Poor[1]
36	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of macro and seagrass statistically similar	Poor[1]	Fair	Good	Good
37	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
38	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	Poor[1]	Not sampled during this reporting period	Poor[1]	Fair
39	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
41	20b	Achugo (south)	No new data	Poor[1]	Poor[1]	Poor[1]	Not sampled during this reporting period
34	21	As Matuis	Seagrass abundance significantly less than algae	Good	Not sampled during this reporting period	Good	Poor[1]

Energy and Government Facility Siting

Section 309 Enhancement Objective: 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. §309(a)(8)114

Resource Characterization:

1. *In the table below, characterize the status and trends of different types of energy facilities and activities in the state's or territory's coastal zone based on best available data.*

Status and Trends in Energy Facilities and Activities in the Coastal Zone				
Type of Energy Facility/Activity	**Exists in CZ**		**Proposed in CZ**	
	(# or Y/N)	Change Since Last Assessment (+ / - / unkwn)	(# or Y/N)	Change Since Last Assessment (+ / - / unkwn)
Energy Transport				
Pipelines	Y	+ (currently being replaced with new line)	N	N
Electrical grid (transmission cables)	Y	No Change – Transmission cables and circuits in Saipan, Tinian, and Rota (~455 km)	N	N
Ports	Y	No Change – Ports on Saipan, Tinian, and Rota	N	Ports improvements contemplated for Tinian in CJMT DEIS and may be necessary for construction of Tinian Solid Waste Transfer Station operations, but neither of these proposals are well developed at the time of the writing of this report.
Liquid natural gas (LNG)	N	N/A	N	No

[115] CZMA § 309(a)(8) is derived from program approval requirements in CZMA § 306(d)(8), which states:

> "The management program provides for adequate consideration of the national interest involved in planning for, and managing the coastal zone, including the siting of facilities such as energy facilities which are of greater than local significance. In the case of energy facilities, the Secretary shall find that the State has given consideration to any applicable national or interstate energy plan or program."

NOAA regulations at 15 C.F.R. § 923.52 further describe what states need to do regarding national interest and consideration of interests that are greater than local interests.

Status and Trends in Energy Facilities and Activities in the Coastal Zone				
Type of Energy Facility/Activity	**Exists in CZ**		**Proposed in CZ**	
	(# or Y/N)	Change Since Last Assessment (+ / - / unkwn)	(# or Y/N)	Change Since Last Assessment (+ / - / unkwn)
Other (please specify)				
Energy Facilities				
Oil and gas	Y	No change	N	Current project proposals on Tinian will require the use of all current capacity of the existing generation facility, and Phase II of the Plumeria development will require additional energy capacity, however, only Phase I of this three-phase project is being permitted at this time.
Coal	N	No change	N	N
Nuclear	N	No change	N	N
Wind	Y (small scale)	No change	N	N
Wave	N	No change	N	N
Tidal	N	No change	N	N
Current (ocean, lake, river)	N	No change	N	N
Hydropower	N	No change	N	N
Ocean thermal energy conversion	(explora -tion)	No change	N	N
Solar	Y (small scale)	No change	N	N
Biomass	N	No change	N	N
Other (please specify)				

2. *If available, briefly list and summarize the results of any additional state- or territory-specific information, data, or reports on the status and trends for energy facilities and activities of greater than local significance in the coastal zone since the last assessment.*

Some ocean geothermal exploration is being conducted, but no significant changes to report. Two development proposals on Tinian – Alter City Group's Plumeria Resort and the Department of Defense's CJMT expansion – anticipate using the full capacity of the island's existing oil-powered generation facility, however, only Phase I of the Plumeria Resort has been permitted at this time.

3. *Briefly characterize the existing status and trends for federal government facilities and activities of greater than local significance in the state's coastal zone since the last assessment.*

No significant changes in the type or number of government facilities sited in the coastal zone have occurred since the last assessment report. In part due to the economic downturn, only one major permit for a government facility – the Tinian Waste Transfer Station, approved in October, 2015 – has been issued in this planning cycle. Although DCRM permitted a Solid Waste Landfill for Tinian in 2008, this project has not moved forward due to the Department of Defense's decision to not allow the siting of this facility on the lease-backed lands in Tinian. While site assessment for potential landfill construction on Tinian continues, the now approved permit for waste transfer facility will serve to address waste management needs in the interim. Similarly, there were no further efforts to develop a landfill on Rota during the past planning cycle. Waste management on Saipan, Tinian, and Rota remains a concern, and DCRM will continue to be involved in waste management and generation reduction discussions.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) that could facilitate or impede energy and government facility siting and activities have occurred since the last assessment.*

Management Category	**Employed by State or Territory** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	N
State comprehensive siting plans or procedures	N	N

2. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*

c. Characterize the outcomes or likely future outcomes of the changes.

Not applicable – no significant changes to report at this time.

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____

Medium _____

Low __X__

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Because there is no projected expansion of energy facilities planned at this time, this enhancement area will not be a priority in the next five years. However, given increasing energy demand associated with development proposals on Tinian, DCRM will work with CUC to encourage energy efficient development designs in permitted projects and will revisit the prioritization of this enhancement area in the next planning cycle if not sooner, should the need arise. Meanwhile, DCRM is exploring opportunities to incentivize renewable energy development and incorporation of energy efficient design in the permitting process in conjunction with climate impact reduction planning efforts. Similarly, DCRM will support efficient, effective, and ecologically sensitive waste management activities at current and proposed landfills and waste transfer station sites. While it is likely growth in this sector will rebound during the next planning cycle, current BECQ-DCRM and DEQ regulations will be adequate to ensure potential impacts to coastal resources are considered and mitigated as future projects arise.

Aquaculture

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. §309(a)(9)

Resource Characterization:

1. *Characterize the existing status and trends of aquaculture facilities in the state's coastal zone based on the best available data.*

Type of Facility/Activity	Status and Trends of Aquaculture Facilities and Activities[i]		
	# of Facilities[115]	Approximate Economic Value	Change Since Last Assessment (+ / - / unkwn)
Aquaculture farms	5	~$200,000	No change
Ponds	15	Unknown	No change
Tanks	51	Unknown	No change
Total		Production in 2009 was estimated at 10mt with a value of $56,000 USD.[ii] NMC-CREES reports economic value was approximately $200,00 in July 2015, just before Typhoon Souldeor.[iii]	+
i. Trends based on 2006-2011 309 Assessment and Strategy Report and most recent data available, described below.			
ii. Commonwealth of the Northern Mariana Islands Aquaculture Development Plan: 2011-2015, pg. 3			
iii. NMC-CREES estimation of market value, 2014-2015.			

2. *If available, briefly list and summarize the results of any additional state- or territory- specific data or reports on the status and trends or potential impacts from aquaculture activities in the coastal zone since the last assessment.*

While aquaculture production increased in the CNMI between 2002 and 2007 (see Table 1),[116] the Northern Mariana College's Cooperative Research Extension and Education Service (NMC-CREES) program reports there have been small gains in the aquaculture industry in

[116] Note – limited CNMI data is available on the Aquaculture Marine Mapper at this time. Guam/CNMI Aquaculture Marine Mapper, NOAA, http://www.pifsc.noaa.gov/MarineMapper/GCNMI/.

[117] 2007 Census of Agriculture, CNMI, Volume 1, Geographic Area Series, Part 56; USDA, Issued February 2009. http://www.agcensus.usda.gov/Publications/2007/Full_Report/Outlying_Areas/cnmi.pdf. Accessed 03/2015.

