U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office for Coastal Management
Silver Spring Metro Center, Building 4
1305 East-West Highway
Silver Spring, Maryland 20910

Mr. Edwin Reyes
Administrator, Guam Coastal Management Program
Bureau of Statistics and Plans
513 West Marine Corps Drive
Hagåtña, GU 96910

Dear Mr. Reyes:

The Office for Coastal Management (OCM) has completed its review of the Guam Coastal Management Program's Fiscal Year (FY) 2026-2030 Coastal Zone Management Act (CZMA) Section 309 Final Assessment and Strategy. We initially received a draft to review on May 5, 2025, and received final revisions on November 10, 2025. OCM is pleased to inform you that we approve Guam's 2026-2030 Assessment and Strategy and concur with the State's designated priority rankings for the nine enhancement areas. With an approved Assessment and Strategy, the Guam Coastal Management Program is eligible for FY 2026-2030 weighted formula (or base) funds under Section 309 of the CZMA to implement the work plan as presented in Guam's strategy.

States and territories with approved strategies that address an enhancement area of national importance are also eligible to compete for Project of Special Merit funding to further their strategies. Coastal Hazards and Wetlands are designated as enhancement areas of national importance for the FY2026-FY2030 enhancement cycle. Therefore, you are currently eligible to apply for competitive Projects of Special Merit funding, when available, to further the following strategy:

- Coastal Hazards: Address stormwater flooding from residential developments, especially parental and piecemeal subdivisions often exempt from current regulations, which contribute to cumulative impacts. The program will collaborate with local and federal agencies to assess the problem, formulate new regulations, and establish post-construction compliance policies for residential structures, closing an enforcement gap.

OCM may choose to designate additional enhancement areas of national importance during the FY2026-2030 cycle to address new or emerging issues that may arise.

We appreciate the time and effort you and your staff put into this process, as well as your continued support for and participation in the Enhancement Grants Program. OCM looks forward to working together to achieve the strategy goals you have set for Guam over the next five years. Again, we offer our congratulations.

Sincerely,

PENN.KIMBERLY.MIKITA.1264797434

Digitally signed by PENN.KIMBERLY.MIKITA.1264797434
Date: 2025.12.09 10:33:34 -05'00'

Kim Penn
Communities Program Manager, Acting

Guam Coastal Management Program Section 309 Assessment and Strategy

2026 to 2030

Table of Contents

Acronyms and Abbreviations

AAA	Administrative Adjudication Act
ADA	Americans with Disabilities Act
ADV	Abandoned Derelict Vessels
ARC	Application Review Committee
BOEM	Bureau of Ocean Energy Management
BSP	Bureau of Statistics and Plans
BMUS	Bottomfish Management Unit Species
C-CAP	Coastal Change Analysis Program
CLTC	CHamoru Land Trust Commission
CMP	coastal management program
CNMI	Commonwealth of the Northern Marianas Islands
CY	calendar year
CZEP	Coastal Zone Enhancement Program
CZM	coastal zone management
DoAg	Department of Agriculture
DLM	Department of Land Management
DPW	Department of Public Works
EFMUTS	essential facilities, major utilities and transportation systems
eGIS	electronic Geographic Informations System
FedCon	Federal Consistency
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GADTC	Guam Aquaculture Development and Training Center
GALC	Guam Ancestral Lands Commission
GAR	Guam Administrative Rules and Regulations
GBS	General Building Stock
GCMP	Guam Coastal Management Program
GEPA	Guam Environmental Protection Agency
GHS/OCD	Guam Homeland Security/Office of Civil Defense
GLTMP	Guam Long-term Coral Reef Monitoring Program
GPA	Guam Power Authority
GPT	Guam Preservation Trust
GSHAP	Global Seismic Hazard Assessment Program
HMP	Hazard Mitigation Plan
HPRA	High Priority Reef Areas
lbs.	metric pounds
M	Magnitude
mi^2	square miles
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NCZMP	National Coastal Zone Management Program
NGLA	Northern Guam Lens Aquifer
NOAA	National Oceanic and Atmospheric Administration
NREL	National Renewable Energy Laboratory
NWS	National Weather Service
OAG	Office of the Attorney General

OCM	Office for Coastal Management
PGA	peak ground acceleration
RFMP	Reef Flat Monitoring Program
SAMP	Special Area Management Plan
SVI	social vulnerability index
UoG	University of Guam
US	United States
USACE	United States Army Corp of Engineers
USDHS	United States Department of Homeland Security
USEPA	United States Environmental Protection Agency
WAMS	Waterway Analysis and Management System
WERI	Water and Environmental Research Institute

Introduction

The NCZMP, which was established under the CZMA, establishes a voluntary partnership between the federal government and U.S. coastal and Great Lakes states and territories to protect, restore, and responsibly develop coastal communities and resources. Administered by NOAA, the NCZMP provides funding and technical assistance to support state efforts in managing coastal areas through planning, conservation, and sustainable development, with the intent of the program being to encourage states and territories to improve their Coastal Zone Management Programs in key enhancement areas of national interest. The CZEP which was created through Section 309 of the Coastal Zone Management Act, as amended in 1990 and 1996, established a voluntary coastal zone enhancement grants program, and provides funding and technical support to assist coastal management programs develop and implement strategies that strengthen resource protection and address emerging coastal challenges. The CZEP provides a voluntary 5-year cycle process for a federally approved coastal management program to review, assess and realize opportunities addressing one of, or more, nine enhancement areas that are deemed a high-priority for the coastal management program. The following enhancement areas that are assessed include wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management plans, ocean and great lake resources, energy and government facility siting, and aquaculture, all of which have their own respective objectives. The corresponding objectives are the following:

1. Wetlands: Protection, restoration, creation, or enhancement of the existing coastal wetlands;
2. Special Area Management Plan: Preparing special area management plans for important coastal areas;
3. Energy and Government Facility Siting: Developing policies to facilitate the siting of government and energy-related facilities and activities;
4. Cumulative and Secondary Impacts: Assessing the cumulative and secondary impacts of coastal growth and development;
5. Coastal Hazards: Prevent or significantly reduce threats to life and property by eliminating development and redevelopment in high-hazard areas, managing development in other hazard areas;
6. Marine Debris: Reducing marine debris entering the nation's coastal and ocean environment by managing uses and activities that contribute to the entry of such debris;
7. Aquaculture: Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone;
8. Ocean and Great Lake Resources: Planning for the use of ocean and great lake resources; and
9. Public Access: Providing opportunities for public access to coastal areas of recreational, historical, aesthetic, ecological, or cultural value.

During the outset of this process, a high-level assessment is conducted to have a baseline understanding of the status of each enhancement area, based on actions and initiatives the state or territory has conducted since the last assessment cycle. Stakeholder input and territory information of changes related to each enhancement area are used to prioritize the enhancement areas during the high-level assessment phase. A product of the high-level assessment is a determination of priority rankings of each enhancement area. The process is followed up with an in-depth assessment of one, or more, high-priority enhancement areas to determine key problems and opportunities in order to improve the coastal management

program's effectiveness in meeting the enhancement area's objective. After the completion of both assessment phases, the coastal management program renders strategies leading to a "program change" to bolster the coastal management program's ability to increase in meeting the high-priority enhancement area objective. A "program change" consists of changes to coastal zone boundaries, and/or one of the following:

- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and MOA/MOU;
- New or revised authorities, local coastal programs and implementing ordinances;
- New or revised authorities, coastal land acquisition, management, and restoration programs;
- New or revised authorities special area management plans or plans for areas of particular concern, including enforceable policies and other necessary implementing mechanisms or criteria and procedures for designating and managing areas of particular concern; and
- New or revised guidelines, procedures, and policy documents that are formally adopted by a state and provide specific interpretations of enforceable coastal policies to applicants, local governments, and other agencies that will result in meaningful improvements in coastal resource management.

The entire process culminates in the drafting and adoption of the state's, or territory's, Assessment and Strategies, a document providing the rationale and gameplan for the coastal management program to follow in order to work towards a program change.

For this enhancement cycle, the BSP-GCMP worked with network partners. This began with rendering focus groups for each enhancement area, in November 2024. The focus groups were created to provide the BSP-GCMP relevant information regarding any changes that have occurred since the last enhancement cycle. From the analysis of information gathered from the focus groups together with BSP-GCMP's internal literature review regarding changes to each enhancement area leading up to the stakeholder engagement meetings, the BSP-GCMP made its evaluation of what enhancement areas were a high, medium and low priority. Stakeholder engagement meetings were held in March 2025 to present the BSP-GCMP's findings and evaluation of the enhancement area priority rankings, as well as gain input regarding what specific areas of the high-priority enhancement area should be addressed. Stakeholders also provided input on what their priority rankings for each enhancement area were, corresponding issues that should be addressed, and why they merit further examination. After both stakeholder engagements, the BSP-GCMP met with NOAA-OCM to go over stakeholder input and BSP-GCMP's internal review and justification for each enhancement area's ranking. As a consequence of the consultation, BSP-GCMP worked on developing a strategy to address the coastal hazard enhancement area. The public comment period began after BSP-GCMP's submission of its draft Assessment and Strategy to the NOAA - OCM for review on May 1, 2025. The public review process is structured to ensure coastal stakeholders and the broader public have an opportunity to comment on how states and territories plan to enhance their coastal management programs. The public review process takes place for a 30-day period with broad notice, open access to the draft, opportunities for feedback, and required documentation of participation before NOAA approval. The draft document for public review was published on BSP's website and was shared with all stakeholders electronically, on May 19, 2025. Public comments were requested to be provided to the Bureau of Statistics and Plans Director and lead planner via email. By the end of the 30-day public review period, on June 20, 2025, BSP received no comments for its draft 2026-2030 Assessment and Strategies.

Summary of Recent Section 309 Achievements

The BSP-GCMP has worked diligently to complete its strategies set out in the last enhancement cycle (2021 - 2025). The results of both strategies are realized in the creation of the ARC/FedCon Geodatabases and the updated *2022 Guidebook to Development Requirements on Guam*.

The ARC Geodatabase[1] represents the BSP-GCMP's endeavors to understand the cumulative and secondary impacts of development over Guam's coastal resources. The creation of this database allows for the immediate integration of updated rules and regulations in the application assessment and screening phases of the review within the ARC. The ARC Geodatabase provides information on development applications the BSP-GCMP has received and reviewed since 2021, geo-referencing proposed developments, BSP-GCMP's official position, Notice of Action from the Guam (Hybrid) Land Use Commission and Territorial Seashore Protection Commission, the applicant seeking development, the application type, a description of the proposed use/zone, lot number(s), municipality/watershed in which development will occur in, the land use designation, current zoning, proposed zoning, total potential land area (in sq. meters) affected by development, BSP-GCMP's recommended conditions guided by the North and Central Guam Land Use Plan's policies and Guam's Land Use Policies under Executive Order 78-37. The database also comprises layers for land cover and geology, hazards, hydrology, protected areas, village population, parcels and zonings, Guam Forest System Plan and Habitat Conservation Plan locations, and other Lidar-based information. In relation to understanding the impacts of development over Guam's finite coastal resources, the ARC Geodatabase, in conjunction with the updated C-CAP provided by NOAA, are used to analyze the cumulative impact and restrictions on available lands, which is vital in endeavors to protect and preserve surrounding natural resources and to minimize the secondary impacts that would occur in the future. The data found in the ARC Geodatabase was compiled using internal physical and digital references, and was assisted by the Guam DLM in which they provided vicinity maps to geolocate applications of proposed development as well as Notice of Actions officially stipulating the conditions for a development. Similarly, the FedCon Geodatabase consists of compiled information regarding Federal Consistency applications the BSP-GCMP reviews for consistency with respect to BSP-GCMP enforceable policies Section 307 authority of the Coastal Zone Management Act. Information that is compiled in the FedCon Geodatabase include the federally-associated development's geospatial location, the applicant/contractor for development, brief description of development, site name location, subpart, BSP-GCMP's determination date, BSP-GCMP's response to the application, hyperlinks to BSP-GCMP's determination document, federal and local submerged lands locations, and cable landing sites. The continual update of both geodatabases will enhance and streamline the BSP-GCMP's endeavors in analyzing potential effects of future development growth on environmental resources and its impacts on surrounding communities. Both geodatabases will continue to serve as an archive for development conditions and actions within areas of particular concern, which will be beneficial to understand precedence for development activity within a given area.

The second goal of the Cumulative and Secondary Impact Data and Information Tool was to build off of prior work done to update the *Guidebook to Development Requirements on Guam* completed in 2020 by making the document digital and interactive through the BSP website. In 2022, the *Guidebook to Development Requirements on Guam*[2] was updated to reflect this desire. Along with providing a comprehensive summary of current permit application processes, permitting process flow charts with

[1]ARC Geodatabase, prepared by the Bureau of Statistics and Plans - Guam Coastal Management Program, 2024. Available at https://bsp.guam.gov/arc-geodatabase/

[2]2022 Guidebook to Development Requirements on Guam, prepared by the Bureau of Statistics and Plans - Guam Coastal Management Program, 2024. Available at https://bsp.guam.gov/guam-development-guidebook/

respect to each regulatory agency, and checklists for development plan review and permit documents required to be submitted to associated regulatory agencies, the interactive guidebook utilizes hyperlinks to reinforce development requirements based on adopted statute and policies; these hyperlinks provide viewers official documentation of local statutes, Executive Orders, regulatory agency GAR's, OAG opinions, and links to critical geospatial data that work together to ensure compliance with plans and enforceable policies of the BSP-GCMP. The updated guidebook is now made available on BSP's website.

Phase I Assessment

Wetlands

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

Note: For the purposes of the Wetlands Assessment, 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)]. See also pg. 14 of the CZMA Performance Measurement Guidance[3] for a more in-depth discussion of what should be considered a wetland.

Phase I (High-Level) Assessment: (Must be completed by all states.)
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

Resource Characterization

1. Using the tables below as a guide, provide information on the status and trends of coastal wetlands. Be as quantitative as possible using state or national wetland trend data.[4] The tables are information presentation suggestions. Feel free to adjust column and row headings to align with data and time frames available in your state or territory. If quantitative data is not available for your state or territory, provide a brief qualitative narrative describing wetlands status and trends and any significant changes since the last assessment.

   Current state of wetlands in 2015 (acres): 4041.6

Coastal Wetlands Status and Trends

Change in Wetlands	from 2005-2015
Percent net change in total wetlands (% gained or lost)*	+0.03 m^2 +0.37%
Percent net change in freshwater (palustrine wetlands) (% gained or lost)*	+0.022 m^2 + 0.32%
Percent net change in saltwater (estuarine) wetlands (% gained or lost)*	+0.012 m^2 +1.49%
Source: https://coast.noaa.gov/ccapatlas/. Updated C-CAP data for this cycle is unavailable, and thus current analysis is based on most up-to-date C-CAP results.	

[3] coast.noaa.gov/data/czm/media/czmapmsguide.pdf

[4] National data on wetlands status and trends include NOAA's Land Cover Atlas (coast.noaa.gov/digitalcoast/tools/lca.html), the U.S. Geological Survey's National Land Cover Database (usgs.gov/centers/eros/science/national-land-cover-database), and the U.S. Fish and Wildlife Service's National Wetland Inventory data (fws.gov/program/national-wetlands-inventory).

How Wetlands Are Changing

Land Cover Type	Area of Wetlands Transformed to Another Type of Land Cover between 2005-2015 (Sq. Miles)
Development	0
Agriculture	0.01
Barren Land	0.01
Water	0.01
Source: https://coast.noaa.gov/ccapatlas/. Updated C-CAP data for this cycle is unavailable, and thus current analysis is based on most up-to-date C-CAP results.	

Management Characterization

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

Significant Changes in Wetland Management

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

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information.
    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.

a. Guam Forest System Plan[5]: The Guam Forest System Plan, authorized under the Guam Forest Legacy Act of 2012[6], was adopted and established to protect and conserve the natural resources and natural habitats/ecosystems, open spaces and historic artifacts within the Guam Forest System inventory for the perennial benefit of its citizens through recreation and education. The Guam Forest System Plan provides the elements that must be incorporated in the planned use of a parcel within the inventory. These elements include, but are not limited to, proposals of potential uses in the Forest System for the public's benefit to proposals for the maintenance and enhancement of the overall quality of the environment.

b. The BSP-GCMP is continuing the interagency collaboration with the Guam DoAg to fulfill the completion and official adoption of the Guam Forest System Plan. The BSP-GCMP, which oversees the land use planning duties of the Bureau of Statistics and Plans, played a crucial and

[5] Guam Forest System Plan, prepared by the Guam Department of Agriculture and the Bureau of Statistics and Plans, March 2022. Available at https://doag.guam.gov/wp-doag-content/uploads/2024/06/Compressed-2022-Guam-Forest-System-Plan-FINAL.pdf

[6] Guam Forest Legacy Act of 2012, 5 Guam Code Annotated Government Operations Chapter 63 Fish, Game, Forestry & Conservation, Article 5. Available at https://archives.guamlegislature.gov/31st_Guam_Legislature/Bills_Passed_31st/SBill%20No.%20B382-31%20(COR)%20passed.pdf

instrumental role in developing the Guam Forest System Plan. The BSP-GCMP partnered with the Guam DoAg's Forestry and Soil Resource Division to draft the plan, ensuring it met all the necessary requirements of the Guam Forest Legacy Act of 2012. This collaboration was critical for creating a comprehensive plan that addressed the protection and conservation of Guam's forests. BSP-GCMP was also responsible for coordinating and facilitating the plan's journey through the administrative adjudication law process for its final adoption. Following this, the program will continue to work closely with DoAg and partners to promulgate the rules and regulations needed for the plan's implementation. In addition, BSP-GCMP will maintain its vital role by providing ongoing technical and planning support to ensure the long-term success of the Guam Forest System Plan. Upon receiving approval from the Office of the Governor on August 22, 2022, the plan was submitted to the Guam Legislature for review on September 13, 2022. It was determined through correspondence with the Office of the Speaker of the 37th Guam Legislature, that the Guam Forest Legacy Act stipulations, specifically the clause that the plan should be developed in accordance with the Administrative Adjudication Act, presumes that the plan should go through the AAA process for adoption. In light of this, BSP-GCMP & Guam DoAg worked to ensure the requirements of the AAA process were fulfilled for the adoption of the Guam Forest System Plan, including required notices to the public to provide input and a public hearing which was held on June 10, 2024. The Guam DoAg transmitted the plan to the Guam OAG on June 27, 2024. On September 17, 2024, BSP-GCMP received an email from the Guam DoAg notifying that the Guam OAG had completed its review of the Guam Forest System Plan providing its findings that the plan was constitutional and complies with the AAA and the Guam Forest Legacy Act. On September 23, 2024 the Guam DoAg submitted the Guam Forest System Plan to the Speaker of the 37th Guam Legislature to seek further review and written approval. On October 16, 2024, Speaker Therese Terlaje introduced Bill 363-37 for the adoption of the Guam Forest System Plan. A public hearing was subsequently held on the bill on October 28, 2024. In January 2025, Bill 363-37 was passed by the Guam Legislature and was put into law; it is now known as P.L. 37-143. Currently, the Guam DoAg is required to promulgate the rules and regulations within 90 days of the approval of the plan. BSP-GCMP's Conservation District Planner commits 40% of his time and effort to facilitate the planning and coordination of activities to this task.

c. Lands that have been designated within the Guam Forest System include the Hagatna Wetlands which consist of multiple areas around the island. The total acreage of these wetlands encompasses 46.52 acres. All lands within the inventory of the Guam Forest System are protected and shall be conserved for future public uses. Specific lands to be utilized, through the Guam Forest System Plan, shall be compatible with all objectives and goals set within the Guam Forest System Plan.