CNMI since the last reporting cycle, but that the recent impacts from the 2015 typhoon season derailed much of this progress. The CNMI Department of Commerce attributes lack of significant growth in part due to high utility, infrastructure, and shipping costs.[117] Despite these challenges, aquaculture was identified as a focal growth industry in the 2013 Economic Development Forum held by the Department of Commerce. The resulting report noted that the aquaculture industry is currently in the infancy stage in the CNMI, with the establishment of a successful shrimp production facility and small- scale tilapia farms, but that there is potential for near-shore and off-shore growth.[118] The plan notes that while the sustainable aquaculture "has proven to be a stellar example to the commercial viability of the aquaculture industry, the operational challenges inherent to doing business in the CNMI will continue to inhibit the maturation of the industry."[119] The report suggests that CNMI's aquaculture industry must be diversified in order to realize the greatest yield the industry has to offer. Efforts to accomplish this are currently underway with NMC - CREES sponsored Abalone project.

The 2013 economic development plan predicts that the diversification of the industry will "allow for advanced development through various product offerings. This dynamic will promote export activity versus that of a single product offering."[120] Aquaculture sales were reported to be $6,150 in 2002, $66,725 in 2007,[121] and $56,000 in 2009.[122] NMC – CREES reports that between 2014 and 2015, the estimated market value of aquaculture in CNMI was approximately $200,000, however, three facilitates operating in 2011 were destroyed by the August 2015 storm. Overall, while development has not been significant in this area, NMC-CREES is hopeful to continue to encourage growth of these programs to support the local economy. In July of 2015, USDA-NIFA awarded NMC-CREES a $570,000.00 3 -year research grant to conduct a study on the production of native Forktail Rabbitfish, *Signaus argenteus*, juveniles to facilitate and support the farming of marine finfish in the CNMI. This research may be a "game changer" for local aquaculture.

According to the 2011 CNMI Aquaculture Development Plan, aquaculture in CNMI is primarily based on tilapia and shrimp culture, although the industry is growing and there is an increasing recognition of both the potential and the need for aquaculture development. In 2011 there were eight tilapia farmers (five in Saipan, two in Rota, and one in Tinian). Saipan Aquaculture – the largest commercial producer of shrimp in CNMI – uses 32 concrete tanks with re-circulating systems.[123] These facilities were damaged in the 2015 typhoon season, and as of October, 2015, NMC-CREES reports a total of four active tilapia farm (three on Saipan and one on Rota) and one shrimp farm on Saipan.[124]

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[118] 2013 CNMI Economic Development Forum Report and Recommendations, Department of Commerce. http://commerce.gov.mp/wp-content/uploads/2013/09/FINAL-EDF-REPORT.pdf. Accessed 03/2015.
[119] CNMI Aquaculture Development Plan, 2011 – 2015, 2011, pg. 3-4.
[120] CNMI Aquaculture Development Plan, 2011 – 2015, 2011, pg. 3-4.
[121] 2007 Census of Agriculture, CNMI, Volume 1, Geographic Area Series, Part 56; USDA, Issued February 2009, pg. 4.
[122] 2007 Census of Agriculture, CNMI, Volume 1, Geographic Area Series, Part 56; USDA, Issued February 2009, pg. 4.
[123] CNMI Aquaculture Development Plan, 2011 - 2015, 2011, pg. 3.
[124] CNMI Aquaculture Development Plan, 2011 – 2015, 2011, pg. 3-4.
[125] Updated NMC-CREES data courtesy of Michael Ogo, Aquaculture Specialist / Program Leader, NMC-CREES.

Management Characterization:

1. *Indicate if the approach is employed by the state or territory and if there have been any state- or territory-level changes (positive or negative) that could facilitate or impede the siting of public or private aquaculture facilities in the coastal zone.*

Management Category	Employed by State or Territory (Y or N)	Significant Changes Since Last Assessment (Y or N)
Aquaculture comprehensive siting plans or procedures	Yes	No
Other aquaculture statutes, regulations, policies, or case law interpreting these	Yes	No

1. *For any management categories with significant changes, briefly provide the information below.*
    a. *Describe the significance of the changes;*
    b. *Specify if they were 309 or other CZM-driven changes; and*
    c. *Characterize the outcomes or likely future outcomes of the changes.*

There have been no significant changes in aquaculture regulations since the last reporting cycle, but some updates on previously reported projects are briefly detailed here. These projects and their advancement were not driven by 309 or other CZMA-driven changes, however, the DCRM program will remain involved with aquaculture permit applications, and will monitor development pressures in order to respond to new needs as they arise in this enhancement area.

The creation of the first comprehensive aquaculture management plan was mandated by the Legislature (Public Law 15-43 § 4, Commonwealth Code § 1362, January 14, 2007) and published in 2011. The plan prioritizes the further development of tilapia and marine shrimp aquaculture, and encourages development of marine finfish, freshwater crustacean, giant clam, and milkfish industries. Although the development of the plan was strongly supported by the CNMI government, implementation and industry expansion have not been extensive.

As the previous report noted, the Northern Marianas College – Cooperative Research Extension and Education Service (NMC-CREES) held a well-attended Open Ocean Cage Culture Symposium on January 26-27, 2011 to begin discussions regarding open water cage aquaculture in CNMI. In 2012 NMC-CREES held aquaculture presentations on Saipan on April 25 and Rota on April 27th, highlighting food security and "appropriate aquaculture systems."[125] While the NMC-CREES program is continuing to advocate for aquaculture expansion, they have had more

[126] Press Release: Free Aquaculture Presentations on Saipan and Rota, Marianas Variety, April 16, 2012. Available at http://www.mvariety.com/community-bulletin-sp-595/45655-free-aquaculture-presentations-on-saipan-and-rota.

success with aquaponics deployment. Because expansion of open cage aquaculture remains an emphasis of the NMC-CREES program, DCRM will continue to participate in meetings and workshops that will further clarify the direction that open water aquaculture will take in the upcoming years.

Enhancement Area Prioritization:

1. *What level of priority is the enhancement area for the coastal management program?*

High _____

Medium _X_

Low _____

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Although it has been identified as an area of potential growth, aquaculture is not currently a major industry in the CNMI. To date, there is only one large-scale aquaculture program in the CNMI, however, with the growing interest in aquaculture, there is a need for CRM to closely monitor emerging issues surrounding aquaculture programs. This enhancement area was ranked as a low priority in the last report, but, due to input from stakeholders and agency representatives, as well as the fact that aquaculture is a "focal area" of current development efforts, it has been given a "medium" rank for this reporting period. With the current economic environment DCRM does not expect to see major developments such as open ocean cage farming that fall outside of existing regulations, however, as ocean resource management planning is developed and regulations are enhanced, considering potential growth of this sector is warranted. In the meantime DCRM will continue to work with partners including NOAA, USFWS, and DLNR-DFW to monitor and reassess the priority level of this sector as needed.

IV. **Strategy to Meet Priority Needs: FY 2016 – 2020**

This section establishes a clear strategy (or strategies) the CMP plans to pursue during the five-year strategy period based on the management needs identified in the assessment for one or more of its high priority enhancement areas.

Strategy 1: Promoting Better Building and Development Practices through DCRM Permit Incentives

Issue Area(s)

The proposed strategy or implementation activities will support the following high-priority enhancement areas:

- ☐ Aquaculture
- ☐ Energy & Government Facility Siting
- ☐ Coastal Hazards
- ☐ Ocean/Great Lakes Resources
- ☐ Special Area Management Planning
- **X** Cumulative and Secondary Impacts
- ☐ Wetlands
- ☐ Marine Debris
- ☐ Public Access

Strategy Description

A. The proposed strategy will lead to, or implement, the following types of program changes:

- ☐ 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,
- **X** 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. ***Strategy Goal:*** The goal of this strategy is to incentivize the use of more environmentally friendly development and building practices in the CNMI. This strategy will prioritize building practices that will address two current issues facing the CNMI: (1) to reduce the impacts of stormwater runoff and non-point source pollution on the CNMI's shoreline and coastal waters, and (2) to build and enhance the resiliency of the CNMI's environment and communities in the face of a changing climate. The low-impact development (LID) building practices and enhancements identified through this strategy will be promoted as options to developers through an incentives program that will be built into DCRM's permitting system. This strategy will also include cooperative efforts with other regulatory and permitting agencies as well as the CNMI legislature with the goal of implementing similar incentives and practices outside of DCRM.