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.

From stakeholder responses, the wetland enhancement area was part of the top-three high-priority enhancement areas. As shared, development within wetlands interrupt the natural flooding control

mechanism these areas provide. Currently, however, the Territorial Planning Commission, now known as the Guam Land Use Commission, has official procedural guidelines and standards for assessing development within wetlands and similar area types of concern. These procedures and standards are found within Title 18 GAR Chapter 3 Article 5 of Guam Law[7]. As there has been no official adopted policy which recommends the amendment of such procedures and standards, and while there have been no major community concerns brought to the local government's attention during the cycle period, the BSP-GCMP remains with the position to consider the enhancement area as a medium-priority. However, the BSP-GCMP will continue to monitor all situations regarding the enhancement area. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, Guam DoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

Coastal Hazards

Section 309 Enhancement Objective: Prevent or significantly reduce threats to life and property by eliminating development and redevelopment in high-hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise and Great Lakes level change. §309(a)(2)

> *Note: 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.*

Phase 1 (High-level) Assessment: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

Resource Characterization:

1. In the table below, indicate the general level of risk in the coastal zone for each of the coastal hazards. The following resources may help assess the level of risk for each hazard. Your state may also have other state-specific resources and tools to consult. Additional information and links to these resources can be found in the "Resources" section at the end of the Coastal Hazards Phase I Assessment Template:

    - The state's multi-HMP
    - Coastal County Snapshots: Flood Exposure
    - Coastal Flood Exposure Mapper
    - Sea Level Rise Viewer/Great Lakes Lake Level Change Viewer

[7] Title 18 GAR Chapter 3 Article 5 "Wetlands", Rule-making authority cited for formulation of regulations governing Wetland Areas by the Territorial Planning Commission, 21 Guam Code Annotated §60405, 1978. Available at https://dlm.guam.gov/wp-dlm-content/uploads/2017/01/18-GAR-WP-1.pdf

General Level of Hazard Risk in the Coastal Zone

Type of Hazard	General Level of Risk[8] (H, M, L)
Flooding (riverine, stormwater)	H
Coastal storms (including storm surge)	H
Geological hazards (e.g., tsunamis, earthquakes)	tsunamis: M, earthquakes: H
Shoreline erosion	H
Sea level rise	H
Great Lakes level change	N/A
Land subsidence	L
Saltwater intrusion	H
Other: Wildfire	M

2. If available, 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. The state's multi-HMP or risk assessment or plan may be a good resource to help respond to this question.

2024 Guam HMP[9]: The Guam Hazard Mitigation Plan is the Government of Guam's comprehensive strategy to identify and reduce long-term risks from natural and human-made hazards, such as flooding, coastal storms, geological hazards, shoreline erosion, disease, wildfire, non-seismic ground failure/sinkholes, and slope failure characterized by landslides, mudslides, and post-fire debris flow. It guides how Guam prepares for, mitigates, and recovers from disasters while maintaining eligibility for federal mitigation funding.

Flooding (Coastal, Riverine and Stormwater)

On Guam, flooding affects approximately 10 mi^2 of the island, 4.7% of the total population, 21.4% of essential facilities, 7.5% of major utilities, and 30.1% of transportation systems on island (Summary All-Hazard Vulnerability Analysis for Guam, 2024 Guam HMP). The effects of flooding, although widespread, impacts specific villages more than others in different ways.

In terms of utilities and infrastructure exposure, a large portion of exposed EFMUTS adjacent to Apra Harbor have significant exposure, with 277 transportation systems alone, worth $946.8 million. EFMUTS exposure is more concentrated in Hagatna with 28 facilities, worth $26.0 million, followed by Tamuning/Tumon with 14 exposed facilities each, worth $110.5 million. In terms of GBS exposure, Hagatna, Agat, and Merizo have significant amounts of exposure, with Hagatna having 402 structures (64%) exposed worth approximately $139.8 million. Notably, GBS exposure in Agat and Merizo are 364 and 372 structures, respectively.

In terms of exposure to village-specific populations, Agat and Merizo are disproportionately affected. 21% of Agat's and 27% of Merizo's populations are vulnerable to flooding, and both have SVI measures of 1.00 and 0.94, respectively, which indicates these village populations' inability to adapt and recover from flood hazards and the effects of sea level rise.

[8] 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*

[9] 2024 Guam Hazard Mitigation Plan, prepared by Guam Homeland Security/Office of Civil Defense, June 2024. Available at https://bsp.guam.gov/wp-bsp-content/uploads/2025/06/Guam-2024-HMP_20240711-MS-Updated-Maps.pdf

Coastal flooding occurs through a combination of factors such as increasing impervious surfaces stemming from development, effects of typhoons and heavy rainfall events, deficiencies in drainage infrastructure as well as oversaturation of natural land cover leading to an accumulation of water that is unable to be absorbed. Flooding is experienced differently in the north and south of Guam. Coastal flooding has historically occurred in the southern and eastern areas, of which contain bays with small restricted entrances that can become inundated by storm surges and wind-generated waves. These areas can also flood from water originating further inland, or by water that is brought by heavy storm events–for example, Inarajan Bay, Talofofo Bay, Ylig Bay, and Pago Bay all experience significant coastal flooding caused by heavy storm events.

Riverine flooding on Guam is typically caused by prolonged periods of rainfall, usually from slow-moving tropical cyclones or monsoon surges between June – December. The Guam Comprehensive Flood Study[10] was created for the Government of Guam to understand riverine flooding throughout the island. In addition to providing riverine flood frequency estimates, the study also provides mitigation designs to address flood-prone areas in southern Guam. The report consists of four parts, the first of which provides flood frequency stream gauge estimates and the remaining consisting of specific flood hazard studies for areas strongly impacted by flooding near streams and rivers. The three rivers highlighted in the flood hazard study include the Umatac River, Manell River and Upper Namo River. Each of the flood hazard studies provide associated costs for mitigation design recommendations to alleviate flooding issues faced by citizens around the three rivers. The Guam Comprehensive Flood Study will continue to serve as a baseline analysis to be used for further advance future flooding investigation studies for areas that are impacted by riverine flooding.

Flooding stemming from stormwater runoff is, and has been, a perennial concern within Guam's municipalities, particularly within residentially dense areas such as parental subdivisions and piece-meal properties. During the 2020 Assembly of Planners a panel presentation consisting of regulatory agencies such as the Guam DLM, GEPA and Guam DPW was provided to speak more on this issue[11]. Each agency presented their regulatory authorities as it related to addressing flooding within residentially-dense areas. The GEPA shared that although it has statutory authorities for pollution control and prevention, it does not have any policy specifically addressing flood volume control. Under the Erosion and Sediment Controls Regulation, GEPA requires developments, through the permitting process, to provide a post-construction drainage system plan to mitigate erosion and pollution. Furthermore, the plan is only required to be rendered during the permitting and project design phases and does not regulate post construction[12]. In 2012, GEPA adopted the CNMI and Guam Stormwater Drainage Manual through Guam Executive Order 2012-02 which provides additional requirements for managing stormwater within developments[13]. However, these additional requirements are not enforceable for the development of single-family and two-family residences, both of which are typical within residential subdivisions. As it was shared by the Guam DLM, parceling of a lot into 5 or fewer divisions is not required to go through the Guam Land Use Commission for review in which the final determination of conditions are provided by the body for all

[10] Guam Comprehensive Flood Study, prepared by the United States Army Corps of Engineers for the Bureau of Statistics and Plans, March 2020. Available at https://bsp.guam.gov/guam-flood-study/

[11] 2020 Assembly of Planners, Bureau of Statistics and Plans - Guam Coastal Management Program, February 2020. Available at https://www.youtube.com/watch?v=vx63KGU_DBk&list=WL&index=297&t=359s

[12] Title 22 Guam Administrative Rules - Guam Environmental Protection Agency Ch. 10: Guam Soil and Erosion and Sediment Control Regulations, January 2024. Available at https://guamcourts.gov/compileroflaws/GAR/22GAR/22GAR002-10.pdf

[13] Guam Executive Order 2012-02, Governor of Guam, January 26, 2012. Available at https://governor.guam.gov/governor-content/uploads/2017/07/E.O.-2012-02-Relative-to-Adopting-Stormwater-Management-Criteria-for-Guam.pdf

development outside of federally held lands[14]. Furthermore, parental subdivisions are not required to make improvements for storm drainage systems as they are exempt from doing so[15]. The Guam DPW panel member stated that their respective agency does not have the authority to mandate developers to conduct post-construction remediation. As more development occurs within these property types, along with the current regulatory statutes in place, the cumulative negative impacts of stormwater flooding surrounding these types of development areas will continue to increase. This sentiment was also shared by Guam Silver Jackets members, an established charter consisting of federal and local agencies–BSP, Guam DLM, Guam DPW, GEPA, GHS/OCD, UoG - WERI, FEMA, NOAA - NWS and USACE–serving to incite the development of comprehensive and sustainable solutions to Guam's hazard issues, including mitigation planning, flood hazard mapping, risk reduction activities, response and recovery planning, community resilience, and adaptation within the island. In 2020 and 2024 Guam Silver Jackets meetings, stormwater flooding within piece-meal properties and parental subdivisions was brought to attention as an issue that should be looked into further to address.

Sea Level Rise

Guam continues to experience sea level rise. Since 1993, the island has seen an increase of four inches of mean sea level. As sea level increases, its effect on coastal areas will be apparent through more frequent observations of coastal flooding and erosion. Impacts from sea level rise would further negatively elevate village population exposure and affect EFMUTS statistics previously discussed within the flooding hazard profile assessment. New developments within high-risk coastal areas will increase exposure to sea level rise and flooding, as well. Thus, initiatives to relocate development from flood hazard areas is paramount. The Government of Guam is partaking in the relocation of the Ukudu Power Plant from a coastal flood zone to a less vulnerable area, an effort to mitigate sea level rise impacts on a major utility facility.

Coastal Storms

Guam's vulnerability to coastal storms is significant due to its location in the western North Pacific; observations of coastal storms within the region are more frequent in comparison to surrounding regions. The entirety of the island is not exempt from experiencing the impacts of this hazard[16]. The types of coastal storms Guam historically faces are cyclones, tropical depressions, and tropical storms, all of which are accompanied by destructive winds, heavy rainfall, storm surges, post-hazard strewn debris and associated flooding. The most damaging amongst the categories are tropical cyclones which immediately threaten infrastructure and affect elements of community well-being such as safety, security, food, water, shelter, health and medical services, energy, communications, and transportation.

Notable village populations particularly vulnerable to tropical cyclones include Agat, Dededo, Hagatna, Mangilao, Merizo, Mongmong-Toto-Maite, Umatac and Yigo (Table 43, 2024 Guam HMP). Among all villages within the island, Dededo, Yigo and Mangilao have the highest village population exposure. An SVI was used to measure village community resilience in preparing, responding and recovering from various hazards within the 2024 Guam HMP. In relation to vulnerable communities in relation to the hazard, Dededo, Yigo and Mangilao have an SVI of 0.78, 0.61 and 0.72, respectively. More notable and alarming is village vulnerabilities seen in Agat and Merizo. Although both village population's exposures

[14] Title 18 Guam Administrative Rules - Land Management Chapter 3: Territorial Planning Commission, Government of Guam, 1997. Available at https://guamcourts.gov/CompilerofLaws/GAR/18GAR/18GAR001-3.pdf

[15] Title 21 Guam Code Annotated Real Property Ch. 62 Guam Subdivision Law, Government of Guam. Available at https://www.guamcourts.gov/CompilerofLaws/GCA/21gca/21gc062.PDF

[16] Guam Coastal and Estuarine Land Conservation Program Plan, prepared by the Guam Coastal Management Program, April 30, 2008. Available at https://coast.noaa.gov/data/czm/landconservation/media/celcpplangudraft.pdf

are a fraction of the exposed population in relation to the three aforementioned villages, their SVI's are 1.0 and 0.94, respectively, the highest measures of social vulnerability (Table 6, 2024 Guam HMP).

In terms of EFMUTS, critical infrastructure and village GBS, tropical cyclones can have a devastating impact on them. For example, as Tamuning/Tumon is considered the tourism district on Guam, exposure and impacts to tourist-centric developments within the area would devastate the island's biggest non-federal form of economy. Dededo's utilities are valued at $864,949,321, and its GBS is valued at $3,374,695,451. A notable aside, Barrigada's transportation systems that are exposed to this hazard are valued at $902,046,000.

Earthquakes (Surface Fault Ruptures)

From recorded occurrences between 1975-2013, the frequency of an earthquake magnitude of significant size, i.e. M > 5.7, is likely to be felt once every 4-5 years. The 1999 GSHAP conducted a generalized global probabilistic seismic hazard analysis which included Guam. GSHAP calculated PGA with a 10% chance of being exceeded in 50 years.

In terms of the village-level population exposed to surface faulting, Tamuning/Tumon and Dededo had the largest communities potentially affected by surface fault ruptures, 5,497 people (31%) and 3,640 people (8.5%), respectively.

In terms of cumulative village-level structure exposure, Yigo has the highest number of exposed village structures (1,065), encompassing 21.7% of all the structures worth $150 million, followed by Tamuning/Tumon with 419 village structures (26.5%) worth $313.7 million, and Santa Rita with 130 village structures (29.5%) worth $18.9 million. In 2023, 93 permits (29% of total) were issued in Dededo. Potential exposure of Essential Facilities is spread throughout all affected villages. However, significant exposure of essential facilities is within Hagatna with 28 facilities worth $28 million. Yigo has the most concentrated number of major utilities exposure with 16 facilities worth $58 million, followed by Tamuning/Tumon with 10 facilities worth $70.3 million, and then Dededo with 10 facilities worth $89 million. In regards to transportation systems exposure, Hagatna and Tamuning have 31 facilities valued at $24.5 million and 40 facilities valued at $30 million, respectively.

Earthquake (Liquefaction)

In regards to high levels of exposure to liquefaction, a relatively small population of the island currently resides within hazardous related areas, 1,728 people (approximately 1%) (Tables 5-17 and 5-18, 2024 Guam HMP). In terms of village-level exposure, Santa Rita leads with 512 people, approximately 14.2% of the village's population, followed by Tamuning/Tumon with 506 (2.81%) and Piti and Hagatna with 155 and 168, respectively. In regards to the island's EFMUTS exposure, 16 essential facilities worth $21.4 million, 2 major utilities worth $269 million, and 31 transportation systems worth $689,738 million are located within the hazard areas. The high value of potentially affected transportation systems is due to their location around Guam's only port in Apra Harbor. Exposure to Piti's village structures comprise 102 structures worth $44 million.

Tsunamis

Tsunamis can not only affect the island's beaches, but also its bays, tidal flats, and the shores of large coastal rivers. In total, tsunamis have the potential to affect approximately 45.86 $mi.^2$ of the island affecting many villages directly; these villages include Yigo, Dededo, Asan, Agat, Umatac, Talofofo, Mangilao, Inarajan, Barrigada, Merizo, Piti, Sanat Rita, and Hagatna. The total number of potential impacts to major infrastructure include 135 essential facilities, 215 major utilities, and 376 transportation systems.

While 7.5% of the island's population is directly exposed to tsunami inundation, village-level population exposure is proportionately different varying greater in Tamuning/Tumon and Mongmong-Toto-Maite with 14.83% (2,210 individuals) and 13.3% of village population (1,012 individuals), respectively. In terms of potential essential facilities with very notable exposure, most of these are concentrated in coastal villages such as Hagatna, Tamuning/Tumon, and Piti (Table F-25, 2024 Guam HMP). In terms of potentially affected transportation systems, Piti also has 11 transportation systems exposed and worth $75.3 million.

Coastal Erosion

For coastal villages in the vicinity of the shoreline, consequences of coastal erosion directly affects their communities and infrastructure. The most notable village affected is Hagatna, the capital of Guam, which has a 63.9% population exposure. Hagatna also has the most essential facilities exposure worth $11.5 million. In terms of potential loss to transportation systems, Piti is the most notable with potentially $816 million of exposed systems being affected. A notable village affected include the tourism district of Tamuning/Tumon in which coastal erosion can affect 1,738 citizens. In terms of major utilities infrastructure exposure, Piti is the highest in terms of worth at $52 million, followed by Hagatna with two facilities worth $13.2 million, and Merizo with 10 facilities worth $12.6 million (Table F11 and F12, 2024 Guam HMP).

In terms of population exposure, Tamuning/Tumon, Hagatna and Agat have the highest exposure to coastal erosion, 1,738, 703, and 443 individuals, respectively. In terms of village population vulnerability, Hagatna, Merizo and Agat have the highest numbers with 626, 279, and 434, respectively. In terms of the proportion of population exposed to each village's total population, Hagatna, Merizo and Agat are the highest, 57%, 13% and 8%, respectively (Please see Table 25, 2024 Guam HMP) with all three villages abutting close to shores.

In 2021, a study was conducted to analyze Guam's coast experiencing low to high-level erosional issues, the latter of which contain information on significant infrastructure and in need of shoreline mitigation efforts. The completed study was named the *Guam Shoreline Atlas*. The study was prepared by the USACE and examined Guam's coastline providing important information and illustrative details of Guam's shoreline such as shoreline protection efforts, types of benthic habitats found within, streams, stormwater infrastructure, and many more[17]. Furthermore, the *Guam Shoreline Atlas* classified Guam's shorelines facing different degrees of erosion. These classification of shorelines include "critical", "potentially critical" and "non-critical". "Critical" is defined as existing and/or continuing shoreline erosion, protective structure failure, or storm damage vulnerability that is an immediate threat to existing structures or public facilities, and thereby justifies protective action. "Potentially Critical" is defined as existing and/or continuing shoreline erosion, protective structure failure, or storm damage vulnerability that is a potential threat, and justifies protective action; however, protective action is not as urgent as "critical" shorelines. "Non-critical" is defined as shoreline erosion, protective structure failure, or storm damage vulnerability that is either not currently a threat or does not exist, and does not justify protective action; however, these areas could become "potentially critical" or "critical" if erosion begins to threaten existing structures or public facilities within. Shoreline areas with the "critical" classification include: the east end and central part of Trinchera Beach, Inn on the Bay, Agat Mayor's Office, Nimitz Beach Reach B, and Nimitz Beach Reach E. In addition, shoreline areas with the "potentially critical" classification include: the South end of Naton Beach, WW2 Fortification, northeast end of Ypao Beach, Hilton Hotel Beach, Hagatna Bay Reach C, west end of Trinchera Beach, Hagatna Bay Reach G, Hagatna Bay Reach H, Asan Bay

[17] Guam Shoreline Atlas, prepared by the United States Army Corps of Engineers, October 2021. Available at https://bsp.guam.gov/guam-shoreline-atlas/

Reach B, Asan Bay Reach D, Piti Bay Reach D, Southend of Togcha Beach, Agat Bay Reach J, Nimitz Beach Reach C, Umatac Bay Reach, Bile Bay, Merizo Reach A-D, Suyafe River to Liguan Point, Agfayan Bay and Jones Beach. Cumulatively, 23% of all shorelines are at least in the "potentially critical" category. It should also be noted that 2 distinct long swathes of shoreline are in, at least, the "potentially critical" status which include Meizo Reaches A-D (approximately 4,100 ft. total length) and Hagatna Bay Reaches D - G (approximately 5,550 ft. total length).

Agat Emergency Shoreline Protection Feasibility Study[18]: The Agat Shoreline Protection Feasibility Study was prepared by the USACE and provides identified issues and solutions to reduce risk associated with flooding and coastal erosion of coastline abutting the Agat Mayor's Complex. The complex serves as the municipal office for the village as well as provides critical services for its community, especially during natural disasters such as typhoon events. In 2023, when typhoon Mawar struck Guam, many village citizens were without necessities such as power, water, communications and shelter. During and after the aftermath of the typhoon, the municipal office provided critical services and resources for the village's vulnerable community. The complex is located directly on the coastline. By the coast is a concrete seawall that is vulnerable to undermining due to continued erosion of the beach fronting it. Among the Agat Mayor's Complex, various buildings and facilities are in very close proximity to the seawall making them highly vulnerable to exposure during high wave events. Thus, given the situation, the Agat Emergency Shoreline Protection Feasibility Study was conducted to provide alternative solutions to mitigate the growing issue faced within the coastal area. A public hearing was hosted on October 16, 2024 by the USACE and the Government of Guam at the Agat Mayor's Office in which concerned citizens were able to inquire and provide comments on the tentatively selected plan to construct an open cell piling seawall, in addition to the alternative designs that were considered to mitigate the flooding and coastal erosion.

Wildfires

As it is generally understood, drier conditions and higher temperatures will increase the likelihood of a wildfire to occur. From 2021-2023, Guam has experienced 424 wildfires. The size of affected lands ranges from 0-¼ acres to as much as 300-999 acres, with the most frequent events within 0.26 - 9 acres in affecting size. The yearly total acres burned within the period amounts to thousands of acres, with the highest amount of land affected occurring in 2022 with a total of 4,744.62 acres burned, 3.5% of the total area of Guam[19].

Collectively, approximately 110,000 people (69.1%) are exposed to a high or very high wildland fire hazard scenario. In terms of village exposure, Dededo has the largest exposed population with 21,309 people residing in a very high wildland fire hazard area. This is followed by Yigo, which has the second highest number of exposed populations with 11,074 residing in a very high hazard area and an additional 4,231 people residing in a high wildland fire hazard area. It is worth mentioning that the village of Sinajana has the highest proportion of exposure, with 81.8% within at least high wildland fire hazards area.

Saltwater Intrusion

The people of Guam have recognized the fundamental importance of the island's NGLA. The NGLA supplies 90% of the island's drinking water. Any actions that would compromise this water source would

[18] Agat Shoreline Protection Feasibility Study, prepared by the United States Army Corps of Engineers, Available at https://www.poh.usace.army.mil/Missions/Civil-Works/Civil-Works-Projects/Agat-Shoreline-Protection-Sec-14/

[19] Wildfires in Guam from 2015 to 2022 mapped using satellite imagery, shared by the Guam Department of Agriculture - Forest and Soil Resource Division, January 7, 2023. Available at https://www.arcgis.com/home/webmap/viewer.html?webmap=9551f742c919485093235011f2a92a55&extent=144.3405,13.1419,145.3547,13.7136

inevitably lead to a catastrophic deterioration of the island's overall health and wellbeing. Recent technical reports conducted by the UOG - WERI convey that there has been a general increase in chloride concentration within waters pumped from basins sourcing water from the NGLA over the years. The following technical reports examined water production wells in the Finegayan Basin and the Yigo-Tumon Basin.

Geospatial and Temporal Analysis of Patterns and Trends of Salinity in Finegayan Basin[20]: Although the Finegayan Basin consists of less than one-tenth of the NGLA, it supplies 15% of the island's total drinking water. Temporal analysis of 16 water production wells within the basin convey that 62.5% of wells exhibit a significant increasing trend in salinity concentration, and 25% of the wells exhibited an increasing trend but is non-significant (Appendix A, Geospatial and Temporal Analysis of Patterns and Trends of Salinity in Finegayan Basin).

Probable causes for significant levels of chloride concentration in the Finegayan Basin water production wells may be due to saltwater intrusion, geriatric production well design and needed maintenance. Overpumping may also be a probable cause or a contributing factor. This is evident for a few wells when examining their production rates against level of chloride concentration. Thus, a potential remediation could be to pump wells with low chloride concentrations more, allowing wells with significant salinity levels to be remedied or undergo needed maintenance.

Geospatial and Temporal Analysis of Patterns and Trends in Salinity in Yigo-Tumon Basin[21]: The Yigo-Tumon Basin is the most productive basin in terms of water-well production, and is the largest basin in the NGLA. Generally, chloride concentration within water pumped within the basin has seen an increase, especially in more recent observations[22]. Corroborating Simard et. al's findings in 2015, the WERI report details very similar results in relation to the percentage of production wells exhibiting significant increasing trends in salinity levels. Linear regression and statistical analysis convey that 74.6% of the 63 wells exhibited a statistically significant increasing trend in chloride concentration and 11.1% of the total wells exhibit a statistically non-significant increasing trend; a total of 54 wells show increasing trends in salinity levels. The WERI report did not examine all of the wells examined by Simard et. al.; precisely, this report examined 63 of Simard's 79 observed wells.

Similar to the Finegayan Basin chloride concentration report, salinity levels in the water pumped from the Yigo-Tumon Basin may be due to a variety of reasons. One probable cause for the increasing trend may be observed in the correlation between increased production rates and increased chloride concentration. An examination into wells within the Yigo-Tumon Basin with low salinity levels should be investigated with the potential action to pump water from these wells in higher rates to compensate wells that should be remedied and attending maintenance. An overall contemporary redesigning of older production wells is also suggested, based on the report's observations that newer wells in the basin have lesser chloride concentrations. Other factors that can contribute to increased chloride concentrations include external factors such as sea spray, salinization of soils, leakage of septic tanks, and industrial waste.

Management Characterization

[20] Geospatial and Temporal Analysis of Patterns and Trends of Salinity in Finegayan Basin, prepared by Hazelle Ko et. al, December 2022. Available at https://ghs-cdn.uog.edu/wp-content/databases/Library/PDFs/TRs/WERI%20TR%20177%20-%20Ko%20et%20al%202022.pdf

[21] Geospatial and Temporal Analysis of Patterns and Trends in Salinity in Yigo-Tumon Basin, prepared by Hazelle Ko et. al, April 2023. Available at https://weri-cdn.uog.edu/wp-content/PDFs/TRs/WERI%20TR%20178%20-%20Ko%20et%20al%202023.pdf

[22] Salinity in the Northern Guam Lens Aquifer, prepared by Simard, C.A., Jenson, J.W., Lander, M.A., Manzanilla, R.M., Superales, D.G., and Habana, N.C, April 2015. Available at https://weriguam.org/publications/weri-technical-reports.html

1. In the tables below, 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.

Significant Changes in Hazards Statutes, Regulations, Policies, or Case Law

Topic Addressed	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Elimination of development/redevelopment in high-hazard areas[23]	Y	Y	N
Management of development/redevelopment in other hazard areas	Y	Y	Y
Sea level rise or Great Lakes level change	Y	Y	N

Significant Changes in Hazards Planning Programs or Initiatives

Topic Addressed	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Hazard mitigation	Y	Y	Y
Sea level rise or Great Lakes level change	Y	Y	N

Significant Changes in Hazards Mapping or Modeling Programs or Initiatives

Topic Addressed	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Sea level rise or Great Lakes level change	Y	Y	N
Other hazards	Y	Y	N

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

Although there is no direct definition for "high-hazard areas," the Guam HMP does provide the general locations and statistics where hazards profiled are seen and are more likely to be experienced on island. This is conveyed in Section 5 "Risk Assessment and Hazard Profiles" of the 2024 Guam HMP.

3. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

[23] Use the state's definition of high-hazard areas.

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.

a. The Guam HMP was officially updated in June 2024. The updated plan provides current hazards of concern and plans to address them; please see Section 6, "Mitigation Strategy" of the 2024 Guam HMP for all mitigation goals and associated actions/projects created to achieve them. With respect to the Guam Comprehensive Flood Study, please see its initial reference in "General Level of Risk in the Coastal Zone" for response.
b. There were no 309 or other CZM-driven changes.
c. The Guam HMP provides an update of hazards faced and ensuing threats on Guam. As mentioned in "3a.", the plan also provides future mitigation efforts to resolve many of the identified hazard related issues. Likewise, the comprehensive flood study provides the foundational analysis of riverine peak discharge for rivers in southern Guam where most of which are located on island. The comprehensive flood study will be further used as the baseline analysis to drive advanced studies and project designs within nearby areas of concern around rivers and streams.

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.

The BSP-GCMP ranked coastal hazards as a high priority enhancement area, initially due to the direct impact to the island's citizen's livelihoods. Based on BSP-GCMP's internal review of coastal hazards, it has been determined that the following coastal hazards have high general levels of risk: flooding, coastal storms, earthquakes, shoreline erosion, sea level rise, and saltwater intrusion. As it was shared by stakeholders, coastal hazards were tied for highest enhancement area priority ranking, with shoreline erosion and riverine and flooding–particularly storm runoff flooding–the major hazards to address. Both specific hazards garnered 80% of all stakeholder responses. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, Guam DoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

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)

Phase 1 (High-level) Assessment: *(Must be completed by all states.)*

Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

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[24]	Changes or Trends Since Last Assessment[25] (↑, ↓, –, unknown)	Cite data source
Beach access sites	211	–	2020 Observation
Shoreline (other than beach) access sites	99	–	2020 Observation
Recreational boat (power or non-motorized) access sites	8	–	BSP-GCMP
Designated scenic vistas or overlook points	14	–	2020 Dept. of Parks and Recreation
Fishing access points (i.e. piers, jetties)	8	–	2020 Observation
Coastal trails/ boardwalks *(Please indicate number of trails/boardwalks and mileage)*	18+	–	Recent Guam trail guides published listing numerous trails, many of which are restricted access (base access only)

[24] Be as specific as possible. For example, if you have data on many access sites but know it is not an exhaustive list, note "more than" before the number. If information is unknown, note that and use the narrative section below to provide a brief qualitative description based on the best information available.

[25] If you know specific numbers, please provide. However, if specific numbers are unknown but you know that the general trend was increasing or decreasing or relatively stable or unchanged since the last assessment, note that with a ↑ (increased), ↓ (decreased), – (unchanged). If the trend is completely unknown, simply put "unknown."

Type of Access	Current number[24]	Changes or Trends Since Last Assessment[25] (↑, ↓, –, unknown)	Cite data source
Acres of parkland/open space	176 Natural Preserves, Conservation Preserves, Territorial Parks, Territorial Recreational Facilities and Historic Sites. The Guam DPR maintain an additional 5,414 acres of undeveloped property in inventory for future development	↓	Department of Parks and Recreation 2014 Guam Statewide Comprehensive Outdoor Recreation Plan[26] Comprehensive Outdoor Recreation Plan

[26] 2014 Guam Statewide Comprehensive Outdoor Recreation Plan, prepared by the Guam Department of Parks and Recreation, 2024. Available at bsp.guam.gov/wp-bsp-content/uploads/govarchieve/G13-20.111 2014 Guam Statewide Comprehensive Outdoor Recreation Plan.pdf

Type of Access	Current number[24]	Changes or Trends Since Last Assessment[25] (↑, ↓, –, unknown)	Cite data source
Access sites that are Americans with Disabilities Act (ADA) compliant[27]	2+	—	War in the Pacific National Historical Park website specifically mentions ADA access – no other sites listed / observed, although notes commitment by NPS to make facilities and services accessible One (1) ADA fishing ramp at Paseo de Susana Park as reported in 309 assessment stakeholder meetings
Other (please specify)			

2. Briefly 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. There are several additional sources of statewide information that may help inform this response, such as the Statewide Comprehensive Outdoor Recreation Plan,[28] the National Survey on Fishing, Hunting, and Wildlife Associated Recreation,[29] and your state's tourism office.

The ocean shore provides the necessary setting for citizens to enjoy themselves through a myriad of recreational activities. More importantly, the shore serves as a means for fulfilling basic human needs,

[27] For more information on ADA see *ada.gov.*

[28] Most states routinely develop "Statewide Comprehensive Outdoor Recreation Plans", or SCROPs, that include an assessment of demand for public recreational opportunities. Although not focused on coastal public access, SCORPs could be useful to get some sense of public outdoor recreation preferences and demand. Download state SCROPs at*.recpro.org/resources--reports/scorp-resources.*

[29] The National Survey on Fishing, Hunting, and Wildlife Associated Recreation produces state-specific reports on fishing, hunting, and wildlife associated recreational use for each state. While not focused on coastal areas, the reports do include information on saltwater and Great Lakes fishing, and some coastal wildlife viewing that may be informative and compares 2016 data to 2011, 2006, and 2001 information to understand how usage has changed. The most recent survey was conducted for 2022 but due to a change in methodology, results cannot be compared to previous reports. See *fws.gov/program/national-survey-fishing-hunting-and-wildlife-associated-recreation-fhwar.*

e.g., sustenance and providing work. As the population on Guam is expected to increase to 183,580 by the year 2040, the inherent access demands to reach the ocean shore for its resources and recreation will inevitably ensue[30]. From an early onset, the people of Guam have recognized the inherent importance of protecting and not obstructing rights-of-way to the ocean shore. However, from time-to-time, issues arise between private land-owners and citizens over the inaccessibility of rights-of-ways within private property. While features such as public parking is a component that enhances public access, the priority focus for the BSP-GCMP will be to protect the access trails themselves. The BSP-GCMP has, at the request of its citizens and partnering agencies, listened, monitored and attempted to resolve related issues to public access restrictions. Cases during this assessment period occurred first on November 3, 2023 when a chain-link barrier obstructed the walkway leading towards the public access point within Guam Reef Hotel's private boundary. Initial attempts to begin dialogue between the BSP-GCMP and the Director of Operations for the Guam Reef Hotel was made to address and resolve the obstruction. A follow-up email to the Director of Operations on November 6, 2023 was made, and a response was made from Guam Reef's Director of Operations stating that the public access obstruction was removed.

The second public access restriction incident occurred on December, 01, 2023, when it was brought to the attention of the BSP-GCMP that a public easement across the Guam Plaza was prohibited from being parked on.. Guam Plaza security personnel conveyed to citizens that the parking space obstructed a designated fire lane. Historically, this easement has been used for parking to reach two public access points located downhill from the parking area. After consultation with a Guam Fire Department Battalion Chief, it was made clear that the parking area in question was not a designated fire lane. An acknowledgement and explanation letter of the situation was provided to Guam Plaza staff and the establishment's Director of Operations. A follow up email correspondence was made to the Director of Operations on December 5, 2023.

The third public access related issue occurred on June 18, 2024 when a citizen raised concern of a bull cart trail fenced off in Tumon/Tamuning. This bull cart trail has been utilized to reach the ocean shore to Tumon Bay frequently by citizens and tourists. The trail runs north of the Tumon Police Precinct towards the beach, parallel to the Hyatt Hotel. The BSP-GCMP contacted the Guam DPW for their response on the matter, and it was shared that the bull cart trail had been fenced off due to findings of endangered terrestrial snails within the area and that no activity can occur before an environmental consultation is given by the Guam DoAg. The BSP-GCMP continues to follow up with Guam DPW regarding the bull cart trail's reopening.

In terms of tourism demands for public access, there have not been any related reports shared with the BSP-GCMP. Potentially, this no-response may be due to Guam's tourism industry's inability to recover to its pre-Covid 19 visitor's/tourist numbers which is down 46% in 2023, compared to 2019; in April 2023, the island received approximately 55,354 visitors[31]. An unclear recovery is expected to persist, despite a general increase outlook in worldwide travel demand expected since 2023[32].