C. *Describe the proposed strategy and how the strategy will lead to and/or implement the program changes selected above.*

This strategy will be heavily focused on the research and development of a guidance document that will address three focus areas: (1) Technical research & analysis; (2) Social feasibility assessment; and (3) Incentives implementation study. This research and analysis will result in recommendations that prioritize which low-impact development practices may be the most technically appropriate and logistically feasible for the context in the CNMI, specifically considering the tropical environment and small and remote location. For the purposes of this strategy, "low-impact development" practices refer to any building or development practices and site design that are intended to manage stormwater runoff and build resiliency through the use of on-site natural features and design.

The results from research and analysis undertaken in this strategy will inform the development and implementation of an incentives program that will be incorporated into DCRM's permitting process to encourage developers to incorporate some of these identified best building practices into their development plans. If additional funding and resources can be obtained, the information resulting from this research will also be used to aid in the development of a toolkit or fact sheets that can be distributed to developers, members of the legislature, and other people of influence. These fact sheets would explain the different opportunities, their pros and cons, what situations they could be applied to, and outline the environmental, social, and economic reasons they may be good choices in certain situations. Should additional funding become available, the scope of this strategy could be expanded to include workshops and collaborations with external partners that may allow other regulatory agencies and decision making bodies to incorporate and promote similar building practices into their regulatory processes.

Needs and Gaps Addressed

The CNMI is currently experiencing a sudden and intense tourism development boom, in large part spurred by the opening of the Chinese tourism market and the influx of foreign investors. This surge in development will likely result in a dramatic loss of greenspace and permeable, natural surface, particularly in prime shoreline locations.

Stormwater runoff, erosion, non-point source pollution, and an overburdened and aging stormwater infrastructure system have continued to be identified as ongoing issues in the CNMI that contribute to the loss of top soils, localized flooding and erosion, diminished nearshore water quality, and the declining health of coral reef and other marine ecosystems. These problems will be exacerbated not only by this increase in development, but also by the changing weather patterns projected to impact the CNMI through climate change.

Currently there are few regulatory mechanisms that either require or suggest that environmentally friendly building practices be incorporated into development project. BECQ-DEQ does have soil erosion prevention measures built into their "One Start" permits that are intended to mitigate runoff during construction, but these do not address the long-term impact of the loss of permeable surfaces and vegetation. In addition, there is little social, political, or financial pressure for foreign investors to go above and beyond the bare minimum required environmental mitigation techniques. The idea of low impact development practices including natural infrastructure and other techniques is a relatively unknown concept in the CNMI. This strategy provides DCRM an opportunity to introduce these practices into the regulatory process as well as expand awareness and support of lower impact, more sustainable building practices with developers and potentially the public at large.

Most of the new development coming into the CNMI has strong political and social support; several political leaders are even calling for less regulatory oversight and expedited permit processing[3]. Given this political climate, any new regulations or permit restrictions that could be seen as hindering or slowing the development process would be unlikely to get the necessary approval of the DCRM Agency Board. Instead, including incentives that offer the

[3] "Hocog says permitting agencies should review development proposals in 3 days". *Marianas Variety*, 22 March 2016. http://www.mvariety.com/cnmi/cnmi-news/local/84720-hocog-says-permitting-agencies-should-review-development-proposals-in-3-days.

developers the opportunity to implement more environmentally friendly building practices in the DCRM permitting process is likely to be much better received.

Benefits to Coastal Management

If implemented properly, this incentives program would motivate developers to incorporate practices into their development plans that would mitigate stormwater runoff and build community and ecological resiliency. Stormwater runoff and its impact on marine ecosystems has been an ongoing issue facing the CNMI. Through this strategy, DCRM can work with the private sector to reduce the contribution of new developments to stormwater runoff and erosion and its impact on coastal and marine resources. When fully implemented, the goal is for this strategy to positively affect any and all development permits that fall under DCRM's jurisdiction. Not only does this strategy fall under the cumulative and secondary impact priority, but depending on the proposed locations of individual new developments, this strategy could also benefit wetlands and specific biologically sensitive or significant areas.

Likelihood of Success

DCRM believes that the likelihood of success of this strategy is high. The primary focus of this strategy is to affect changes to the DCRM permitting process. Because the intended program changes (1) require minimal cooperation from external partners and (2) will likely result only in an optional incentives program and not binding regulatory changes, DCRM does not anticipate resistance to implementing these program changes. In addition, the lack of technical resources within DCRM will not impact the likelihood of success of this program change because DCRM intends to contract out most of the technical work under this strategy to experts already experienced in the field of low impact development. Therefore, DCRM staff involvement will be limited to the development and oversight of contracts, including the review of draft materials, and the development and implementation of program changes when appropriate.

For any additional changes or partnerships that may grow out of this strategy, DCRM believes the likelihood of success is medium to low. Some smaller, less contentious changes could be achievable in other partner agencies. For example, DCRM's sister agency, Division of Environmental Quality, is currently pursuing a funding opportunity under EPA's Pollution Prevention grant program to research similar low impact development guidance, and there may be viable opportunities to partner and expand efforts here. Some infrastructure-specific recommendations may be especially relevant to partner agencies such as DPW and CUC – both members of the DCRM Agency Board. While DCRM's recommendations and incentives can create many ecological and economic gains on-site, it will be important to get interagency buy-in, especially regarding off-site infrastructure-specific recommendations. In addition, there have been recent concerns raised over "how much development is too much?"[4], and DCRM or its partners could leverage that concern to build support for these and other measures that would reduce the impact of new development on the CNMI's environment and communities. However, at present the influx of development has strong political and social support, so any dramatic changes outside of DCRM would be unlikely to be implemented unless supporting guidance presents a clear and convincing business case for these changes.

Strategy Work Plan

> **Strategy Goal:** The development and implementation of a program in the DCRM permitting system that will offer developers incentives to incorporate environmentally friendly and low impact building practices into development projects. These building practices will focus specifically on the reduction and mitigation of stormwater runoff and erosion as well as building and enhancing the resiliency of the CNMI's environment and communities in the face of a changing climate. A part of this strategy will include the development of a

[4] "How much development is enough for us?" Editorial by Congressman Gregorio Kilili Camacho Sablan. Marianas Variety, 10 March 2016: http://www.mvariety.com/cnmi/cnmi-news/editorials/84412-opinion-how-much-development-is-enough-for-us.

best building practices "Toolkit" that will be made available to developers, and the identification of opportunities to inform the CNMI public and its political and business leaders about these new building practices and their advantages.
Total Years: 5
Total Budget: $218,000 - $450,000, depending on the availability of outside funding.

Year(s): 1-2

Description of activities: A technical analysis identifying the best building practices that would be most beneficial and most appropriate for the CNMI, specifically how they would apply to a tropical environment as well as a small and remote locale. This analysis will focus on best practices that will address the cumulative and secondary impacts of stormwater runoff and erosion as well as improve the resiliency of the CNMI communities and environments. Potential areas of research could include but is not limited to:

- Low impact development (LID) opportunities;
- "Green infrastructure" such as raingardens;
- The creation and maintenance of living shorelines and natural shoreline buffers; and
- Maintaining a substantial amount of green space on development lots.

The resulting outcome of this research and analysis phase will be a guidance document that identifies potential "best building practices" opportunities that could be implemented in the CNMI given the ecological, technical, and geographic realities. With the available 309 funding this document will describe each opportunity including pros and cons as well as potential cost thresholds. Should more funding become available, a more robust description and analysis of each opportunity will help DCRM to develop thorough guidance documents that can be made available to developers, politicians, and the general public.