[30] Integrated Solid Waste Management Plan. Guam Environmental Protection Agency (Guam EPA). 2023. January. Available at https://www.bing.com/search?q=Guam+Integrated+Solid+Waste+Management+Plan&cvid=a8fa123f4e3642138f79f0a7fbc5327e&gs_lcrp=EgRlZGdlKgYIABBFGDkyBggAEEUYOTIGCAEQABhAMgYIAhAAGEAyBggDEAAYQDIGCAQQABhAMgYIBRAAGEAyBggGEAAYQDIGCAcQABhAMgYICBBFGDzSAQgxMjA1ajBqNKgCCLACAQ&FORM=ANAB01&PC=DCTS

[31] April 2023 Preliminary Arrival Summary, prepared by Guam Visitor's Bureau, May 30, 2023. Available at https://www.guamvisitorsbureau.com/sites/default/files/april_2023_preliminary_arrival_summary.pdf

[32] Tourism set to Return to Pre-Pandemic levels in some Regions in 2023, prepared by United Nations World Tourism Organization, May 2023. Available at https://www.untourism.int/news/tourism-set-to-return-to-pre-pandemic-levels-in-some-regions-in-2023

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.

Asan and Agat Units Management Plan and Environmental Assessment[33]: The Asan and Agat Unit Management Plan represents a long-term planning guide to manage important, local historical sites within Guam's national parks. These sites consist of the Asan Beach, Asan Inland, Agat, and Mt. Alifan Units of the War in the Pacific National Historical Park. The units management plan does not just seek preservation and enhancement of these sites as they serve as commemoration for all those who were sacrificed and were involved with the liberation of Guam during WWII, but also seeks to provide protection for native terrestrial and marine organisms while also providing for recreational opportunities to visitors and citizens alike. For instance, the Asan Beach Unit is frequently utilized for familial functions such as family picnics and outdoor gatherings by the ocean shore, in addition to kite-boarding, fishing, and snorkeling, etc. Similarly, the Agat Unit also offers opportunities for various recreational activities seen and experienced within the Asan Beach Unit. However, public access for potential recreational opportunities is limited, or otherwise restricted, within the Asan Inland and Mt. Alifan Units. For instance, Mt. Alifan unit, a historically significant area where Japanese occupiers fended against the U.S. military during WWII, is characterized by a savannah with high slopes and rugged terrain. Mt. Alifan's Unit geography makes complete access not available. In fact, the unit is currently unavailable for visitors to access, although there are management aspirations to allow for light visitor access for Guam citizens. In the case of the Asan Inland Unit, the unit consists of cliffs and hillsides with thick sword grass, vines, steep ravines, and rocky outcroppings. The historical significance of the Asan Inland Unit is made apparent by the Memorial Wall indicating the names of those who lost their lives during WWII. Currently, there are no formal public access opportunities within both units, although public access to the Asan Bay Overlook located at the summit of the Asan Inland Unit is available where the Memorial Wall is located.

An educational training workshop was conducted on public access by BSP-GCMP on June 19, 2024, at the request of the Tamuning Municipal Office. A total of 33 participants registered for the training workshop, and attendees learned about, or were refreshed on, local statutes protecting and providing public access, the types of public access on island, agencies involved with public access, and how to utilize the Guam DLM hosted resource, the Guam eGIS Land Web Information Center, for analyzing parcels with documented traditional rights-of-way or public access[34]. At the end of the training workshop, it was shared by attendees that there were historical and conservation areas within the Government of Guam's public lands inventory which are inaccessible. The sites identified with public access restrictions include Gaddao's Cave, Hurao Park, Santos Memorial Park in Asan, and other conservation areas within the Government of Guam land inventory.

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.

[33] Asan and Agat Units Management Plan and Environmental Assessment, prepared by National Parks Service, January 2-24. Available at https://parkplanning.nps.gov/document.cfm?parkID=344&documentID=134032#:~:text=The%20plan%20provides%20guidance%20for%20resource%20and%20facility,the%20plan%20and%20EA%20available%20for%20download%20below.

[34] Guam eGIS Land Web Information Center, prepared by the Guam Department of Land Management, April 2025. Available at http://naturalresources.guam.gov/GuamLandWeb/Default.aspx?Transection=http://naturalresources.guam.gov/GuamLandWeb/ReviewDept/SpecialDocumentSearch.aspx

Significant Changes in Public Access Management

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	Y	N
Operation/maintenance of existing facilities	Y	Y	N
Acquisition/enhancement programs	N	N	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

    a. Although there have been no significant changes to any of the above management categories related to public access, the recently adopted Guam Forest System Plan includes the goal of supporting public access to the Forest System inventory and has provided objectives to be met within the plan to create and respect the inherent right of access to lands within the Forest System for recreational and educational purposes for the benefit of the people of Guam. Please see Guam Forest System Plan referenced in the wetlands enhancement area assessment for more details regarding the specific objectives.

3. Indicate if your state or territory has a publicly available public access guide. How current is the publication and how frequently it is updated?[35]

Publicly Available Access Guide

Public Access Guide	Printed	Online	Mobile App
State or territory has? (Y or N)	Y (Man Land and Sea) previous publication}	Y ("Guam Ocean Shore Public Access" by BSP-GCMP)	N
Web address (if applicable)	N/A	https://bsp.guam.gov/public-access/	N/A

[35] Note some states may have regional or local guides in addition to state public access guides. Unless you want to list all local guides as well, there is no need to list additional guides beyond the state access guide. You may choose to note that the local guides do exist and may provide additional information that expands upon the state guides.

Public Access Guide	Printed	Online	Mobile App
Date of last update	2019 Commercial Guide Updates (hiking and snorkeling/diving)	N/A	N/A
Frequency of update	N/A	N/A	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.

The frequency of complaints made in regards to public access to historical sites, ocean shore and inland is a major reason for the public access priority ranking. In terms of planning efforts, the recently adopted Guam Forest System Plan and future Seahorse Reserve Plan address public access as a key element to both within the Seashore Reserve and the Guam Forest Inventory. Stipulations regarding public access to these areas will be addressed through special area management plans guided by both the Guam Forest System Plan and Seashore Reserve Plan. 30% of stakeholders during both stakeholder engagement sessions on March 19 and 21, 2025 shared that, currently, public access should be a priority to address, and was ranked 7th in terms of priority ranking. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, GDoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

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)

Phase 1 (High-level) Assessment: *(Must be completed by all states.)*
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

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.

Existing Status and Trends of Marine Debris in Coastal Zone

Source of Marine Debris	**Significance of Source** (H, M, L, unknown)	**Type of Impact**[36] (aesthetic, resource damage, user conflicts, other)	**Change Since Last Assessment** (↑, ↓, –, unknown)
Beach/shore litter	H	Aesthetic, resource damage, and health	↑
Land-based dumping	H	Aesthetic, resource damage, and health	↑
Storm drains and runoff	unknown	Aesthetic, resource damage, and health	unknown
Land-based fishing (e.g., fishing line, gear)	M	Aesthetic, resource damage, and health	↑
Ocean/Great Lakes-based fishing (e.g., derelict fishing gear)	L	Resource damage	↑
Derelict vessels	M	Resource damage	–
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	L	Resource damage	–
Hurricane/Storm	H	Aesthetic, resource damage	unknown
Tsunami	L	Aesthetic, resource damage, and health	–
Other (please specify): Unexploded ordinances	H	Aesthetic, resource damage, and health	–

Source: Guam Marine Debris Emergency Response Guide: Comprehensive Guidance Document, prepared by NOAA Marine Debris Program, September 2024. Available at https://marine-debris-site-s3fs.s3.us-west-1.amazonaws.com/s3fs-public/publications-files/2024_Guam_Comprehensive_Guide_508.pdf?VersionId=Dw7iBgA2A3hcp.KImpbpfacnkx.SmOst

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.

[36] You can select more than one, if applicable.

There are relatively few datasets and reports focused specifically on marine debris. However, there have been significant efforts since the previous enhancement cycle conducted to address marine debris.

2022 Guam Statistical Yearbook[37]: The Guam Statistical Yearbook, an annual report rendered by the Guam BSP, comprises a comprehensive collection of data on Guam's economic performance and trends, in addition to various statistics provided by partnering federal and local agencies. The 2022 Guam Statistical Yearbook includes a collection of land and underwater debris collected in the island between 2018-2022. Among the types of debris presented, those stemming from "Shoreline and Recreational Activities" was the most collected, since 2018. The lowest and highest percentages of items associated with this activity were captured in 2019 (approximately 71%) and 2021 (approximately 93%), respectively. In terms of most consistent types of debris found on land and underwater between 2019-2022, beverage bottles and food wrappers ranked in the "top 10" in terms of total number collected and percentage of types of collected items (Table 1-04, 2022 Guam Statistical Yearbook). Fortunately, Guam has also seen an increased trend in recycling rates since 2020. Based on GEPA reports, Guam has seen approximately a 45% increase between 2020 and 2022. However, Guam's waste diversion rate (waste generated/waste diverted) seem to remain stagnant at an average rate of approximately 28%[38].

BSP-GCMP supports the annual International Coastal Cleanup and provides annual data on the number of volunteers and amount and composition of waste collected. The Ocean Conservancy compiles the International Coastal Cleanup Annual Reports as part of a global effort to characterize all types of marine debris collected by and near the coast. For Guam, from 2020-2023, the ratio of lbs. of waste collected per person dropped precipitously, while the 2024 report indicated the ratio had increased by approximately a factor of four from the previous year[39]. A note, the undulating number of attendees during this enhancement cycle may have been caused by a combination of the effects of the COVID-19 pandemic disrupting normalcy and the underutilization of the Clean Swell App by participants used to log debris collected.

E.O NO. 2020-42 Relative to Establishing the Guam Abandoned Derelict Vessels Removal Group[40]: On December 9, 2020, the Governor of Guam signed an executive order to establish the Guam ADV Removal Group. The group is made up of local agencies including the GEPA, BSP, Guam DoAg, and federal partners such as the US Navy, USACE, the US Coast Guard, NOAA, and the US Fish and Wildlife Service. The ADV Removal Group is tasked with identifying, removing and disposing of ADVs within the island's territorial waters. Guam Executive Order 2020-42 recognized that ADV's are a significant threat to maritime transportation as they present navigational hazards. In addition, ADV's represent a hazard for marine and coastal habitats surrounding them as they can shift during heavy wave events, with the potential of oil and toxic chemical dispersion housed within them may occur. Furthermore, ADV's can pose a risk to the public as the decrepit structures are unstable, potentially entrapping

[37] 2022 Guam Statistical Yearbook, prepared by the Bureau of Statistics and Plans, 2023. Available at https://bsp.guam.gov/wp-bsp-content/uploads/2024/01/2022-Guam-Statistical-Yearbook_Final.pdf

[38] Integrated Solid Waste Management Plan. Guam Environmental Protection Agency. 2023. January 2024. Available at https://epa.guam.gov/wp-content/uploads/2023/09/Intergrated-Solid-Waste-Management-Program_Jan2023.pdf

[39] International Coastal Cleanup Report, prepared by Ocean Conservancy, 2020 - 2024. Available at https://oceanconservancy.org/trash-free-seas/international-coastal-cleanup/annual-data-release/

[40] Guam Executive Order No. 2020-42, prepared by the Governor of Guam. Available at https://epa.guam.gov/wp-content/uploads/2021/04/ADV-EO_120920_FINAL.pdf

recreational divers within them. Currently, there are approximately 31 vessels identified and surveyed on Guam that require removal, 14 of which are considered critical and have been identified as first priority for removal.

Port Authority of Guam - Removal of M/V Voyager from Piti Channel: In May 2023, Super Typhoon Mawar broke M/V Voyager free from its mooring. The event set the vessel adrift and grounded it in Piti Channel in Outer Apra Harbor. The vessel was declared abandoned after multiple attempts by the Port Authority of Guam to contact the registered owner. The abandoned property is located on premises owned, or controlled, by the Port and it constitutes a public nuisance and a navigational hazard. Currently, the vessel poses a threat to Port of Guam infrastructure, commercial vessel waterways such as the US Navy fuel piers at Wharves Delta and Echo, and port stakeholder properties. The Port Authority of Guam currently is gathering the necessary permits to ensure the safe removal operation of M/V Voyager by CTF 73 Navy Salvage and Divers, with the removal plan slated to begin in August-October 2025 and is as follows: (1) M/V Voyager will be floated and moved to one of the Port of Guam piers; (2) marine hazardous debris will be removed and prepared for towing by naval vessel Salvor; and (3) M/V Voyager will be towed and sunk in designated area 12 nautical miles outward to sea.

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.

Significant Changes in Marine Debris Management

Management Category	**Employed by State/Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Marine debris statutes, regulations, policies, or case law interpreting these	Y	N	Y
Marine debris removal programs	Y	N	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

a. Guam Zero Waste Act[41]: Passed into law on September 30, 2022 through the 36th Guam Legislature, the Guam Zero Waste Act was established to serve as a foundation for developing localized and innovative recycling and waste management programs on Guam to protect the environment from debris generated by consumer wastes and to bolster the island's tourism industry. The Guam Zero Waste Act looks to modernize local recycling programs to optimize programs as their current statuses are both infeasible and inefficient. In concert with the GEPA, the act prioritizes overall waste reduction, circular use of materials, and the promotion of innovative research to address the rapidly decreasing lifespan of the island's landfill which would decrease the amount of potential debris reaching out to shore.

   2023 Zero Waste Master Plan[42]: The 2023 Guam Zero Waste Master Plan provides a framework and guidance for the government and people of Guam to become a zero-waste society. The plan majorly emphasizes the realization and utilization of an environmentally aware community and circular economy to completely eliminate all production waste through its reutilization. The plan provides suggestions in regards to building economic sectors and future legislative recommendations to sustain the effort. Within the plan are detailed conceptual guides which provide a detailed implementation of a zero-waste program that encompasses the support from public and private entities, suggested timeline for implementation, and sustainability impacts that can be realized over a 20-year period, if the program is implemented with fidelity.

b. There are none.

c. Please see the earlier response in "2a."

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.

Based on stakeholder responses, the marine debris enhancement area is tied for the top ranked enhancement area in terms of designating it as a high-priority enhancement area, with 50% of respondents considering the enhancement area a high priority. However, according to the above-mentioned references, particularly Guam Executive Order 2020-42 and the Guam Zero Waste Act, the BSP-GCMP has ranked the enhancement area a low-priority at this time. However, future ranking of the enhancement area during subsequent Coastal Zone Enhancement Program cycles may change and be elevated to a high-priority. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, GDoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

[41] Public Law 36-115, prepared by the 36th Guam Legislature, September 30, 2022. Available at https://archives.guamlegislature.gov/public-laws/

[42] 2023 Zero Waste Master Plan, prepared by Guam Environmental Protection Agency, January 2023. Available at https://epa.guam.gov/zerowaste/

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)

Phase 1 (High-level) Assessment: *(Must be completed by all states.)*
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

Resource Characterization

1. Using National Ocean Economics Program Data on population and housing,[43] please indicate the change in population and housing units in the state's coastal counties between 2017 and 2021. You may wish to add additional trend comparisons to look at longer time horizons as well (data available back to 1970), but at a minimum, please show change over the most recent five-year period data is available (2017-2021) to approximate current assessment period.

Trends in Coastal Population and Housing Units

	2010	2020	Percent Change (2010-2020)
Number of people	159,358	153,836	-3.47%
Number of housing units	50,567	51,555	+1.95%
Source: 2020 Island Areas Census: Guam, prepared by the United States Census Bureau, October 20, 2022. Available at https://www.census.gov/data/tables/2020/dec/2020-guam.html			

2. Using the tables below as a guide, provide information on land cover changes and development trends. Be as quantitative as possible using state or national land cover data.[44] The tables are a suggestion of how you could present the information. Feel free to adjust column and row headings to align with data and time frames available in your state or territory. If quantitative data on land cover changes and development trends are not available, provide a brief qualitative narrative describing changes in land cover, especially development trends, including significant changes since the last assessment.

[43] *www.oceaneconomics.org/*. Enter "Population and Housing" section and select "Data Search" (near the top of the left sidebar). From the drop-down boxes, select your state. Select the year (2021) then select "coastal zone counties." The default comparison year will be 2017 so no need to select a comparison year.

[44] National data on wetlands status and trends include NOAA's Land Cover Atlas (*coast.noaa.gov/digitalcoast/tools/lca.html*) and the U.S. Geological Survey's National Land Cover Database (*usgs.gov/centers/eros/science/national-land-cover-database)*.

Distribution of Land Cover Types in Coastal Counties

Land Cover Type	Land Area Coverage in 2015 (Acres)	Gain/Loss Since 2005 (Acres)
Developed, High Intensity	-	-
Developed, Low Intensity	-	-
Developed, Open Space	15,078.4	+793.6
Grassland	25,817.6	-601.6
Scrub/Shrub	11,820.8	+2,636.8
Barren Land	3,475.2	-627.2
Open Water	13,056	+32
Agriculture	576	-192
Forested	59,776	-1,094.4
Woody Wetland	3,052.8	+44.8
Emergent Wetland	985.6	-19.2
Source: https://coast.noaa.gov/ccapatlas/. Updated C-CAP data for this cycle is unavailable, and thus current analysis is based on most up-to-date C-CAP results.		

Development Status and Trends for Coastal Counties

	2005	2015	Percent Net Change
Percent land area developed	18.06	19.41	7.5
Percent impervious surface area	8.35	9.17	9.8
Source: https://coast.noaa.gov/ccapatlas/. Updated C-CAP data for this cycle is unavailable, and thus current analysis is based on most up-to-date C-CAP results.			

How Land Use Is Changing in Coastal Counties

Land Cover Type	Areas Lost to Development Between 2005-2015 (Acres)
Barren Land	364.8
Emergent Wetland	-
Woody Wetland	-
Open Water	12.8
Agriculture	64
Scrub/Shrub	595.2
Grassland	505.6
Forested	1,964.8

3. Briefly characterize how the coastal shoreline has changed in the past five years due to development, including potential changes to shoreline structures such as groins, bulkheads and other shoreline stabilization structures, and docks and piers. If available, include quantitative data that may be available from permitting databases or other resources about changes in shoreline structures.

In regards to general construction over the coastal zone, statistics sourced from the Guam DPW within the 2022 Guam Statistical Yearbook convey the number of new construction permits. Permit categories include Commercial, Industrial, Residential, and Other types. With the exception of condominium permits,

all permit categories, since 2018 have continued to increase over the reporting timeline. Residential permits have seen the most increase between FY2018-FY2022, followed by permits for warehouse/storage, utility/infrastructure, photovoltaic/solar, signage, demolition, and clearing/grading. In regards to general construction value, Commercial permits and residential permits cumulatively make up the majority in new, addition and renovation permits (Table 17-06, 2022 Guam Statistical Yearbook). Amongst all villages on Guam, from FY2019 – FY2022, Dededo, Yigo, Tamuning, Mangilao, and Barrigada have consistently seen the most permit requests, consisting mostly of residential construction permits, with the greatest number of building permits issued in Dededo–93 permits, 29% of total building permits[45]. With the continual increase of development, impervious surfaces have the effect of synthesizing geomorphological characteristics not native to the landscape. Visual evidence indicates heavy rainfall events are a stressor in the tourist district of Tumon which result in man-made gullies within the district's beach profile. The consequential freshwater washouts is a threat to the area's beach profile and marine ecosystems, and merits further future analysis of the effects stemming from these man-made gullies originating from an increase in impervious surfaces.

4. Briefly summarize the 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, shoreline hardening, and habitat fragmentation, since the last assessment.

During this reporting period, there are no territory-specific data or reports on the cumulative and secondary impacts of coastal growth and development. However, it is suspected that some degree of impairment to the islands marine bays' and recreational beaches' water quality stems from a combination of municipal point source and agricultural activities, sewage overflows, urban runoff contaminated sediments from onshore, and freshwater seepage[46].

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.

[45] 2024 Guam Hazard Mitigation Plan, prepared by Guam Homeland Security/Office of Civil Defense, June 2024. Available at https://bsp.guam.gov/wp-bsp-content/uploads/2025/06/Guam-2024-HMP_20240711-MS-Updated-Maps.pdf

[46] 2020 Integrated Report, prepared by Guam Environmental Protection Agency, 2020. Available at https://epa.guam.gov/wp-content/uploads/2023/11/2020-GUAM-IR.pdf

Significant Changes in Management of Cumulative and Secondary Impacts of Development

Management Category	**Employed by State or Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Statutes, regulations, policies, or case law interpreting these	N	N	N
Guidance documents	Y	N	N
Management plans (including SAMPs)	Y	N	Y

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

a. Regarding input for "Management Plans (including SAMPs)" please see Guam Forest System Plan referenced under the wetlands assessment.

ARC Geodatabase[47]: The ARC Geodatabase represents the BSP-GCMP's endeavors to understand the cumulative and secondary impacts of development over Guam's coastal resources. The ARC Geodatabase provides succinct information on development applications the BSP-GCMP has received and reviewed since 2021, geo-referencing of proposed developments, BSP - GCMP's official position, Notice of Action from the Guam (Hybrid) Land Use Commission and Territorial Seashore Protection Commission, the applicant seeking development, the application type, a description of the proposed use/zone, lot number(s), municipality/watershed in which development will occur in, the land use designation, current zoning, proposed zoning, total potential land area (in sq. meters) seeking development, and BSP-GCMP's recommended conditions guided by the North and Central Guam Land Use Plan's policies and Guam's Land Use Policies under Executive Order 78-37. In relation to understanding the impacts of development over Guam's finite coastal resources, the ARC Geodatabase, in conjunction with the updated C-CAP provided by NOAA, are used to analyze the cumulative impact and restrictions on available lands which is vital in endeavors to protect and preserve surrounding natural resources and to minimize the secondary impacts that would occur in the future. The data found in the ARC Geodatabase was compiled using internal physical and digital references, and was assisted by the Guam DLM. The Guam DLM provided vicinity maps to geolocate applications of proposed development as well as provided the Notice of Actions, which officially stipulate the conditions for a development.

Enhancement Area Prioritization

[47] ARC Land Use Applications with Location Point, prepared by the Guam Bureau of Statistics and Plans, October 18, 2024. Available at https://govguamgis.maps.arcgis.com/home/item.html?id=a44ec76267f44c4c998e4dece308c389#overview

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.

Assessing cumulative and secondary impacts stemming from development is vital to understand the foreseeable and unintentional future effects on the island's resources. A procedure to include the use of the ARC Geodatabase, together with NOAA C-CAP analysis, begins the process of assessing the cumulative effects of development on Guam and helps to understand the development effects on surrounding resources. Based on stakeholder responses, 40% considered the enhancement area a high-priority; this enhancement area was tied for 4th place in terms of enhancement area high-priority rankings. As it was shared in stakeholder input, as the island's land resource is finite, ensuring that developers understand the effects of development prior to breaking ground is essential.

Special Area Management Planning

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

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."

Phase 1 (High-level) Assessment: *(Must be completed by all states and territories.)*
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

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 SAMP. This can include areas that are already covered by a SAMP but where new issues or conflicts have emerged that are not addressed through the current SAMP.

Geographic Area	**Opportunities for New or Updated Special Area Management Plans** Major conflicts/issues
N. Guam aquifer recharge area	Major issues include overharvesting, near-shore development, increased recreation, poor fishing practices, storms, shoreline erosion,

Geographic Area	Opportunities for New or Updated Special Area Management Plans Major conflicts/issues
	flooding, and non-point source pollution.
Marine Protected Areas	Major issues include agriculture, development, overuse, military build-up, illegal dumping
Fragile Areas (wetlands, limestone forest, wildlife habitats and historic sites)	Major issues include development, Military, Ancestral Lands and Chamorro Land Trust needs, water sports and tropical beach recreation, vandalism, graffiti and theft of historic properties in historic sites.
Priority Southern watershed management areas (Piti- Asan, Manell-Geus, Pago Bay, Ugum, Fouha,Toguan)	Major issues include fires, poor land management, increasing development, flooding, and invasive species.

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.

Please see Guam Forest System Plan reference under the wetlands enhancement area assessment.

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.

Significant Changes in Special Area Management Planning

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
SAMP policies, or case law interpreting these	Y	Y	N
SAMP plans	Y	Y	Y

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

a. Please see the initial Guam Forest System reference within the wetlands enhancement area assessment.
b. Please see the initial Guam Forest System reference within the wetlands enhancement area assessment.
c. Through the adoption of the Guam Forest System Plan, the Guam Forest System can be effectively managed to protect its valuable natural resources and provide areas to support compatible uses within particular parcels determined within future site-specific management plans. The goals and objectives of the Guam Forest System Plan focus on protecting Guam's watersheds and native ecosystems by improving water quality, restoring degraded forests, and reducing threats such as flooding, wildfires, and feral ungulates. Potential management planning efforts include reforestation, establishing riparian buffers, and collaborating with government, nonprofits, and landowners to strengthen watershed management. At the same time, the plan seeks to maintain and enhance biological integrity by protecting rare plant species, conserving and restoring native habitats, propagating and reintroducing threatened or endangered species, and creating conditions for the return of locally extinct species. Ongoing monitoring and adaptive management will guide these strategies to ensure long-term ecological resilience.

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.

Stakeholders' responses from stakeholder engagement meetings held on March 19 and 21 have not indicated specific issues which a SAMP could help respond to. The enhancement area was tied for 4th in terms of high-priority ranking, with 40% of respondents giving the enhancement area a high-priority ranking. Future consideration of increasing the ranking of the enhancement area will be given in the event a major community issue is brought to attention for an area of particular concern. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, GDoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

Ocean and Great Lakes Resources

Section 309 Enhancement Objective: Planning for the use of ocean [and Great Lakes] resources. §309(a)(7)

Phase 1 (High-level) Assessment: *(Must be completed by all states and territories.)*
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

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),[48] indicate the status of the ocean and Great Lakes economy as of 2021 (the most recent data) in the tables below. Include graphs and figures, as appropriate, to help illustrate the information. Note ENOW data are not available for the territories. The territories can provide alternative data, if available, or a general narrative, to capture the value of their ocean economy.

Status of Ocean and Great Lakes Economy for Coastal Counties (2021)

	All Ocean Sectors	Living Resources	Marine Construction	Ship & Boat Building	Marine Transportation	Offshore Mineral Extraction	Tourism & Recreation
Employment (# of Jobs)	*8982*	*51*	*347*	*NA*	*452*	*NA*	*8132*
Establishments (# of Establishments)	*366*	*4*	*6*	*NA*	*13*	*NA*	*343*
Wages (Millions of Dollars)	*~$176.68*	~$0.91	~$19.06	*NA*	*~$16.28*	*NA*	*~$140.43*
GDP (Millions of Dollars)	*~$366.57*	*~$4.99*	*~$29.83*	*NA*	*~$32.23*	*NA*	*~$299.51*
Source: Economics: National Ocean Watch, prepared by NOAA Office for Coastal Management, Bureau of Labor Statistics and Bureau of Economic Analysis, February 2025. Available at https://coast.noaa.gov/digitalcoast/data/enow.html							

[48] *coast.noaa.gov/digitalcoast/tools/enow.html*. If you select any coastal county for your state, you are directed to various data displays for that county. In the upper left of the screen, click the "State" box, to the left of the county box so that the state name will be highlighted. Now the data will reflect statewide data for all of the state's coastal counties. Make sure "2021" is selected for the year (top right corner). You can then click through the sector types by selecting the icons along the top and the type of economic data (employment, wages, GDP, etc.), by clicking through the icons on the left.

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2021)[49]

	All Ocean Sectors	Living Resources	Marine Construction	Ship & Boat Building	Marine Transportation	Offshore Mineral Extraction	Tourism & Recreation
Employment (# of Jobs)	-8410	+471 (~55% increase)	+418 (~89% increase)	+2467 (~53% increase)	-1937 (~37% decrease)	-17 (~17% decrease)	-9812 (~10% decrease)
Establishments (# of Establishments)	1109	-8 (5% decrease)	+17 (~65% increase)	+4 (~18% increase)	-1 (~1% decrease)	+1 (~14% increase)	+1096 (~32% increase)
Wages (Millions of Dollars)	$1,518.09	+~$43.45 (~178% increase)	+~$66.25 (~195% increase)	+~$365.1 (~106% increase)	+~$95.06 (~40% increase)	-~$0.72 (~6% decrease)	+~$948.95 (~42% increase)
GDP (Millions of Dollars)	$2,888.78	+~91.46 (~167% increase)	+~$106.54 (~150% increase)	+~$91.53 (~226% increase)	+~$114.07 (~25% increase)	+~$19.25 (~100% increase)	+~$2,465.93(~44% increase)
Above analysis provided by Economics: National Ocean Watch, and is for the Pacific region; 2005 information on Guam was not compiled. Available at https://coast.noaa.gov/digitalcoast/data/enow.html							

2. Understanding existing uses within ocean and Great Lakes waters can help reduce use conflicts and minimize threats when planning for ocean and Great Lakes resources. Using Ocean Reports,[50] indicate the number of uses within the ocean or Great Lakes waters off of your state. To avoid duplication, energy uses (including pipelines and cables) are reported under "Energy and Government Facility Siting" in the following template. However, feel free to include energy uses in this table as well if listing all uses within ocean and Great Lakes waters in one place is preferred. Add additional lines, as needed, to include additional uses that are important to your state. Note: The Ocean Reports tool does not include data for the Great Lakes states. Great Lakes states should fill in the table as best they can use other data sources.

Uses within Ocean or Great Lakes Waters

[49] Trend data is available at the bottom of the page for each sector and type of economic data. Mouse over the data points for 2005 and 2021 to obtain the actual values and determine the change by subtracting 2005 data from 2021.

[50] *coast.noaa.gov/digitalcoast/tools/ort.html*. Select the "view quick reports" button and enter the name of your state or territory in the search bar. Some larger states may have the "quick reports" for their state waters broken into several different reports. Click on the "state waters" reports to view. Note the Ocean Reports tool also generates "quick reports" for national estuarine research reserve boundaries in your state. These reports are just a subset of the "state waters" report(s) so you can ignore the reserve "quick reports." Use the icons on the left-hand side to select different categories: general information, energy and minerals, natural resources and conservation, oceanographic and biophysical, transportation and infrastructure, and economics and commerce. Scroll through each category to find the data needed to complete the table. The top six categories in the table above are in the "energy and minerals" section while the other information to complete the table can be found under the "transportation and infrastructure" section.

Type of Use	Number of Sites
Federal sand and gravel leases *(Completed)*	0
Federal sand and gravel leases *(Active)*	0
Federal sand and gravel leases *(Expired)*	0
Federal sand and gravel leases *(Proposed)*	0
Beach Nourishment Projects	0
Ocean Disposal Sites	1, outside within 10 nautical miles
Principle Ports *(Number and Total Tonnage)*	3; 14,117,530 total tonnage
Coastal Maintained Channels	1, Apra Harbor
Designated Anchorage Areas	Naval, Explosive, and General Anchorages within Apra Harbor
Danger Zones and Restricted Areas	1 (US Navy)
Other (Unexploded Ordinance)	4
Data reported from 2022 Guam Statistical Yearbook permit review confirmed by BSP unless otherwise noted	

3. 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** (↑, ↓, –, unknown)
Benthic habitat (including coral reefs)	↑
Living marine resources (fish, shellfish, marine mammals, birds, etc.)	↑
Sand/gravel	—
Cultural/historic	↑
Other (please specify)	—
Transportation/navigation	—
Offshore development[51]	—
Energy production	—
Fishing (commercial and recreational)	↑
Recreation/tourism	—
Sand/gravel extraction	—
Dredge disposal	—
Aquaculture	—
Other (please specify)	↑

[51] Offshore development includes underwater cables and pipelines, although any infrastructure specifically associated with the energy industry should be captured under the "energy production" category.

4. For those ocean and Great Lakes resources and uses in the table 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. Place an "X" in the column if the use or phenomenon is a major contributor to the increase.

Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources

	Land-based development	Offshore development	Polluted runoff	Invasive species	Fishing (Commercial and Recreational)	Aquaculture	Recreation	Marine transportation	Dredging	Sand/Mineral Extraction	Ocean Acidification	Other (Specify)
Benthic habitat (including coral reefs)	X	X	X	X							X	heat stress
Living marine resources	X		X	X	X			X			X	disease
recreation/tourism	X											declining visitors
Cultural/historic	X											coastal hazards

5. 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.

A Decade of Change on Guam's Coral Reefs[52]: This report provides an overview of assessments and activities collected and conducted by the GLTMP and UoG RFMP since 2010 and 2009, respectively, till 2021. The report provides insight to broad trends of coral reef ecosystem health, with an emphasis on changes within Guam's HPRA. Due to historically severe mass coral bleaching events in 2013, 2014, 2016, and 2017, there has been urgency to shift resources towards comprehensive data collection efforts throughout the island including 20 more shallow reef community sites. Much of the change in reef conditions documented were gathered within the shallow, wave-washed reef front zone and the island's shallow reef flat areas.

Benthic Habitats

Island-wide surveys that were carried out documented a 34% decline in living coral along the entire reef front zone of the island as a result of the record-breaking levels of heat stress occurring from 2013 - 2017. For instance, bleaching-susceptible corals in the shallower reaches of Guam's reef were most severely impacted from the significant heat-stress events where an estimated 59% loss in living coral occurred. In

[52] A decade of change on Guam's coral reefs, prepared by David Burdick et.al, August 2023. Available at https://www.uog.edu/ml/technical-reports.php.

contrast, coral cover along the seaward slope within the HPRAs remained relatively stable, and modest declines were exhibited within a couple. The relative stability of moderate to high levels of live coral cover at the Tumon, East Hagatna, and Piti HPRAs is likely a result of the near complete dominance of resilient coral species such as the *Porites rus* and mounding *Porites*. However, average coral cover within shallow seaward slope sites across the island in 2021 did not recover to 2013 coral coverage.

Recovery following the bleaching events has varied, with 60% of reef front sites showing increases in coral cover through 2021 and 40% of sites showing decreases. All but one of the shallow reef flat sites monitored by the RFMP showed a decline in coral cover between 2009 and 2022, with an average loss of 24% during the period. Sites with a greater proportion of the more bleaching-susceptible staghorn corals generally experienced greater losses, with one site losing as much as 50% of its living coral. A series of island-wide staghorn coral mortality assessments found an estimated 60% reduction in the size of living staghorn coral island-wide between 2013 and 2020-2021, with some sites losing all of their staghorn corals, and all but one species now considered uncommon or rare. Continual surveys between 2020- 2021 conveyed more declines with live staghorn corals no longer found at Sharks Hole and Pugua Patch Reef; there has been a considerable diminishment in recovery progress along historically major staghorn sites in Tumon Bay, Cocos Lagoon, and West Hagatna Bay.

Living Marine Resources

Sea cucumbers and edible shells suffered significant losses during these periods within most of the HPRAs, detrimental losses ranging between 69%-93%. Based on an anecdotal 2014 observation report, a declination of sea cucumber densities may also have been caused by a marine disease that affected a single, once-numerous spiky sea cucumber. The anecdotal report has suggested that a possible link between the supposed disease-related mass mortality of the spiky sea cucumber and ocean warming should be investigated further as ocean warming is projected to increase in the future, with the expected projection to increase the virulence and prevalence of marine disease that can result in the mass mortality of sea cucumbers and other marine invertebrates that are important food sources for coastal communities and the maintenance for normal coral reef function.

As it relates to fish biomass, findings have suggested both negative and positive trends in marine biomass within the HPRAs. The biomass of all food fish families within the Tumon Bay Reef Preserve, except groupers, appeared to have increased between 2019 and 2021. Furthermore, the density of small food fishes may have likely increased within the same period, since their observed decline between 2015-2019. As mentioned previously, significant declines in mean number of sea cucumbers and edible shells have been observed with an 81% decrease from 2010-2021 and 63% decrease from 2012-2015, respectively.