Another opportunity should additional funding become available could include the expansion address CNMI-wide concerns such as limiting the reliance on the CNMI utility infrastructure or reducing the development's carbon footprint. There are already potential opportunities for collaboration with DEQ and other agencies on similar projects, and DCRM expects additional collaboration opportunities will arise as more development projects are proposed.

Major Milestone(s): This task will result in a guidance document that will help DCRM identify which best building practices to include in the incentives program, as well as helping DCRM to develop the toolkit for developers to help them navigate what could be new and complex building practices.

Budget: $72,000 over two years for the minimum outcomes. This could potentially be expanded to a budget of $150,000 or more depending on the next steps DCRM hopes to pursue.

Year(s): 3

Description of activities: An implementation study will be conducted to look into which of the identified best building practices would be most applicable to the CNMI and how to best incentivize these practices. This could draw inspiration from other jurisdictions who have implemented similar incentives programs. This study will factor in the social and political context of the CNMI in order to ensure that the incentives implemented by DCRM will be enticing enough to actually motivate new developers to implement better building practices. This study could incorporate results from the development social feasibility study that is being conducted by the Marianas Visitors' Authority. The result of this study will be a report identifying which best building practices to include in DCRM's new incentives program and recommendations on how to best incentivize their use by developers.

Should additional funding become available, this report will be expanded to include a more robust social and political feasibility study. Through this study DCRM will address the unique demographic realities of the CNMI, including the large number of foreign developers and investors.

This expanded phase will also identify opportunities to promote these identified building practices through outreach and education to the general public, the political leaders, and new developers in an effort to build public support and publicity for these new building techniques.

Major Milestone(s): An implementation study and report detailing which best building practices to include in the incentives program, including a prioritization or ranking of the best building practices. The report will also detail recommendations for how to incentivize the practices. With additional funding, a study applying social and political feasibility to the technical analysis previously completed as well as ideas for an outreach campaign to promote the new best building practices.

Budget: $76,000 for the implementation study, $150,000 for the expanded implementation study with social and political feasibility study and outreach recommendations.

Year(s): 4-5

Description of activities: Once the research and analysis has been completed, DCRM staff will take the resulting recommendations and begin to incorporate this incentives program into the DCRM permitting system. This will possibly require an incremental approach, perhaps phasing in the incentives or implementing them on a few case study trial applications. A key component of this activity will be providing education and outreach about new methods and gathering feedback from stakeholders, other partner agencies, and the legislature and then adjusting the incentives program as needed.

Major Milestone(s): The outcome of this two year process will be the final and long-term implementation of an incentives program in the DCRM permitting system that entices and motivates developers to implement environmental friendly building practices, specifically to address stormwater runoff and coastal resiliency.

Budget: $50,000 over two years

Year(s): 5

Description of activities: Based upon the results of the research and analysis, a guidance document will be developed that can be distributed to developers to start providing them with information about possible environmentally friendly enhancements they can incorporate into their building plans and incentives to do so. This will be a basic document that will be distributed to developers, policy makers, business leaders, and other influential members of the general public in order to help promote the ideas behind low impact development and better building practices. This document will articulate information about the building practices that are being incorporated into the DCRM permitting incentives program, including suggestions for additional resources available.

DCRM expects that a basic guidance document could potentially be developed in-house or contracted out for about $20,000. However, a more robust and informative toolkit would be more beneficial for the purposes of this strategy. Should additional funds become available, DCRM intends to expand up on the above mentioned document and produce a more informative toolkit for distribution.

Major Milestone(s): A guidance document and possible toolkit that helps developers identify and implement possible best building practices in new developments.

Budget: $20,000 for the basic toolkit, up to $50,000 for a full guidance document and toolkit.

Year(s): 5

Description of activities: An important step for building support and possible motivation for the implementation of this incentives program would be the development and implementation of a public outreach and education campaign targeting policy makers, developers, and the general public. As mentioned in previous sections of this strategy, the use of low impact development practices is largely unknown and not often used in the CNMI. An outreach campaign would serve to build awareness, support, and possibly even social pressure for the use of low impact development practices on future developments.

This outreach and education campaign would be an important step in building public support and possible motivation for developers to take part in this new incentives program, and could take several different forms depending on the funds available. The priority target audience would be policy makers and key members of the development industry in the CNMI such as architecture and engineering firms, environmental compliance contractors, and business owners. If funding allows, this campaign could be expanded to include the general public.

This campaign does not fall within the current Section 309 budget. Therefore this campaign will only occur if additional funding and resources are acquired.

Major Milestone(s): The outcome of this campaign will be an increase in public awareness of the benefits of building practices, specifically how they can allow development to occur in ways that do not harm our coastal and marine environments.

Budget: $20,000-$50,000

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 CMP has made, if any, to secure additional state funds from the legislature and/or from other sources to support this strategy.*

DCRM can accomplish a basic research and analysis study and implement an incentives program under this strategy using the 309 funding that will be made available. However, this strategy will be much more effective and robust should other funds be applied to the project. DCRM does intend to apply other funds such as program income or other potential grant opportunities to this strategy in order to expand the scope and implement a more effective incentives program. For example, DCRM could work with DEQ to leverage funding opportunities through the EPA's 319 Nonpoint Source Management Program grant program to supplement this strategy and apply similar principles to DEQ's programs and permits as well.

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

While DCRM currently has some staff with subject matter expertise to support this project, to ensure a robust development of this research and recommendations, much of this research and analysis will be contracted out. The use and implementation of "eco-friendly" building and development practices is becoming increasingly common throughout the United States. Entire architecture and planning firms specialize in LID and other eco-friendly practices. However, these concepts are still relatively unknown and untested in the CNMI. DCRM believes it is most prudent to take advantage of the plethora of knowledge and experience that is continuously growing in the United States and therefore contract out initial research and recommendation aspects of this strategy to knowledgeable and experienced firms with this expertise. Section 309 funding will be used to fund the contracts necessary for the basic research and analysis, and as additional funds become available the scope of the research will be expanded as described above.

Projects of Special Merit (Optional): *If desired, briefly state what projects of special merit the CMP may wish to pursue to augment this strategy.*

This strategy will not directly address coastal hazards, therefore DCRM will not pursue Projects of Special Merit funding to augment this strategy.

Strategy 2: Coastal Hazards

Issue Area(s)

The proposed strategy or implementation activities will support the following high-priority enhancement areas:

- ☐ Aquaculture
- ☐ Energy & Government Facility Siting
- **X** Coastal Hazards
- ☐ Ocean/Great Lakes Resources
- ☐ Special Area Management Planning
- ☐ Cumulative and Secondary Impacts
- ☐ Wetlands
- ☐ Marine Debris
- ☐ Public Access

Strategy Description

A. The proposed strategy will lead to, or implement, the following types of program changes*:*

- ☐ 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;
- **X** 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,
- **X** 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. ***Strategy Goal:*** The goal of this strategy is to create a DCRM-specific coastal hazards guidance plan that will help DCRM better address and mitigate coastal hazards. A key component of this plan will be the development of an official agreement between DCRM and CNMI's Office of Homeland Security and Emergency Management (HSEM), such as a Memorandum of Understanding (MOU) or a Standard Operating Procedures (SOPs). This strategy will build and expand upon the sea level rise vulnerability work completed under the CNMI's 2011-2015 Section 309 Strategy. It will be informed by an enhanced social vulnerability assessment that will be completed to assess the way coastal hazards impact the different communities of the CNMI as well as a technical update and review that will use current sea level rise inundation models and be expanded to include other hazards.