Within the East Hagatna Bay, the biomass of jacks and other similar families may have increased between 2019-2021, while biomass for all other food fish families assessed remained unchanged and stable. However, there have been highly varying changes in small fish populations, from 2015-2020, initially displaying a declining trend in density followed by a high increase of types of fish observed. However, total fish biomass in 2019 was relatively low, at 23% of the potential total reef fish biomass estimated for an unimpaired Guam reef. Total species richness ranged from a low of 122 species in 2020 compared to a high of 168 species in 2017; mean species richness ranged from a low of 34-44 species in 2020 to 51-71 species in 2017. Sea cucumber densities remained low through 2021, and edible shells increased steadily during this period.

Similar observations were made in the East Hagatna Bay within the Piti Bomb Hole. Many of the fish biomass remained stable between 2018-2020, with the total potential fish biomass in 2018 still relatively

low, ranging from 23%-40%. However, the biomass of parrotfishes may have increased between 2018 - 2020, and the density of small food fishes likely increased within the same period. The mean density of edible shells decreased by 67% from 2012-2014 and remained relatively stable through 2020 (see Fig. 42–43, A Decade of Change on Guam's Coral Reefs). Edible shell declination was contributed by a large decline in the density of top shell species, most notably from the decrease in *Tectus niloticus*. Similarly, the density of giant clams also appeared to decrease during the same period. The density of large sea stars and sea urchins appeared to have remained relatively stable, although densities of both groups appeared to have risen dramatically in 2018 before declining in 2020.

The Fouha Bay has seen similar trends to that of the trends within Piti Bomb Hole in relation to densities observed and the potential biomass. However, reports state that surgeonfish population density and other related families have increased between 2019 and 2021, fortunately.

Similar to the previous HPRAs, the Achang Reef Flat Marine Preserve marine food biomass trends were similar, namely, total biomass was very low in comparison to the HPRA's total potential fish biomass with optimal conditions. In addition, the density of sea cucumbers may have declined between 2014-2018. Fortunately, during the same period, biomass of surgeonfishes, wrasses, emperors, parrotfishes, and groupers may have increased, and the density of small food fishes and edible shells may have increased between 2014-2021. However, the density of moderate and large food fishes remained very low within the HPRA.

Within the Cocos East HPRA, coral cover remained very low–5% of coverage–between 2014-2018. Total fish biomass in 2014 was relatively low, between 19-38% of the potential total reef fish biomass with optimal reef conditions. Although survey data were limited between 2014-2021, analysis showed the density of sea cucumbers and edible top shells and giant clams may have declined by more than 50% during the period. And while the biomass of large fish, such as the parrotfish, and small fish density may have increased between 2014-2021, other previously observed species within the site such as the emperor fish, groupers or jacks were either sparsely or not observed at all.

2024 Stock Assessment Update of the Bottomfish Management Unit Species of Guam[53]: The 2024 BMUS Stock Assessment provides the fishable status of 13 BMUS–rusty jobfish, giant trevally, black jack, ruby snapper, deepwater longtail redsnapper, spotcheek emperor, bluestripe snapper, goldflag snapper, crimson jobfish, golden eye jobfish, Von Siebold's snapper, oblique-banded snapper, and yellow-edge lietail grouper–based on data and information of species stocks through 2023. A comparative analysis was conducted between the previous stock assessment published in 2019 and the current stock assessment. Statistical analysis of 2023 stocks using Bayesian statistics suggests BMUS in Guam were not overfished and were not experiencing overfishing in 2023, compared to the stock assessment in 2017 which conveyed that BMUS were overfished but not experiencing overfishing. Smaller catches between 2017-2020 may have greatly influenced the increase in stock biomass in 2023. However, higher catches in 2021-2023 appear to have reduced stock biomass in the most recent years. Stock projection models between 2024 - 2029 were rendered incorporating a range of variations in hypothetical six-year catches, uncertainties in surplus model production parameters and the 2023 stock status. The models provide similar conclusions to the previous benchmark stock assessment, i.e., annual catches of 31,000 - 33,000 lbs./yr. over the period would be associated with an approximately 40% probability of overfishing.

[53] Stock Assessment Update of the Bottomfish Management Unit Species of Guam, 2024, Bohaboy, E.C., Matthews, T., U.S. Department of Commerce. NOAA Technical Memorandum. TM- PIFSC-162. doi: 10.25923/rmxw-gh78

Natural Resource Condition Assessment: *War in the Pacific National Historical Park*[54]: This report provides a synopsis of the known biodiversity and ecological conditions of terrestrial, aquatic and marine ecosystems found within the War in the Pacific National Historical Park. As part of the National Parks Service's Natural Resource Condition Assessment, an analysis of the overall condition of native and invasive species richness within the park's streams was conducted. Aquatic organisms observed included small crustaceans, fishes and mollusks within 12 river streams within the park between 2013-2020. From the Assessment report, all 3 riverine species categories exhibited low diversity in almost all river streams. However, the ratio of native species to invasive species was very high, which is a positive indicator of perennial existence of those native species within the areas.

The park's stream crustacean fauna is relatively sterile. However, native species dominate all streams, with exception in the Asan River. The ratio of native to invasive species was at least 4:1, with the ratio of 1:0 within 66% of all streams. Overall, crustaceans have not been observed within 25% of streams.

Similar to crustacean species diversity, mollusk species observed within the park's streams are low. However, within 50% of all streams, the majority of all species are native (see Table 15, Natural resource condition assessment: War in the Pacific National Historical Park). A single invasive species, the *Gyraulus chinensis*, was the only mollusk reported within the Matgue River, while another, the *Pila conica*, shares habitat with four native species in the Masso River.

Native freshwater and euryhaline fish species dominate more than 83% of the park's streams. However, it should be noted that very low species richness is also observed. While the domination of native fish species is seen, there is at least one instance in which a single native or invasive species is the only fish species observed. For instance, the Big Gutal stream has only tilapia present, which is invasive. Likewise, the Paulana River provides habitat to only the goby, which is native. The Salinas River is a habitat for a single native and single invasive species, the jungle perch *(Kuhlia rupestris*) and the guppy (*Poecilia reticulata*), respectively.

An overall aquatic community assessment within the park's river systems was conducted in which it was found with high confidence that current aquatic species resources are in good condition and have remained relatively stable. However, with the relatively desolate species diversity within the park's river system, considerations of stressors should be assessed which could affect those species found to increase their rate of survival.

Recreation/Tourism

Guam's tourism economy generates significant economic benefits for its citizens. Tourism is the principal, non-federal economic driver in the island's growth. In 2021, tourism-supported jobs accounted for 21% of all jobs in the island equating to 8,132 jobs[55]. However, since the onset of Covid-19, Guam's tourism industry has seen a massive rate of decline. A year-over-year analysis on the number of visitors between 2019 and 2020 show that there have been significantly less tourists coming into Guam, i.e., an 80.3% decline from 2019, with the subsequent year approximately 83% less than 2020's observations[56]. When comparing 2019 to 2021 visitor statistics, tourist decline was as much as 97%. This trend, however, has

[54] Natural resource condition assessment: War in the Pacific National Historical Park, Donaldson, T. J., M. Kottermair, and T. N. Mesa. 2024. Science Report NPS/SR—2024/150. National Park Service, Fort Collins, Colorado. https://doi.org/10.36967/2303627

[55] Economics: National Ocean Watch, prepared by NOAA Office for Coastal Management, Bureau of Labor Statistics and Bureau of Economic Analysis, February 2025. Available at https://coast.noaa.gov/digitalcoast/data/enow.html

[56] The Guam Traveler Economy 2021 Results, prepared by Tourism Economics, September 2022. Available at https://www.guamvisitorsbureau.com/sites/default/files/tsa_2021_report.pdf

rebounded, although not with similar magnitude. In CY2023, Guam received 582,797 visitors, approximately 39% of 2019 arrivals, and in FY2024, Guam received 753,316 arrivals, a little less than ½ of 2019's total visitor amount[57]. The optimistic forecast for FY 2025 regarding tourist arrivals is expected to reach one-million, or will remain stagnant based on conservative estimates[58].

Transportation/navigation[59]

Approximately every five years, the United States Coast Guard conducts a WAMS study for the waters around Guam in order to address the US Department of Homeland Security maritime challenges and concerns. However, the study has not been conducted for the waters around Guam within the past few years. The Port Authority of Guam has not made any concerns regarding the matter, and current aids to navigation systems are not expected. However, the WAMS study will likely become a priority in the future due to the increase of U.S. military presence likely to utilize Guam's port facilities, in addition to the increase in commercial vessels coming into the Port of Guam. The likely increase in port utilization will inevitably bring stresses related to home-porting additional vessels and construction of new wharves and the deepening of the channel to accommodate future activities.

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?

[57] November 2023 Monthly Arrivals Summary, prepared by the Guam Visitor's Bureau, November 2023. Available at https://www.guamvisitorsbureau.com/sites/default/files/november_2023_preliminary_arrival_summary.pdf

[58] Guam arrivals reach 753K in fiscal 2024, GVB targets up to 1M in 2025, prepared by the Pacific Daily News, October 28, 2024. Available at https://www.guampdn.com/news/guam-arrivals-reach-753k-in-fiscal-2024-gvb-targets-up-to-1m-in-2025/article_ca9dbd76-92ad-11ef-8e81-874ef6c42865.html

[59] Jose D. Leon Guerrero Commercial Port of Guam 2023 Master Plan, prepared by WSP, March 2023. Available at https://www.portofguam.com/modernization

Significant Changes to Management of Ocean and Great Lakes Resources

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

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

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)	Y	Marine Conservation Plan, 2017 (Guam EEZ)
Under development (Y/N)	N	Marianas Trench Marine National Monument (MTMNM)
Web address (if available)	–	https://www.fisheries.noaa.gov/pacific-islands/habitat-conservation/marianas-trench-marine-national-monument
Area covered by plan	–	MTMNM - 95,216 square miles (246,608 square kilometers) of submerged lands and waters of the Mariana Archipelago east of the Philippines; Guam Marine Conservation Plan – to 200m EEZ

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.

Planning for the use of ocean and great lakes resources is important for the enhancement of the island's ability to self-sustain itself. Based on BSP-GCMP's internal review and stakeholder feedback, at this time, the enhancement area is a medium-priority. Stakeholder input shared this priority ranking, with 100% of stakeholder input indicating the enhancement area as a medium-priority. As noted earlier in regards to the tourism industry, Guam continues to see steady, albeit slow, progress. Future monitoring of the sector will be conducted to ascertain if the enhancement area may need to be upgraded to a high-priority in future CZEP cycles. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, GDoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

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)[60]

Phase 1 (High-level) Assessment: *(Must be completed by all states and territories.)*
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

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. If available, identify the approximate number of facilities by type. For ocean-facing states and territories (not Great Lakes states), Ocean Reports[61] includes existing data for many energy facilities and activities.

[60] 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 describes what states need to do regarding national interest and consideration of interests that are greater than local interests.

[61] *coast.noaa.gov/digitalcoast/tools/ort.html.* Select the "view quick reports" button and enter the name of your state or territory in the search bar. Some larger states may have the "quick reports" for their state waters broken into several different reports. Click on the "state waters" reports to view. Note the Ocean Reports tool also generates "quick reports" for national estuarine research reserve boundaries in your state but this is just a subset of the "state waters" report(s) so you can ignore the reserve "quick reports." Click on the wind turbine icon on the left ("energy and minerals") for information on energy production. While outside your coastal zone, you may also want to consider facilities/activities in "federal waters" that may have effects on your coastal zone.

Status and Trends in Energy Facilities and Activities in the Coastal Zone

Type of Energy Facility/Activity	**Exists in Coastal Zone** (# or Y/N)	**Change in Existing Facilities/Activities Since Last Assessment** (↑, ↓, –, unknown)	**Proposed in Coastal Zone** (# or Y/N)	**Change in Proposed Facilities/Activities Since Last Assessment** (↑, ↓, –, unknown)
Pipelines	Y	unknown	Y	-
Electrical grid (transmission cables)	Y	-	-	-
Ports	Y	↑	N	↑
Liquid natural gas (LNG)	N	-	Y	-
Electric Power Facilities (Oil)	Y	↑	Y	—
Electric Power Facilities (Gas)	Y	↑	Y	↑
Electric Power Facilities (Coal)	N	-	N	-
Electric Power Facilities (Nuclear)	N	-	Y	-
Electric Power Facilities (Wave)	N	-	Y	-
Electric Power Facilities (Tidal)	N	_	N	-
Electric Power Facilities (Current.ocean, lake, river)	N	_	N	-
Electric Power Facilities (Hydropower)	N	-	N	-
Electric Power Facilities (Ocean thermal energy conversion)	N	-	N	-
Electric Power Facilities (Solar)	N	-	N	-
Electric Power Facilities (Biomass)	Y	-	Y	-
Other (please specify)	N	-	N	-

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.

Guam100 Advisory Group[62]: Through the support of the NREL, the Guam100 was established on October 30, 2024 to assist in rendering a comprehensive approach for Guam to fully self-sustain itself through 100% renewable energy. Membership of the Guam100 Advisory Group consists of stakeholders from local government agencies, for- and non-profit institutions, and community-based organizations. Feedback from the group is used to ensure technical assistance is provided to the United States Department of Interior's Office of Insular Affairs and the NREL through the Guam100 project. The Guam100 Advisory Group consists of representatives from the Governor's Office, Guam Power Authority, Guam Energy Office, Mayor's Council of Guam, U.S. Navy/Joint Region Marianas and Guam Legislature, University of Guam, Guam Community College and Guam Green Growth Initiative, the Guam Chamber of Commerce and Guam Hotel/Restaurant Association, Micronesian Climate Change Alliance, Guåhan Sustainable Culture and Micronesian Resource Center. Input from the advisory group includes the local technical and regulatory requirements and the various cohesive goals of the island in the development and implementation of plans and policies for Guam's transition to 100% renewable energy. The Guam100 project pushes forward Guam's goals of establishing higher standards for Guam's energy provider's renewable energy portfolio, through Guam Public Law 35-46[63]. Further meetings will be held to discuss a comprehensive approach and roadmap for Guam to attain 100% renewable energy, all whilst integrating the Guam100 Advisory Group's vision statement encompassing the values and objectives from each of the respective stakeholder groups/entities.

Bureau of Ocean Energy Management - Offshore Wind Energy Siting[64]: The BOEM, established through the United States Department of Interior, oversees offshore renewable energy development located in the United States Outer Continental Shelf. Guiding their mandate, BOEM integrates the promotion of energy independence, environmental protection, and economic development through responsible, science-based management of energy and mineral resources. On Jan. 6, 2025, BOEM issued a Call for Information and Nominations for any potential wind energy leasing off the coast of Guam to collect public input and identify potential areas for offshore wind leasing. The action aligns with Guam's goals of achieving sustainable renewable energy dependence to 50% by 2035 and 100% by 2045. The Call for Information and Nominations will initiate a 90-day comment period ending on April 7, 2025 during which citizens can submit relevant information on site conditions, marine resources, and ocean uses near or within the potential areas for offshore wind leasing.

Application Review Committee[65]: Under Guam Executive Order 96-26, the ARC was established and charged with the responsibility of reviewing potential non-federally related development activities. The ARC consists of Government of Guam agency members such as the Guam DLM, GEPA, Guam DoAg, GWA, GPA, Guam DPR, Guam DPW and BSP in which each agency provides their respective positions and recommendations to the Guam Land Use Commission/Guam Hybrid Land Use Commission/Territorial Seashore Protection Commission based on their mandates and authorities. The BSP reviews the development applications for potential land-use conflicts that do not align with the land use designation described in legislatively-approved Guam land use planning documents. Furthermore, BSP's position

[62] Guam100: Guam's 100 Renewable Energy Future, National Renewable Energy Laboratory, October 2024. Available at https://www.nrel.gov/state-local-tribal/guam-renewable-energy.html

[63] Public Law 35-46: An Act To Amend § 8311 Of Article 3, Chapter 8, Title 12, Guam Code Annotated, Relative To Raising The Renewable Portfolio Standards Of The Guam Power Authority, prepared by Amanda L. Shelton and Clynt E. Ridgell, November 12, 2019. Available at https://archives.guamlegislature.gov/35th_Guam_Legislature/Public_Laws_35th/P.L.%20No.%2035-46..pdf

[64] Guam Activities, United States Department of Interior - Bureau of Ocean and Energy Management, February 2025. Available at https://www.boem.gov/renewable-energy/state-activities/guam-activities

[65] Executive Order 96-26, Governor of Guam, October 28, 1996. Available at http://www.bsp.guam.gov/wp-bsp-content/uploads/2017/03/E.O.-96-26-Relative-to-Creating-the-Application-Review-Comm.pdf

provides its analysis on the developmental impact stemming from new development within the watershed, and provides recommendations that are based on BSP-GCMP's enforceable policies. There have been at least two development applications relevant to the enhancement area in which BSP-GCMP has provided a position. They concern the Ukudu Power Plant and Megawatt Photovoltaic Energy Facility in Yona.

Height Variance Application for the Ukudu Powerplant

On May 20, 2021, BSP provided its position statement on a Height Variance Application for the Ukudu Powerplant. The applicant, Ukudu Power LLC representing TG Engineers and PC (TGE), requested a Variance for Height for various structures within the proposed 198-megawatt combined cycle, combustion turbine powerplant located in Dededo, Guam. The total area for the subject lots is 25 acres and is located on the Northern Watershed. According to National Oceanic and Atmospheric Administration's most up-to-date C-CAP land cover data from 2011, the Northern Watershed has changed by 9.03% due to increased impervious surfaces. In terms of development impacts, 29.42% of the Northern Watershed was developed and 15.05% consisted of impervious surfaces. It is well understood that an area is at greater risk of flooding the more an area is developed and levels of impervious surfaces are high. Furthermore, impervious surface degrades the watershed quality by greatly reducing the stream flow and increasing the stream temperature, and often carry huge pollutant loads downstream, causing due harm to aquatic life. Effects of runoff consists of channeling and loss of beach profile along untreated storm drain outfalls, sediment plumes and algae blooms, noxious orders as result in poor water quality, and coral mortality.

The existing landscape of the subject lots is a forested area, and based on the building footprint's magnitude, the landscape within the area will considerably be altered based on the proposed development plans and will contribute to the overall development rate of the Northern Watershed. The North and Central Guam Land Use Plan[66], authorized by Public Law 30-224[67], designates the proposed development area as "Residential" within the Future Land Use Map of the NCGLUP, and thus, is not consistent with the land use designation of the NCGLUP. Based on this conflict, BSP reminded the Commission that the power plant must mitigate any features of the facility so that it comes into compliance with the conditional use provisions of 21 Guam Code Annotated, Ch. 61, Section 61309 (M1) Light Industrial Zone[68], and provided conditional approval stipulations emphasizing air, water and noise quality enforceable policies[69].

Application for Conditional Use - Megawatt Photovoltaic Facility in Yona

On August 14, 2024, BSP provided its position on an application for Conditional Use pertaining to the Megawatt Photovoltaic Facility in Yona The applicants, Samsung E&C America Inc. and Samsung C&T Corporation, submitted a Conditional Use permit application to allow the construction and operation of a new 132-Megawatt solar Photovoltaic/Battery Energy Storage System consisting of approximately

[66] ICF International. 2009. North and Central Guam Land Use Plan. September. (ICF International #00824.08.) Seattle, WA. Prepared for Bureau of Statistics and Plans—Government of Guam.

[67] Public Law 30 - 224, Section 4, prepared by the 30th Guam Legislature, 2010. Available at https://archives.guamlegislature.gov/30th_Guam_Legislature/Public_Laws_30th/P.L.%2030-224%20SBill%20No.%20462-30%20(LS).pdf

[68] 21 Guam Code Annotated Real Property Ch. 61 Zoning Law. This Chapter was repealed and reenacted by P.L. 24- 171:3 (Apr. 17, 1998) as part of the adoption of the I Tano'-ta Land Use Plan. P.L. 25-011:2 (May 26, 1999) repealed P.L. 24-171 and and P.L. 25-011:3 expressly reenacted the version of Chapter 61 before the passage of P.L. 24-171. Available at https://www.guamcourts.gov/CompilerofLaws/GCA/21gca/21gc061.PDF

[69] Guam Executive Order 78-37: Guam Land Use Policies, prepared by the Governor of Guam, November 15, 1978. Available at https://bsp.guam.gov/wp-bsp-content/uploads/2017/01/E.O.-78-37-Guam-Land-Use-Policies.pdf

360,000 solar PV modules, and a renewable integration energy storage system facility, producing approximately 233,915 megawatts during its first year of operation. The proposed development would be located in Yona, Guam encompassing three agriculturally-zoned lots–two of which were covered under this position statement–with the combination of both lots encompassing 86,609 m^2.

Both lots are located in a "Conservation" designated land-use area under the Guam Land Use Districts[70]. As stated,

> "Conservation districts shall include those areas necessary for protection of watersheds and water sources, prevention of floods and soil erosion and preservation of archaeological, historic, scenic, and other natural and cultural resources; parklands, wetlands, beach and wilderness areas; areas necessary for conservation of endemic plants and animals; open-space areas which, because of their present use, natural condition or openness enhance the present or potential value of abutting or surrounding communities; areas of value for existing or future recreational purposes agricultural preserves as defined under Section 12603 of the Government Code; and other permissible uses and related activities found not to be detrimental to conservation policies and objectives."

And thus, the proposed conditional use was incompatible with the "Conservation" designation.

Both lots are located in the Ylig Watershed, and according to the NOAA C-CAP land cover data from 2005 to 2015, the surface area of this watershed changed by 9.73%. Regarding cumulative development impacts, 11.18% of the Ylig Watershed was developed and 11.35% comprises impervious surfaces. As mentioned, an area is at greater risk of flooding the more an area is developed or levels of impervious surfaces are high, and the potential transiting of huge pollutant and sedimentation loads downstream can occur as an effect of impervious surface rendering, causing due harm to aquatic life, surrounding habitats, and infrastructure. Furthermore, the subject sits atop volcanic uplands with descending slope gradients. Due to the topography, potential runoff is expected to contribute to erosion and sediment run-off consisting of the clay-like soils and badlands found in both lots, and thus contributing to the cumulative impact on the Ylig watershed.

It was proposed that the application include sustainable development designs and proper stormwater management systems be put in place to mitigate issues within the lots. Stipulations related to mitigating issues pertaining to sustainable community development, and air and visual quality were also provided within the BSP's position.

Jose D. Leon Guerrero Commercial Port of Guam 2023 Master Plan[71]: The 2023 Port Authority of Guam Master Plan represents the most up-to-date planning initiatives to maintain and upgrade port infrastructure and collaborative plans in order to optimize and maintain invaluable port functions for the people of Guam, shipping and transporters, and US Department of Defense partners through its realization of the Port Improvement Program. The Port Improvement Program is divided into two categories: the Port Readiness Plan and the Sustainability Plan. The Port Readiness Plan consists of capital improvement projects, port readiness projects, and sustainability Projects. Some of the more notable Port Improvement Program projects include constructing a fuel connectivity pipeline, dredging for a wharf and

[70] Guam Executive Order 78-23, prepared by the Governor of Guam, September 1978. Available at https://governor.guam.gov/governor-content/uploads/2017/08/E.O.-78-23-Promulgation-of-the-Rules-and-Regulations-under-.pdf

[71] Jose D. Leon Guerrero Commercial Port of Guam 2023 Master Plan, prepared by WSP, March 2023. Available at https://www.portofguam.com/modernization

fueling piers, replacing aged ship-to-shore gantry cranes, upgrading soon-to-become decrepit wharves, replacing facilities and equipment exceeding their life-capacity, and increasing capacity in areas that will better serve its commercial customers and the US Department of Defense's readiness plans in the Indo-Pacific theater. For a more detailed list of planned facilities and equipment upgrades, please see chapter seven of the Jose D. Leon Guerrero Commercial Port of Guam 2023 Master Plan.

3. Briefly characterize the existing status and trends for federal government facilities and activities of greater than local significance[72] in the state's coastal zone since the last assessment.

There are no changing trends for federal government facilities and activities of greater than local significance. The perennial trend in the erection of federal government facilities and infrastructure will persist considering the importance of Guam as a key strategic military location within Southeast Asia.

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.

Significant Changes in Energy and Government Facility Management

Management Category	**Employed by State or Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Changes Since Last Assessment** (Y or N)
Statutes, regulations, policies, or case law interpretations	Y	Y	N
State comprehensive siting plans or procedures	Y	Y	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

Enhancement Area Prioritization

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

High _____
Medium _X____
Low _____

[72] The CMP should make its own assessment of what government facilities may be considered "greater than local significance" in its coastal zone, but these facilities could include military installations or a significant federal government complex. An individual federal building may not rise to a level worthy of discussion here beyond a very cursory (if any at all) mention).

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

Currently, the BSP-GCMP has within its enforceable policies a policy addressing major facility siting. Currently, there have been no instances in which the enforceable policy has seen the need to be revised. Furthermore, the Guam BSP also sits on the Application Review Committee which makes recommendations on proposed development. Within its position statements, the Guam BSP emphasizes all enforceable policies and policies within Guam's North and Central Guam Land Use Plan that are relevant to each proposed development to, ultimately, create a balanced use of Guam's coastal resources. 30% of all stakeholder responses indicated that the enhancement area be considered a high-priority, 8th place in terms of high-priority enhancement area rankings. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, GDoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

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)

Phase 1 (High-level) Assessment: *(Must be completed by all states and territories.)*
Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will 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.

Resource Characterization

1. In the table below, characterize the existing status and trends of aquaculture facilities in the state's coastal zone based on the best-available data. Your state Sea Grant Program may have information to help with this assessment.[73]

Status and Trends of Aquaculture Facilities and Activities

Type of Facility/Activity	Number of Facilities[74]	Approximate Economic Value	Change Since Last Assessment (↑, ↓, –, unknown)
Concrete Ponds	14	-	-
Swedish ponds	6	-	-
Raceways	4	-	-
Indoor hatchery (larval and artemia hatching tanks)	1	-	-
Phytoplankton laboratory	1	-	-
Feed preparation and tool work room	1	-	-
Refrigerated feed storage container	1	-	-
Source: https://www.uog.edu/wptrc/guam-aquaculture-development-training-center.php#			

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.

[73] While focused on statewide aquaculture data rather than just within the coastal zone, the *Census of Aquaculture* (*agcensus.usda.gov/Publications/Census_of_Aquaculture/)* may help in developing your aquaculture assessment. The census is conducted every 10 years and the last report was released in 2018. The report provides a variety of state-specific aquaculture data to understand current status and recent trends.

[74] Be as specific as possible. For example, if you have specific information of the number of each type of facility or activity, note that. If you only have approximate figures, note "more than" or "approximately" before the number. If information is unknown, note that and use the narrative section below to provide a brief qualitative description based on the best information available.

Aquaculture Feasibility Study[75]: The Guam Aquaculture Feasibility Study provides an analysis of Guam's aquaculture industry potential, constraints and needs, recommended government actions and processes to improve the industry's development. Globally, aquaculture is the fastest growing food production sector in the world and has been declared as a national interest for the United States of America[76]. Guam's recent Comprehensive Economic Development Strategy has identified aquaculture as a high priority target for development as it would provide meaningful subsidies for farmers while reducing seafood imports into the island[77]. Currently, the island's aquaculture production supplies less than 5% of the total amount of the 5 million lbs. of imported fish and seafood products. Since 2002 - 2010, aquaculture seafood declined approximately 50% from roughly 500,000 lbs. to roughly 250,000 lbs., followed by a stagnation in production from 2010 -2018 (please see Figure 3, Guam Aquaculture Feasibility Report 2022). Fortunately, there has been progress in recent years in producing various commercial seafood on Guam. Since the UoG's private partnership with CoreSeed Aquaculture (Guam) Corp. to manage the GADTC, the facility continues to supply the island's 400 - 500 lbs. of monthly commercial shrimp, and it is on track to double the current rate. In terms of tilapia production, CoreSeed Aquaculture (Guam) Corp is working toward producing 1,000 lbs. of tilapia per month, with the total production on Guam from various fish farms estimated at 200,000 lbs. per year.

The feasibility report also considers suitable and feasible sites for farming processes and fish species that can be lucrative for Guam's future aquaculture industry, in addition to strategic plans for its development. A necessary requirement, however, of establishing an aquaculture industry will be to create an Aquaculture Innovation Center that includes a multispecies marine hatchery essential for supplying the commercial sector with seed and an aquaculture development park. The Aquaculture Innovation Center would also provide applied research to include assessing feasibility of local species for food and non-food production, evaluating commercial marine ornamentals, culture and reproduction of species for reef restoration, various aquaponics systems, and incubation of aquaculture businesses.

Western Pacific Tropical Research Center 2023 Impact Report[78]: The Western Pacific Tropical Research Center Impact Report represents an annual report highlighting important research the UoG is conducting to address agricultural and environmental concerns for the island. Research utilizing aquaculture to independently sustain Guam's citizens persists, and it is a favorable research area, particularly research in aquaponics design. Aquaponics is an approach that incorporates the idea of recirculating water and using organic waste from the fish to fertilize plants. This approach filters and reallocates fertilizing nutrients to plants for plant nourishment and returns the filtered water back to the farmed fish. Three types of aquaponics systems are currently being researched to ascertain their efficacy, efficiency and feasibility in providing an integrated, multi-beneficial process for agriculture and aquaculture. These systems under research include: (1) Coupled (one-pass) system in which water pumps from a fish tank to the filters, then to the plant trays, and finally pumps directly to the fish tank; (2) Decoupled system in which water from the fish culture is collected and is put through a decomposing process settling the fertilizing matter to the bottom of the water column, where it is then filtered and utilized as fertilizer; and (3) Microbiome system in which is similar to the coupled

[75] Guam Aquaculture Feasibility Study, prepared by Jim Wyban, March 15, 2022. Available at https://www.investguam.com/reports-special-projects/.

[76] FAO, 2020, The State of World Fisheries and Aquaculture 2020, 2020. Available at http://www.fao.org/3/a-i3720e/ i3720e01.pdf

[77] Guam Comprehensive Economic Development Strategy 2020-2025, prepared by Guam Economic Development Authority. Available at https://bsp.guam.gov/comprehensive-economic-development-strategies/

[78] Western Pacific Tropical Research Center 2023 Impact Report, prepared by University of Guam - College of Natural and Applied Sciences' Western Pacific Tropical Research Center, 2023. Available at https://www.uog.edu/_resources/files/wptrc/2023-wptrc-impact-report-web.pdf.

system with the addition of a bed of bamboo biochar as part of the filtration system. All three aquaponic systems are currently under research, and publication of findings will be rendered at the end of April 2025.

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.

Significant Changes in Aquaculture Management

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Aquaculture comprehensive siting plans or procedures	N	N	N
Other aquaculture statutes, regulations, policies, or case law interpreting these	Y	N	Y

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
    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.

a. In May 2021, Guam Public Law 36-24 was enacted to provide protection to local farmers through the creation of an official registry, which would ensure legitimate farmers are connected to businesses and companies seeking to purchase locally grown produce or aquaculture products. Guam Public Law 36-24 seeks to thwart any would-be pilfers and unrecognized farmers from selling and distributing agricultural and aquaculture products to local businesses[79].
b. There were no 309 or other CZM-driven changes.
c. Please see (a).

Enhancement Area Prioritization

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

High ____
Medium _X_
Low ____

[79] Public Law 36-24: An Act To Amend § 68101 of Chapter 68 and § 63801(b) of Article 8, Chapter 63, Both of Title 5, Guam Code Annotated, Relative to Requiring Farmers to be Certified as Bona Fide Farmers to Sell Locally Grown Produce or Aquaculture Products and to Suspend or Revoke Business Licenses From Companies Found In Violation; And Amending the Definition of Bonafide Farmer, prepared by 36th Government of Guam Legislature. Available at https://archives.guamlegislature.gov/36th_Guam_Legislature/Public_Laws_36th/Public%20Law%20No.%2036-24%20Bill%20No.%2063-36%20(LS)%20cer.pdf

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

The Guam DoAg - Division of Aquaculture was established through Guam Executive Order 2024-01[80] on April 4, 2024, in order to ensure seafood security and balancing development of the industry by incorporating measures to preserve the health and diversity of current ocean resources, given the growing advancements and practices within the industry worldwide and the ever-increasing global demand for seafood. Since the Guam DoAg - Division of Aquaculture's conception, the BSP-GCMP continues to work hand-in-hand with the division to discuss the creation of permit requirements for siting aquaculture facilities within Guam's Seashore Reserve. Analysis of stakeholder input indicate 40% of stakeholders agreed to consider the adoption of procedures in the siting of aquaculture facilities as a high-priority, tied for 4th in terms of high-priority enhancement area ranking. Stakeholder input was gathered from individuals from the Guam DLM, GPA, GPT, GDoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant.

[80] Guam Executive Order 2024-01, prepared by the Governor of Guam, April 2024. Available at https://governor.guam.gov/wp-content/uploads/2025/02/EO-2024-01-RELATIVE-TO-THE-CREATION-OF-THE-DIVISION-OF-AQUACULTURE-WITHIN-THE-DEPARTMENT-OF-AGRICULTURE.pdf

Phase II Assessment

Coastal Hazards

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.

1. Based on the characterization of coastal hazard risk, what are the three most significant coastal hazards[81] within your coastal zone? Also indicate the geographic scope of the hazard, i.e., is it prevalent throughout the coastal zone, or are there specific areas most at risk?

	Type of Hazard	Geographic Scope (throughout coastal zone or specific areas most threatened)
Hazard 1	Coastal Erosion	Throughout the coastal zone
Hazard 2	Flooding	Throughout the coastal zone
Hazard 3	Coastal Storms	Throughout the coastal zone

2. Briefly explain why these are currently the most significant coastal hazards within the coastal zone. Cite stakeholder input and/or existing reports or studies to support this assessment.

   Based on stakeholder input gathered during engagement meetings, the majority of all respondents have indicated that flooding, coastal erosion and coastal storms are the most significant and immediate coastal hazards to address. Flooding was addressed as the highest priority hazard; approximately 80% of stakeholder responses considered the specific hazard the highest priority to address. In fact, addressing stormwater issues was the most frequent response identified by stakeholders when asked what specific hazards should be addressed firstly. Stormwater flooding has been a concern brought to attention during independent events mentioned in the assessment of stormwater flooding previously during the Assembly of Planners and Guam Silver Jacket meetings.

3. Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat? If so, please list. Include additional lines if needed.

Emerging Issue	Information Needed
Stormwater flooding caused by phased residential development and parental subdivision law	Historical information and modeling within these types of properties
The influences of coastal hazards on coastal erosion.	Relationships between coastal hazards could also assist in evaluating the level of each potential threat as well as compounding impacts stemming from coastal erosion.

In-Depth Management Characterization

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

[81] See list of coastal hazards on pg. 27 of this assessment template.

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.

Significant Changes in Coastal Hazards Statutes, Regulations, and Policies

Management Category	**Employed by State or Territory** (Y or N)	**CMP Provides Assistance to Locals that Employ** (Y or N)	**Significant Change Since the Last Assessment** (Y or N)
Shorefront setbacks/no build areas	Y	Y	N
Rolling easements	N	N	N
Repair/rebuilding restrictions	N	N	N
Hard shoreline protection structure restrictions	Y	Y	N
Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)	Y	N	N
Repair/replacement of shore protection structure restrictions	N	N	N
Inlet management	N	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	N
Repetitive flood loss policies (e.g., relocation, buyouts)	N	N	N
Freeboard requirements	N	N	N
Real estate sales disclosure requirements	N	N	N
Restrictions on publicly funded infrastructure	N	N	N
Infrastructure protection (e.g., considering hazards in siting and design)	N	N	N
Other (please specify)			

Significant Changes to Coastal Hazard Management Planning Programs or Initiatives

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Change Since the Last Assessment (Y or N)
HMPs	Y	Y	Y
Sea level rise/Great Lake level change or adaptation plans	N	Y	N
Statewide requirement for local post-disaster recovery planning	N	Y	N
Sediment management plans	N	N	N
Beach nourishment plans	N	N	N
Special Area Management Plans (that address hazards issues)	Y	Y	N
Managed retreat plans	N	N	N
Other (please specify)			

Significant Changes to Coastal Hazard Research, Mapping, and Education Programs or Initiatives

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Change Since the Last Assessment (Y or N)
General hazards mapping or modeling	Y	Y	N
Sea level rise mapping or modeling	Y	Y	N
Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks)	Y	Y	Y
Hazards education and outreach	Y	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. If none, is there any information that you are lacking to assess the effectiveness of the state's management efforts?