C. *Describe the proposed strategy and how the strategy will lead to and/or implement the program changes selected above.*

This strategy seeks to create DCRM-specific coastal hazard mitigation and adaptation guidelines that are spatially explicit and targeted towards understanding the impacts of coastal hazards across multiple axis that include infrastructure, the environment, and communities. This strategy will expand upon the scope of the sea level rise vulnerability work conducted under the CNMI's 2011-2015 Section 309 strategy to include a wider range of hazards, specifically storm surge, localized flooding, and drought. This strategy will also include a large social vulnerability component, which will incorporate the unique demographics of the CNMI into hazard planning and mitigation.

This strategy will be comprised of three components:

- A social vulnerability analysis, which will include the development of a social vulnerability index and the conducting of a public survey to gather information about the CNMI community's experiences with coastal hazards;
- An update to the sea level rise models conducted under the previous Section 309 strategy with newly available data, and, should additional resources be available, the possible development of a data needs and gaps analysis to identify and prioritize data needs that will help with coastal hazard mitigation; and
- The development of a coastal hazards guidance plan for DCRM.

The social vulnerability analysis will result in a spatially explicit understanding of the degree of vulnerability of the various communities in the CNMI. This project will build off of the participatory mapping projects conducted in Tinian and Rota under the previous Section 309 strategy. In addition, the inundation maps created under the previous strategy will be updated using more recently available data, including IPCC AR5 data. As DCRM begins the groundwork to expand and include other hazards, a data needs and gaps analysis will be conducted to identify what data is available and what data gathering DCRM should prioritize to better address and mitigate coastal hazards.

All of this information will feed into the development of a coastal hazards guidance plan for DCRM, which will incorporate the social vulnerability assessment with the technical data that is available for the CNMI on the priority coastal hazards. This document will articulate recommendations for how DCRM can better address and mitigate the effects from coastal hazards, including ways in which DCRM can reach out and bring other agencies into the conversation. This plan will also include recommendations for other DCRM program changes and a framework for how to implement them, possibly as a project under the next Section 309 cycle. Potential program changes could include the incorporation of new data into DCRM's permitting decision support tool, currently being developed by the CNMI NOAA Coastal Fellow, or ways to expand and incorporate the coastal hazards guidance plan.

A key component of this coastal hazards guidance plan will be the building of an official relationship between DCRM and HSEM. This relationship will be officially agreed upon through a Memorandum of Understanding or the development of a shared Standard Operating Procedures or other medium that will lay the groundwork for future collaboration between the two agencies. Opportunities for collaboration include data sharing, hazard mitigation, and the pursuing of grant opportunities. DCRM and HSEM already have a good relationship, and under this strategy DCRM will continue to build on that relationship.

If the funding is available, DCRM would like to expand this DCRM-focused guidance plan to be a CNMI-wide Coastal Hazard Mitigation Guidebook, similar to that which was published by University of Hawai'i Sea Grant in 2003 (Hwang 2003). This guidance document would offer guidance to other agencies and private entities in the planning and siting of projects to mitigate the risks from coastal hazards.

Needs and Gaps Addressed

The Saipan Vulnerability Assessment created under the CNMI's 2011-2015 Section 309 Strategy focuses on sea level rise and inundation under various future sea level rise scenarios. Because the data necessary to do a similar sea level rise assessment on Tinian and Rota does not currently exist, when DCRM expanded to include Tinian and Rota the focus was more qualitative and included all coastal hazards. This strategy would continue that expansion in scope to include Saipan, as well as adding a social component to the analysis. Given the unique and diverse demographic makeup of the CNMI, this social component is particularly important. DCRM believes this is also quite timely given the very active 2015 typhoon season, which included the passing of multiple typhoons over the populated islands of the CNMI, and an ongoing ENSO cycle that is expected to include severe drought in the upcoming dry season.

The result of this project will be more robust and comprehensive recommendations on how DCRM, and hopefully the CNMI as a whole, can better address coastal hazards and their impacts to the CNMI community.

Benefits to Coastal Management

Creating a guidance document and coastal policy recommendations that apply to DCRM as well as the CNMI can help propel hazard mitigation planning forward. In particular, the establishment of an official relationship between DCRM and HSEM can facilitate a more cohesive CNMI-wide approach to coastal hazards, which will become especially important with the changing weather patterns projected for the Western Pacific under climate change scenarios. This document can also be a key step towards the long term goal of creating a BECQ-DCRM climate adaptation plan, and eventually a CNMI-wide climate adaptation plan.

Likelihood of Success

DCRM believes the likelihood of developing and adopting a DCRM-specific coastal hazards guidance plan is high. Given that the 2015 typhoon season was particularly intense, with Saipan, Tinian, and Rota each having a typhoon pass directly overhead in addition to numerous other storms passing nearby, there is momentum in the CNMI community for addressing coastal hazards. There is also worldwide attention on climate resiliency and adaptation, and with that the emergence of many additional funding opportunities that DCRM hopes to leverage.

DCRM believes the likelihood of an official agreement between DCRM and HSEM is medium to high, depending on the parameters outlined in the official agreement and the political and personnel situation in the CNMI when this agreement will be established. Staff from DCRM and HSEM have worked well together on previous projects including the most recent update to HSEM's Standard State Hazard Mitigation Plan, and DCRM is optimistic that this history and ongoing collaboration can be built upon and leveraged to create a more official agreement between the two agencies in order to better address coastal hazards.

DCRM believes the likelihood of an expansion of the coastal hazards guidance plan to be CNMI-wide is currently low, given the immense amount of technical and financial resources that would be required. However, even small steps in this direction would be beneficial to the communities of the CNMI, and DCRM intends to pursue opportunities and build relationships towards this end.

Strategy Work Plan

Strategy Goal: To develop and implement a DCRM coastal hazards guidance plan and to build and implement an official partnership between DCRM and HSEM to better address and mitigate the impacts of the four priority coastal hazards: sea level rise, storm surge, flooding, and drought.
Total Years: 5
Total Budget: $162,000 - $480,000, depending on availability of outside funds

Year(s): 1-3

Description of activities: A social vulnerability assessment will be developed to identify populations of the CNMI that are highly vulnerable to coastal hazards. This assessment will include the following:

- The development of a robust social vulnerability index that will be created using the most recent available data from the US Census and will incorporate the unique socioeconomic realities of the CNMI.
- A social survey that will be developed and administered to the communities on Saipan, Tinian, and Rota to identify people's own experiences with coastal hazards. This will be an expansion of the participatory mapping workshops that were conducted on Tinian and Rota under the previous Section 309 Strategy and should incorporate and build on the Tinian and Rota Vulnerability Assessments. The development of this survey will be informed by the Social Vulnerability Index.

- A social vulnerability assessment that will identify and detail how coastal hazards affect different segments of the CNMI community using data from the social vulnerability index and the public survey. This will possibly also include a mapping component that represents impacts and experiences geospatially, and the development of a hazards impacts matrix.

Major Milestone(s): The development of the social vulnerability index (Year 1); development and administration of the public survey (Year 2); and completion of the social vulnerability assessment (Year 3).

Budget: All of these projects could be completed by DCRM staff or contracted out if the technical capacity is not available and the funding is. The budget ranges from $70,000 for an in-house assessment and report to approximately $150,000 if it is contracted out.

Year(s): 1-2

Description of activities: The sea level rise inundation models that were created under the previous CNMI Section 309 Strategy will be updated using more recently available data, including IPCC AR5 data. A preliminary data needs assessment will be started to lay the ground work for the full data and information gaps analysis.

Should the opportunity or funding become available, a continuation of the data gaps and needs analysis will be useful to identify and prioritize data needs such as nearshore bathymetry data, especially for the Saipan lagoon, and LiDAR data for Tinian and Rota. This analysis could be contracted out, or possibly completed by NOAA OCM staff at the request of DCRM as a partner need. The result would be a needs assessment that also outlines a preliminary data acquisition plan. This analysis will be applied to all of the identified priority coastal hazards (sea level rise, storm surge, localized flooding, drought) and will keep in mind the long term goals of having the data necessary to apply more robust modeling and resilience tools to the CNMI for these hazards. For example NOAA's Sea, Lake and Overland Surges from Hurricanes (SLOSH) model (http://www.nhc.noaa.gov/surge/slosh.php), or the TNC Coastal Defense Project App (http://coastalresilience.org/our-approach/identify-solutions/coastal-defense/). This data gaps and needs analysis could then be used to justify future funding opportunities or partnerships to begin filling the identified gaps.

Major Milestone(s): Sea level rise inundation maps updated and preliminary data needs identified. Should the funding or opportunity arise, a comprehensive data gaps and needs assessment that identifies and prioritizes data gaps and outlines a preliminary data acquisition plan.

Budget: $10,000 for the minimum outcomes. Approximately $60,000 for all outcomes.

Year(s): 4-5

Description of activities: A comprehensive coastal hazards guidance plan for DCRM will incorporate the social vulnerability assessment with the technical data that is available for the CNMI on the four priority coastal hazards. This document will articulate recommendations for how DCRM can better address and mitigate the effects from coastal hazards, including ways in which DCRM can bring in other agencies. This plan will include a framework for building an official agreement between DCRM and the Office of Homeland Security and Emergency Management (HSEM). Through a mechanism like an MOU or agreed upon SOPs, DCRM will build upon its existing relationship with HSEM to build a partnership to better address and mitigate coastal hazards.

This plan will also include recommendations for other DCRM program changes and a framework for how to implement them, possibly as a project under the next Section 309 cycle. Potential program changes could include the incorporation of new data into DCRM's permitting decision support tool, currently being developed by the CNMI NOAA Coastal Fellow, or ways to expand and incorporate the coastal hazards guidance plan.

The robustness of this guidance plan will largely depend on the availability of funds outside of the allotted Section 309 funding. At a minimum this plan will incorporate the social vulnerability work completed earlier in the strategy and the data gaps and needs assessment and acquisition plan to identify opportunities for DCRM can work to expand its coastal hazards mitigation reach and better assist the most vulnerable communities of the CNMI. These identified opportunities may be based on geography, hazard type, demographics, or other factors that would make certain areas and certain communities more vulnerable.

If additional funding is available, the scope of this guide could be expanded such that it applies to all of the CNMI, not just the regulatory scope of DCRM. The optimal final result would be a Coastal Hazard Mitigation Guidebook similar to that published by University of Hawai'i Sea Grant in 2003 (Hwang 2003). An online component of this guide, including a "toolkit" or publically available hazard-targeted models or applications could support further deployment of these resources.

Major Milestone(s): A comprehensive coastal hazards guidance plan, including recommendations for program changes; the building of an official relationship between DCRM and HSEM to address and mitigate coastal hazards.

Budget: $62,000 - $250,000

Year(s): 5

Description of activities: During the final year of this strategy, DCRM will continue to work with HSEM to finalize the official agreement for a partnership to better address and mitigate the effects from coastal hazards.

Major Milestone(s): An official agreement between DCRM and HSEM that details the new partnership.

Budget: $20,000

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 CMP has made, if any, to secure additional state funds from the legislature and/or from other sources to support this strategy.*

DCRM can accomplish a basic social vulnerability analysis and implement a coastal hazards guidance plan under this strategy using the 309 funding that will be made available. However, this strategy will be much more effective and robust should other funds be applied to the project. DCRM does intend to apply other funds such as program income or other potential grant opportunities to this strategy. In addition, the CNMI was just recently awarded funding from the Department of Interior's Technical Assistance Program to hire a Climate Change Coordinator. This, along with funding that HSEM has opportunities to apply for, could work well to supplement the work occurring under this strategy and may offer opportunities for DCRM to build and leverage partnerships to achieve some of additional projects described above.

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

A new Climate and Coastal Hazards Specialist has recently come on board at DCRM with expertise in social science, so DCRM does intend to complete most of the social vulnerability analysis work in-house. However, if funding becomes available it may be prudent to contract out some of the work to expedite efforts and enhance outcomes.

The basic update of the sea level rise models can be done by DCRM's GIS Specialist, however, the more comprehensive data gaps and needs analysis would need to be outsourced. This is likely also the case with additional tool development, models, or applications. If funding is available, DCRM could look into contracting these project elements to an outside expert. DCRM could also work with NOAA OCM to leverage NOAA expertise to complete this portion of the data gaps and needs analysis as a partner need. However, no effort has been made at this time to fill this need.

Additionally, it is likely that DCRM will need to contract out the development of the coastal hazards guidance plan, as much of this information will likely fall outside of the technical expertise of DCRM staff. DCRM staff would work closely with contractors to ensure the development of these project elements meets the goals of this strategy.

Projects of Special Merit (Optional): *If desired, briefly state what projects of special merit the CMP may wish to pursue to augment this strategy.*

The focus of this strategy is identifying and building social resilience to coastal hazards, and therefore DCRM does intend to apply for assistance under the projects of special merit to augment the projects identified in this strategy. Specifically, if DCRM is able to obtain additional funds, the coastal hazards guidance plan for DCRM could be expanded to include hazard mitigation opportunities outside of the regulatory scope of DCRM, as mentioned in the Strategy Work Plan above.

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.

Strategy Title	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
Adopting BMP Development Incentives	$57,500	$14,500	$76,000	$26,000	$44,000	$218,000
	$78,000	-	$74,000	-	$80,000	$232,000
Coastal Hazards Adaptation Plan	$18,500	$61,500	-	$50,000	$32,000	$162,000
	-	$130,000	-	$188,000	-	$318,000
Total Funding	$76,000	$76,000	$76,000	$76,000	$76,000	$380,000
	$78,000	$130,000	$74,000	$188,000	$80,000	$550,000

1. The numbers in white boxes indicate expected CZMA Section 309 funds to be spent on the project, assuming $76,000 in 309 funding per year.
2. The numbers in light grey boxes indicate funding from other sources that could be used to help supplement each strategy. This funding could come from CRM program income or other grant sources and is not guaranteed.

V. Summary of Stakeholder and Public Comment

Stakeholder Input

In early 2015, DCRM held two meetings to obtain stakeholder feedback regarding challenges and opportunities for DCRM's priority enhancement areas. Stakeholders were asked to rank their top three enhancement areas and then provide comments on the biggest challenges and opportunities facing their ranked enhancement areas.

On 01/22/2015 DCRM convened a stakeholder meeting to discuss the 309 Assessment with representatives from partner agencies and key stakeholder groups, including:

- Department of Public Lands (DPL);
- Division of Fish & Wildlife (DFW);
- Office of Zoning;
- National Park Service (NPS);
- Micronesia Islands Nature Alliance (MINA);
- Hotel Association of the Northern Mariana Islands (HANMI);
- Historic Preservation Office (HPO);
- Marianas Visitors' Authority (MVA); and
- BECQ-Division of Environmental Quality.

On 02/05/2015 DCRM staff presented the 309 Assessment Survey to Marine Sports Operators who were participating in a DCRM-facilitated workshop on current management challenges and potential solutions in this sector. Of the twenty-five marine sports operators who attended the forum, nine provided comments on the 309 Assessment Survey.

Priority Rankings

Most stakeholders provided a 1 through 3 ranking of their top priorities. Several respondents marked their top three priorities with an "x" and did not assign a numerical ranking. Respondents from the agency and NGO stakeholder meeting overwhelmingly ranked wetlands as a top priority, with four respondents ranking it the number one priority enhancement area and two others listing it among their top three. Coastal hazards, public access, and special area management planning were each listed as a top three priority by four respondents at this meeting (see Table V-1).