The Guam HMP incorporates information stipulated in the 2022 State Mitigation Planning Policy Guide[82] and the Stafford Act[83]. The Stafford Act provides the legal framework outlining federal disaster relief protocols and eligibility for funding, while the State Mitigation Planning Policy Guide provides comprehensive guidelines to meet Guam's specific hazard risks. Information the guide seeks to

[82] 2022 State Mitigation Planning Policy Guide, prepared by United States Department of Homeland Security - Federal Emergency Management Agency, April 2022. Available at https://www.govinfo.gov/content/pkg/GOVPUB-HS5-PURL-gpo213865/pdf/GOVPUB-HS5-PURL-gpo213865.pdf

[83] Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, November 1988; amended the Disaster Relief Act of 1974, PL 93-288. Available at https://www.fema.gov/disaster/stafford-act

incorporate include identifying hazards faced, assessing vulnerabilities, and prioritizing effective and feasible mitigation strategies. Furthermore, the Guam HMP includes the reflected changes in development, progress in mitigation efforts, and changes in priorities as well as evaluates the state's hazard management policies, programs, capabilities, and funding sources to mitigate hazards that are identified in the plan. In addition, the Guam HMP incorporates the latest risk assessment and planning methodologies, ensuring mitigation efforts are grounded in current best practices and technologies. By aligning Guam's hazard mitigation planning with the strategic and financial support outlined in the Stafford Act and the detailed and actionable steps provided by the 2022 Policy Guide, the 2024 Guam HMP meets federal requirements establishing a robust framework for reducing disaster risks. This integrated approach ensures that mitigation efforts are comprehensive, well-coordinated, and effectively implemented, significantly enhancing Guam's resilience to natural disasters and minimizing potential impacts on its population and infrastructure.

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. *(Approximately 1-3 sentences per management priority.)*

   Management Priority 1: Policy regarding stormwater management system requirements

   Description: Based on stakeholder input, as well as feedback from partners through various means, the BSP-GCMP has chosen to focus its efforts this enhancement cycle on stormwater management, particularly on requirements within exempted property types on the island. As it was brought up during a 2024 Guam Silver Jackets meeting and at the 2020 Assembly of Planners Symposium, the cumulative impacts stemming from stormwater runoff-derived flooding is great, especially within subdivision-type areas where development is residentially-dense. Furthermore, there is no responsible regulatory agency to reinforce stormwater management plans after the permitting process is completed and construction begins, and thus, it will be paramount to address this gap.

2. Identify and briefly explain priority needs and information gaps the CMP has for addressing the management priorities identified above. The needs and gaps identified here should not be limited to those items that will be addressed through a Section 309 strategy but should include any items that will be part of a strategy.

Priority Needs	**Need?** (Y or N)	**Brief Explanation of Need/Gap**
Research	Y	Research of regulatory agencies and their authorities addressing stormwater management is needed to understand the current jurisdictions and processes involving pre- and post-permitting of stormwater management within piece-meal properties, parental subdivisions and all types of phased residential developments.
Mapping/GIS/modeling	N	
Data and information management	Y	Information management is needed to chronicle the progression of strategy implementation. This process will be pivotal in the potential rendering of policy or regulation to

Priority Needs	Need? (Y or N)	Brief Explanation of Need/Gap
		address stormwater management requirements within the areas of concern.
Training/Capacity building	Y	The development of a stormwater agency, or adding this function to an existing agency will require a phased approach. Additional capacity will be necessary to provide stormwater management positions as well as compliance, and design review training
Decision-support tools	Y	As there are no current methodologies for recording the frequency of flooding stemming from stormwater runoff, a decision support tool establishing the parameters for what constitutes this kind of flooding will be essential.
Communication and outreach	Y	Communication and outreach will be needed during the entire process of strategy implementation, as the resulting outcome includes input from municipal offices for understanding historical flooding within the areas of concerns as well as with regulatory agencies to understand the extent of their respective authorities.
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.

The BSP-GCMP recognizes that there are deficiencies and inefficiencies in regulatory processes for the prevention of stormwater flooding and implementation of stormwater management on the island. While the GEPA has regulatory authority on the transport of pollutants and sediments in stormwater, it does not have regulatory jurisdiction over flooding. The Guam DPW does have prevention and controls in regulating stormwater runoff through Guam's building permit process for projects that consist of road construction and new non-single-family residential development[84]. However, storm water regulation faces significant gaps as it relates to phased residential development, post construction non-compliance, and unpermitted renovation/reduction in property greenspace.

[84] 21 Guam Code Annotated Chapter 62 Subdivision Law, Guam Legislature, August 23, 2023. Available at https://www.guamcourts.gov/CompilerofLaws/GCA/21gca/21gc062.PDF

Strategy: Stormwater Management for Residential Development

Strategy: The BSP-GCMP will work to resolve issues related to stormwater management regulatory processes and policy. Issues that will be looked to be addressed are the establishment of the agency-lead who would enforce stormwater management during post-permit development in addition to establishing a degree of stormwater management requirements within phased residential development**.** Phased residential developments are residential homes being constructed in a manner that avoids stormwater compliance for subdivision development.

I. Issue Area(s)

A. The proposed strategy or implementation activities will *primarily* support the following high-priority enhancement area(s) *(check no more than two):*

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

B. The proposed strategy or implementation activities will also support the following enhancement areas *(check all that apply)*:

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

II. Strategy Description

A. The proposed strategy will lead to, or implement, the following types of program changes *(check all that apply):*

☐ A change to coastal zone boundaries;

✓ New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;

☐ New or revised local coastal programs and implementing ordinances;

☐ New or revised coastal land acquisition, management, and restoration programs;

☐ New or revised special area management plans (SAMP) or plans for areas of particular concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,

☐ New or revised guidelines, procedures, and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government, and other agencies that will result in meaningful improvements in coastal resource management.

B. ***Strategy Goal:*** The BSP-GCMP will improve upon current policy systems in relation to stormwater management within residential development, post construction non-compliance, and unpermitted renovation/reduction in property greenspace.

C. Description

Stormwater flooding within phased or piece-meal developed areas has been a perennial issue, and there has been a long-term concern of the cumulative negative impacts of flooding within residentially dense development areas, often which are excluded from stormwater management requirements. Thus, the the BSP-GCMP will be focused on collaborating with network agencies such as the USACE, Guam DLM, GEPA, Guam DPW and village municipal offices to understand the extent of stormwater flooding and to understand current stormwater management regulation within residential development, information which will be used to formulate potential stormwater management regulation within these areas in order to mitigate flooding impacts from stormwater runoff for surrounding communities.

The BSP-GCMP has recognized that stormwater runoff derived flooding should be examined to a broader extent to encompass general phased or piece-meal development as they can contribute to flooding within the aforementioned property types. As it is currently written within Guam's building code, stormwater management plans are required for non-residential development. However, there is no lead agency to ensure that these stormwater management plans are being implemented for residential structures after the occupancy permit is issued. Thus, the BSP-GCMP will also work with regulatory agencies to address the issue of post-construction compliance through adopted policies.

III. Needs and Gaps Addressed

The BSP-GCMP will seek to address the establishment of the lead regulatory agency to lead the enforcement of stormwater management. While there are local stipulations for developers to provide stormwater management during the permitting process, enforcement is absent during post-permit development. In addition, as there are no requirements for residential properties to establish any degree of stormwater management requirements, revisiting current regulatory policies for potential update will be conducted. As shared by regulatory agencies, the cumulative impacts of flooding from stormwater runoff within residential communities are negatively significant. Thus, an assessment of the impacts of flooding within these affected areas will be conducted to understand the hazard's effects. The analysis will also provide a general baseline of stormwater runoff flooding which will guide potential amendments to stormwater management policies. Furthermore, as the Application Review Committee serves the purpose of providing the Guam Land Use Commission/Guam Hybrid Land Use Commission/Territorial Seashore Protection Commission with technical and professional review, analysis, advice, and individual agency positions concerning various development activities, an assessment to understand the mandates and responsibilities of each member agency within the Committee will be conducted, so that future adopted policy changes are cohesive and in line with each members' mandates.[85]

IV. Benefits to Coastal Management

[85] Guam Administrative Rules and Regulations, Title 18 - Land Management, Chapter 3 - Territorial Planning Commission - Article 7 - Development Review Committee, §3702. Available at https://guamcourts.gov/CompilerofLaws/GAR/18GAR/18GAR001-3.pdf

The proposed strategy will provide safeguards against potential flooding from stormwater runoff for property owners, ultimately mitigating damages to property–and potentially human life. Furthermore, the proposed strategy will push forward one of BSP-GCMP's goals, to create a responsible and balanced use of Guam's coastal resources through improving management and policy systems.

V. Likelihood of Success

As the BSP-GCMP is a networking agency, it has robust communication with local agencies in advancing initiatives and regulations that improve management and policy systems. In doing so, the BSP-GCMP exercises BSP's authority to develop and recommend territorial policies to foster and promote the improvement of planning activity and development quality[86]. Given the statutory responsibility of BSP and GCMP's goal, the strategy addressing these regulatory issues regarding stormwater management is relevant and needed to reduce the threats to property and life. Therefore, the BSP-GCMP will be focused on collaborating with network agencies such as the Guam DLM, GEPA, the Guam DPW, legislative staff and village municipal offices to understand the extent of stormwater flooding within residentially developed areas, which will be used to formulate potential stormwater management development policies to mitigate flooding impacts from stormwater runoff for communities.

VI. Strategy Work Plan

Strategy Goal: The BSP-GCMP will work to resolve issues related to stormwater management regulatory processes and policy. Potential solutions that will be looked into are the establishment of the agency-lead who would enforce stormwater management during post-permit development, in addition to establishing a degree of stormwater management requirements within phased residential development. Phased residential developments are residential homes being constructed in a manner that avoids stormwater compliance for subdivision development.

Total Years: 5 years
Total Budget: $375,000

Year(s): 1
Description of activities: The Enhancement Area Planner will hold monthly meetings with municipal mayors and community members with the goal of understanding the extent of stormwater flooding within residentially dense development areas. These observations will be used to document and enforce the need of addressing regulatory gaps in stormwater management requirements for residential development. The Enhancement Area Planner will coordinate with village mayors and citizens for meetings and site visits to document the impact extent of stormwater flooding within residential areas. Activities that will be carried out by the Enhancement Area Planner will include developing the process agenda, coordinating logistics and facilitation of municipality meetings and site visits etc. Information gathered from site visits will be used to put together an assessment of the impacts from stormwater flooding, and GIS mapping will be utilized to capture location information and a description of flooding extent to be reported to stakeholders for the formulation of a stormwater management working group in year 3-4. There are no foreseeable major travel, equipment, supply or contract expenses to complete this period's task.

[86] 5 Guam Code Annotated Government Operations Chapter 1: Office of the Governor § 1209 Powers of the Bureau, September 12, 2022. Available at https://www.guamcourts.gov/CompilerofLaws/GCA/05gca/5gc001.PDF

Major Milestone(s): Municipal site visit reports supported by village mayors documenting stormwater flooding impacts and extent to village communities and GIS layer documenting information of flooding extent within residential communities will be completed by the Enhancement Area Planner by October 2026.

Budget: $75,000

Year(s): 2
Description of activities: To understand the current stormwater management regulatory layout, the Enhancement Area Planner will catalogue regulatory gaps related to flooding from stormwater runoff within the areas of concern, in addition to analyzing and understanding the internal policies of each of the individual Application Review Committee members as it relates to stormwater management. This task will be done for two overarching reasons: one, to characterize regulatory gaps within current statute and mandates; and two, to use the information gleaned for crafting cohesive and collaborative management policy the Application Review Committee members can agree on for residential developments. The Enhancement Area Planner will conduct research to create a stormwater management regulation/policy matrix, and will utilize assistance from the Application Review Committee to collect regulatory mandates and policies related to stormwater management requirements for residential development. There are no foreseeable major travel, equipment, supply or contract expenses to complete this year's task.

Major Milestone(s): Creation of a current stormwater management regulation matrix as well as internal policy matrix for each application review committee member. Both matrices will be completed by October 2027.

Budget: $75,000

Year(s): 3 - 4
Description of activities: At the outset, the Enhancement Area Planner will present findings regarding the impacts of stormwater flooding within residentially dense areas as well as stormwater management regulatory gaps to regulatory agencies, and municipal and legislative staff, findings of which were gleaned during the previous two years' tasks in order to gain buy-in for the creation of a stormwater management working group. The Enhancement Area Planner will hold quarterly sessions with GEPA, DLM, DPW, municipal offices and legislative policy staff/Guam Senators to discuss the progressive and collective work done to develop necessary policies to address the aforementioned issues. The Enhancement Area Planner will also work with regulatory agencies and legislative staff to understand capacity needs and challenges in effectively administering a flood compliance program. Activities the Enhancement Area Planner will carry out during this period include developing the process agendas, coordinating logistics, facilitation and chronicling of the regulatory working group meetings. There are no foreseeable major travel, equipment, supply or contract expenses to complete this period's task.

Major Milestone(s): Formulation of stormwater management working group and drafted stormwater management policies for residential development and post construction compliance.

Budget: $150,000

Year(s): 5
Description of activities: Developed policies from the previous two years with the working group will go through the legislative adoption process. Based on the recommendations that are given during this period,

the BSP-GCMP will continue to work with the committee to make the necessary changes in order to realize the adoption of policy. Activities the Enhancement Area Planner will be carrying out during this period include providing support in coordinating and facilitating meetings for the adoption process, and to provide other types of support to see through this task. There is no foreseeable major travel, equipment, supply or contract expenses to complete this year's task.

Major Milestone(s): Meeting reports for legislative approval process for residential development policies and post construction compliance action plan.

Budget: $75,000

VII. Fiscal and Technical Needs

A. Fiscal Needs: The BSP-GCMP does not see any major fiscal needs to support the accomplishment of this strategy.

B. Technical Needs: There are no technical needs that the state does not possess that have been foreseen to see through the completion of the strategy.

VIII. Projects of Special Merit (Optional)

5-Year Budget Summary by Strategy

Strategy Title	Anticipated Funding Source (309 or Other)	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
Stormwater Management Policy Improvement	Section 309	$75,000	$75,000	$75,000	$75,000	$75,000	$375,000
Total Funding							$375,000

Summary of Stakeholder and Public Comment

The BSP-GCMP has engaged stakeholders via multiple means. These include email correspondences and virtual meetings with enhancement area focus groups, since November 2024, to gather information related to any changes within each enhancement area since the last enhancement cycle. The BSP-GCMP has also conducted two stakeholder engagement meetings in March 2025 to provide the internal rankings of the enhancement areas and assessment of the high-priority enhancement area: coastal hazards. Stakeholder engagements concluded with the BSP-GCMP providing surveys to gather stakeholder responses to the following: based on the information provided regarding the BSP-GCMP's ranking of coastal hazards as a high-priority, what are the most significant coastal hazards that should be addressed; are there any emerging issues of concern for any coastal hazards that were chosen earlier; what information is needed to evaluate the level of the potential threat; rank each enhancement area objective either low-priority, medium-priority, or high-priority; and briefly explain why it merits this level of priority–what are issues or gaps that need to be fulfilled to address the priority enhancement areas.

After both stakeholder engagements, the BSP-GCMP met with NOAA-OCM to go over stakeholder input and BSP-GCMP's internal review and justified the program's ranking of the enhancement areas. Survey results showed that the top three enhancement areas that should be focused on were wetlands, marine debris and coastal hazards. Survey analysis shared that the main issue regarding wetlands was development within these areas which impede its natural functions, e.g., its function in acting as natural ponding basins to control stormwater runoff. As mentioned earlier in the assessment phase for wetlands, currently, the Guam Land Use Commission has official procedures and standards for development within designated wetlands and related areas of particular concern as well as standards for development and conservation within these areas. These procedures and standards can be found in Title 18 GAR Chapter 3 Article 5 of Guam Law. While Guam Law permits the development within wetlands, procedures for doing so must abide by these adopted standards provided within the law. As there has been no official adopted policy which recommends the amendment of such procedures and standards, and while there have been no major community concerns brought to the local government's attention within the enhancement cycle assessment period, the BSP-GCMP remains with the position to consider the enhancement area as a medium-priority.

In addressing marine debris, the BSP-GCMP recognizes the policies adopted within this enhancement cycle that speak to addressing marine debris both derived from inland waste and debris within the surrounding waters of the island, e.g., abandoned derelict vessels. These policies include the Guam Zero Waste Act and Guam Executive Order 2020-42. Based on these policies, the BSP-GCMP concluded that this enhancement area still remains a low-priority for further assessment.

In regards to coastal hazards, stakeholders overwhelmingly agreed that the most significant coastal hazards that should be addressed were coastal erosion and flooding (stormwater runoff, coastal and riverine) -- 80% of respondents shared this concern–with coastal storms coming in third. An emerging issue related to coastal erosion were its impacts on abutting power infrastructure. A study on what were the influences contributing to coastal erosion was also proposed. In regards to flooding, stormwater mitigation and design was a point of concern to address. This sentiment was also shared in a 2024 Guam Silver Jackets meeting regarding flood policy concerns within residential areas. This issue was subsequently brought to light within silver jackets meetings after the 2020 Assembly of Planners in which a panel discussed issues regarding stormwater management in piece-meal properties and parental subdivisions.

Stakeholder input gathered during this enhancement cycle included input from the Guam DLM, GPA, GPT, Guam DoAg, BSP, CLTC, GHS/OCD, NOAA Fisheries, GEPA and UoG - Sea Grant. From May 19, 2025 to June 20, 2025, public comment was solicited via the BSP's public website during the draft Assessment and Strategy approval process with NOAA-OCM. No public comments and further stakeholder input were received.