Table V-1: Stakeholder Rankings – Agencies & NGOs

Enhancement Area	Ranking				
	1	2	3	x (no numerical ranking given)	Total
Wetlands	4	1	1	0	6
Coastal Hazards	1	2	1	1	5
Public Access	1	0	2	1	4
Marine Debris	0	2	1	0	3
Cumulative and Secondary Impacts	1	1	1	0	3
Special Area Management Planning	0	0	3	1	4
Ocean Resources	1	1	0	0	2
Energy and Government Facility Siting	0	1	0	0	1
Aquaculture	0	0	0	0	0

The respondents from the MSO meeting ranked coastal hazards as a leading area of concern, with six respondents listing it as one of their top three priority areas. Four MSO respondents listed ocean resources as a top three. Marine debris was listed as the number one priority by two MSO respondents, and listed as a top three by one other (see Table V-2).

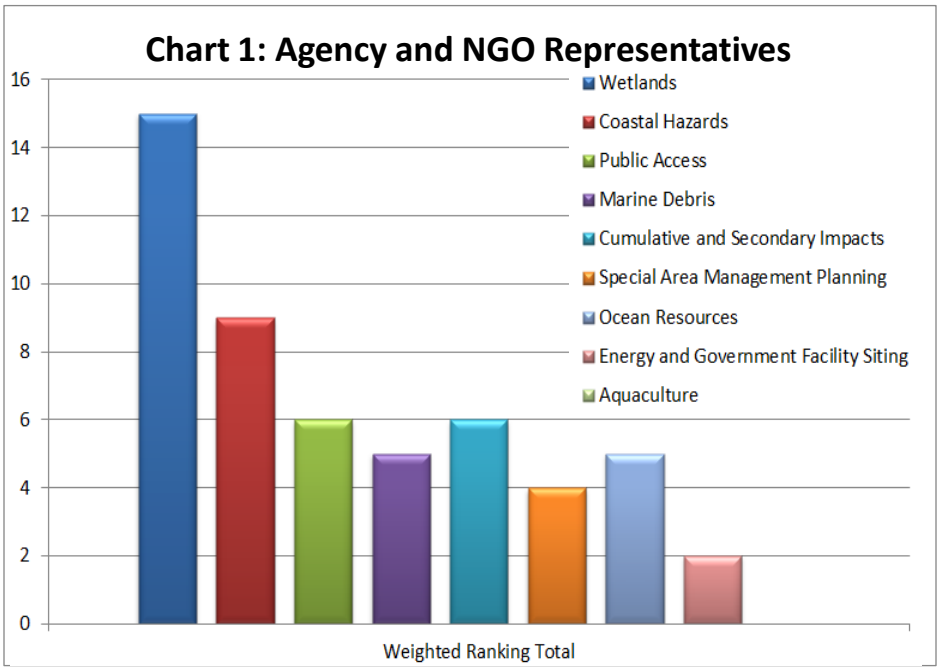
Table V-2: Stakeholder Rankings – Marine Sports Operators

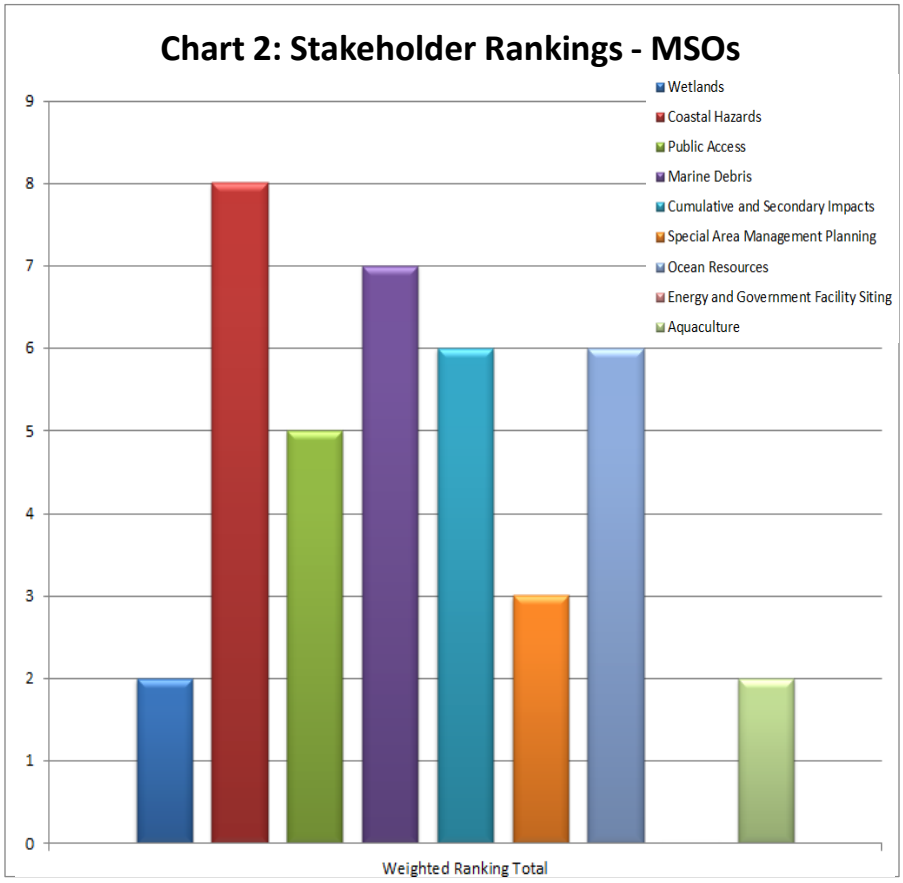
Enhancement Area	Ranking				
	1	2	3	x (no numerical ranking given)	Total
Wetlands	0	0	0	2	2
Coastal Hazards	1	0	2	3	6
Public Access	0	1	0	1	2
Marine Debris	2	0	0	1	3
Cumulative and Secondary Impacts	1	1	1	0	3
Special Area Management Planning	0	1	1	0	2
Ocean Resources	1	0	0	3	4
Energy and Government Facility Siting	0	0	0	0	0
Aquaculture	0	1	0	0	1

In order to better analyze and rank the responses, staff at DCRM weighted the respondent rankings according to the following point system: a ranking of 1 = 3 points, 2 = 2 points, and 3 = 1 point. In the cases of no numerical ranking, if the respondent only marked one priority it was given 3 points and if the respondent marked more than one priority each was given 1 point.

This weighted system placed heavier emphasis on enhancement areas that might have been listed by fewer respondents but were given higher priority. For example, only three agency and NGO stakeholders listed cumulative and secondary impacts as a priority, but the weighted system gives this enhancement area a higher score because stakeholders who ranked it ranked it as top priority. According to this weighted system the agency and NGO stakeholders ranked wetlands,

coastal hazards, public access, and cumulative and secondary impacts as their top priorities. MSO stakeholders ranked coastal hazards, marine debris, cumulative and secondary impacts, and ocean resources as their top priorities (see Chart 1 and Chart 2, below).





Comments on Challenges and Opportunities

In addition to ranking priorities, respondents were also asked to provide comments identifying the biggest challenges and opportunities for their top ranked priorities. Many of these comments routinely addressed management challenges that overlapped across enhancement areas. A representative selection of these comments is listed below.

1) What do you feel are the greatest problems regarding these priority enhancement areas?
    - Stormwater pollution from urban runoff impacting natural resources and human health in wetlands and associated waters *(Wetlands, Cumulative and Secondary Impacts)*
    - Our wetlands are not maintained on a regular basis so when we got heavy rain, flooding, and excessive runoff occurs *(Wetlands, Cumulative and Secondary Impacts)*
    - Planning for adaptation for sea level rise and storm wave inundation related to Climate Change *(Coastal Hazards)*
    - Sea level rise and the constant bad weather conditions make it harder for us to access the docks *(Coastal Hazards, Public Access)*
    - Our docks are slowly eroding away. Areas of many parts of our coast are eroding which lead to access problems *(Coastal Hazards, Public Access)*
    - [Public access] should remain the primary focus and the priority for all BECQ activities. Our residents deserve to have access to all of our island's resources. These natural resources are a main component in visitors choosing to come here. We must make all these resources available for responsible use by residents and visitors alike. *(Public Access)*
    - Water run offs has been and is still a major concern not only to our ocean resources but also our beach and coastal areas. Many of our beaches are constantly being red flagged due to bacteria being carried by the run offs, especially during rainy season. Ponding basins should be considered to help treat the water run offs before it goes into our ocean. *(Public Access, Cumulative and Secondary Impacts)*
    - I see a lot of plastic bags floating in ocean…I also see a lot of batteries from spear fishermen flashlights discarded in the water *(Marine Debris)*
    - There are many wrecks out of Micro Beach. I hope [the government] removes them for safety boat and other marine sports *(Marine Debris)*
    - [People] tend to leave their beer cans on our pristine beaches *(Marine Debris)*
    - Support more beachside trash receptacles and pick ups *(Marine Debris)*

- There are two common origin or marine debris and they are:
  * Beach side activities such as picnics, festivals, and sports etc. – Loose trash left behind after each of these activities are carried by wind into our waters creating danger to our marine life.
  * Water sports and fishing activities – Loose trash on board would fly out into our waters creating same danger to our marine life. *(Marine Debris)*

- Trash collection should be a priority to prevent point source garbage pollution from reaching the water. *(Marine Debris)*

- Sedimentation and erosion are still problems (even with all the work BECQ already does). Marine debris also results from illegal dumping that washes down into the waters. *(Marine Debris, Cumulative and Secondary Impacts)*

- Fuel spills in Outer Cove Marina are a weekly event and are a result of [a lack of enforcement on] permits that prohibit in-water fueling. It has been an on-going problem because after a slap on the wrist…operators continue to do what is easiest and least expensive *(Marine Debris, Cumulative and Secondary Impacts)*

- As the economy improves and development rate increase, it will be even more important to consider the effects of growth even beyond immediate impacts *(Cumulative and Secondary Impacts)*

- Currently, storm run-off poses a problem on our coastal resources. This needs to be addressed to ensure our beaches remain viable for many years to come *(Cumulative and Secondary Impacts)*

- Runoff in Laolao Bay seems worse after the road project was finished, lots of silt in water *(Cumulative and Secondary Impacts)*

- With the current rapid growth of option tours, I fear that unmonitored tours will damage the reef and ocean water quality. *(Cumulative and Secondary Impacts, Ocean Resources)*

- Erosion and runoff implementation areas and to come up with control management plan along our coastal area. *(Cumulative and Secondary Impacts, Special Area Management Planning)*

- Beach operators with DCRM permits should have minimum standards in place that would enhance the beaches…too many beach operations and tents all over the place with operators competing for customers. It would really enhance Saipan if…minimum construction and operation standards were implemented and enforced so tourists get a better experience. *(Special Area Management Planning, Public Access)*

- Developing a balance between using our resources and ensuring their sustainability *(Ocean Resources)*

- Dive sites should be regularly inspected and extreme care taken to protect them from abuse or over usage. Proper anchorages should be provided at all dives sites without exception. All publically available beaches should be likewise monitored. *(Ocean Resources)*

2) What are the greatest opportunities DCRM has for enhancing these priority enhancement areas?
   - (1) Preserve and enhance the existing wetlands; (2) Increase the holding capacity of the wetlands for flood control; (3) provide opportunities for pollutant removal and infiltration of flood waters; and most importantly, (4) provide interpretive stations and signage to enhance public perception of wetlands and of their critical role in the natural environment. *(Wetlands)*

   - Continue to coordinate with NPS and other Watershed Planning Group partners to plan for and possibly find supportive resources to better control pollution of stormwater entering the wetlands *(Wetlands, Cumulative and Secondary Impacts)*

   - Continue monitoring shoreline changes along Micro Beach to Smiling Cove with NPS and planning and assisting with actions for adaptation to the coastal changes *(Coastal Hazards)*

   - The access and enhancement of our docks would help more mariners with business to use our docks *(Public Access)*

   - Our marine environment is one of the focal point of the CNMI's tourism product so effective planning, management and enforcement of our coastal resources play a crucial role. The focus should be on protecting the resources and sustaining future usage tempered by the public's right to access these natural resource assets. *(Public Access)*

   - Help with acquisition of "private" land that inhibits public work to improve the secondary roads… Work with agencies to pave secondary roads that contribute a lot of erosion. *(Public Access, Cumulative and Secondary Impacts)*

   - Community involvement – many communities and their members are willing to assist in cleanup as long as the agency's reps are conducting and leading the clean ups. *(Marine Debris)*

   - Consider partnering with Parks & Rec to install bins & coordinate pickups *(Marine Debris)*

   - Work with DPW and DEQ to assess/improve illegal dumping situation. *(Marine Debris)*

   - Inter-agency collaboration is essential (Zoning, DEQ, DPW, CRM, CUC). Some kind of cumulative assessment training may be necessary. Together (and with new

knowledge on assessing cumulative impacts), the group can establish/modify policies for the CNMI. *(Cumulative and Secondary Impacts)*

- Continue management of APCs and integrate the National Park in surrounding land use, watershed management and Climate Change plans and include National Historical Landmarks conservation in plans and permits *(Special Area Management Planning, Cumulative and Secondary Impacts, Coastal Hazards)*

- Develop and enforce best practices to protect coral from impact *(Ocean Resources)*

- Continue the great work you are doing! *(Ocean Resources)*

Public Comment

Public comments on the draft 2016 – 2020 Assessment and Strategy Report were solicited between November 7, 2015 and December 10, 2015. A notice for public comment was advertised to the public, government agencies, and other interested parties in both local newspapers, on the DCRM website, and by email. The results of this comment period have been appended to this document below.

Comments were received from one citizen and one agency, the Department of Fish and Wildlife (DFW), and were reviewed and considered for incorporation into the final document. DFW's comment focused on the Wetlands assessment area and is summarized as follows:

1. Wetlands are a high priority enhancement area, but the resource characterization is incomplete, which may limit ability to achieve objectives.

2. The land cover data that was used to quantify the extent of CNMI wetlands is outdated (NOAA C-CAP, 2005). In addition, many of our wetlands are fine-scale landscape features that are not readily mapped by remote sensing techniques. To meet the overall objective of protection, restoration, or enhancement of existing wetlands, the essential first step is to map and quantify the extent and types of wetlands across the CNMI. This action would complement both Strategies 1 and 2.

DCRM agrees that the 2005 C-CAP data does not provide sufficient resolution for the management of fine-scale landscape features such as isolated wetlands in CNMI. The agency is working to develop updated, ground-truthed wetland delineations and valuations to support the objective of protection, restoration, and enhancement of existing wetlands.

The other public comment was generally supportive of ongoing DCRM efforts and expressed concern about increasing development pressures and negative impacts to coastal resources. The author noted that focusing on coastal resilience and "some funding for conservation and enhancement projects and more education for the community about how unique and valuable these resources" would likely help these challenges. The comment also provided some feedback on the accessibility and reading ease of the report. An "executive summary or FAQ" was suggested and is being developed to summarize this report on the DCRM website in response to this feedback.

Additionally, one call was logged at NOAA's Office of Coastal Management. In the summary related to DCRM, the caller expressed concerns about lack of public hearings to vet this document and lack of public input on proposed strategies, especially regarding development of new policies and regulations. DCRM is unaware of any jurisdiction that holds or has held public hearings on their 309 Assessment and Strategy Report, but agrees that the document itself could be made more accessible. As noted in response to the other written public comment that was received, a FAQ summarizing this report will be developed as a companion piece to this publication. DCRM values the input of the community and will conduct outreach and education as new regulations are developed and proposed.

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